



BS 5258 : Part 5 : 1975

UDC 662.76:683.945:697.245:614.8

Specification for
**Safety of domestic
gas appliances**

Part 5. Gas fires

British Standards Institution

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ISBN: 0 580 08627 5

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The following BSI references relate to the work on this standard:
Committee reference GSE/17 Draft for comment 73/40743

Co-operating organizations

The Gas Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

*British Gas Corporation
Department of Energy
Department of the Environment
Heating and Ventilating Contractors' Association
*Institution of Gas Engineers
*Institution of Heating and Ventilating Engineers

*Liquefied Petroleum Gas Industry Technical Association
National Association of Plumbing, Heating and
Mechanical Services Contractors
*Society of British Gas Industries
Water-tube Boilermakers' Association

The scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard.

Boiler and Radiator Manufacturers' Association
British Non-Ferrous Metals Federation
Chief and Assistant Chief Fire Officers' Association
Consumer Standards Advisory Committee

Council of Scientific Management in the Home
Institution of Fire Engineers
National Brassfoundry Association
Royal Society for the Prevention of Accidents

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Specification for Safety of domestic gas appliances

Part 5. Gas fires

Règles de sécurité des appareils domestiques utilisant
des combustibles gazeux

Partie 5. Appareils de chauffage indépendants à rayonnement

Sicherheitsbestimmungen für häusliche Gasverbrauchseinrichtungen

Teil 5. Gaseinzelheizöfen

Amendments issued since publication

Amd. No.	Date of issue	Text affected

British Standards Institution · 2 Park Street · London W1A 2BS

Telephone 01-629 9000

Telex 266933

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Foreword

BS 5258 has been prepared, under the authority of the Gas Industry Standards Committee, to meet the need for a standard specifying the safety requirements and associated methods of test for domestic gas appliances burning 1st, 2nd and 3rd family gases.

BS 1250 'Domestic appliances burning town gas' has specified safety and performance requirements for a range of domestic appliances burning 1st family gas while BS 2491 'Domestic cooking appliances for use with liquefied petroleum gases', BS 2773 'Domestic single-room space heating appliances for use with liquefied petroleum gases' and BS 2883 'Domestic instantaneous and storage water heaters for use with liquefied petroleum gases' have similarly covered a limited range of appliances burning 3rd family gas. The increased distribution of 2nd family gas and the development of a new generation of appliances, often designed to burn more than one family of gas, have necessitated the publication of new British Standards which relate to appliances burning 1st, 2nd and 3rd family gases and in which the requirements and methods of test for the three gas families have been, where technically appropriate, harmonized. BS 5258 specifies safety requirements and associated methods of test and therefore supersedes, in part, BS 1250, 2491, 2773 and 2883. Other, non-safety aspects of appliances will be the subject of another British Standard now in course of preparation.

BS 5258 is being prepared in a number of Parts, each of which will apply to one particular type of appliance. In each Part, the sequence of the clauses and their subject matter are being arranged so that, as far as possible, a particular main clause number refers to the same aspect of the specification in all Parts.

Parts in course of preparation are:

- Part 1 Central heating boilers and circulators
- Part 2 Cooking appliances
- Part 3 Drying cabinets
- Part 4 Fanned-circulation ducted-air heaters
- Part 5 Gas fires
- Part 6 Refrigerators and food freezers.

Some of the provisions of this standard are set deliberately high to make allowance for manufacturing tolerances and variations in the supply of fuel gases. Some of the tests are destructive and it follows that it is not practicable to check each appliance made against all the provisions of the standard. However, the intention of the standard is that if all its requirements are met when applied to a sample representing the average of production, this will ensure

that all appliances claimed to be designed to it are safe in normal use when installed and maintained in accordance with the relevant British Standard codes of practice and with the manufacturer's instructions, and

that such servicing as may be necessary to maintain the appliance in a safe condition can be carried out by a competent fitter without difficulty.

For this Part the relevant codes of practice are CP 332 'Selection and installation of town gas space heating', Part 1 'Independent domestic appliances', CP 338 'Domestic propane-gas-burning installations in permanent dwellings' and CP 339 'Domestic butane-gas-burning installations.'

Further, attention is drawn to the requirements of the Gas Safety Regulations, of the Building Regulations and of the Model Water Bye Laws issued by the Department of the Environment and of the Building Standards (Scotland) (Consolidation) Regulations issued by the Scottish Development Department.

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

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Part 5. Gas fires

0. Introduction

Towards the end of 1971 the UK was invited to participate in the work of the EEC Liaison Committee dealing with independent space heating appliances. This committee had already reached an advanced stage in drafting a document covering independent space heaters of the type most common on the Continent, i.e. the closed convector heater, and consequently there were certain safety aspects of the typical British gas fire that were not covered. In order to avoid extensive redrafting, the Liaison Committee decided that such appliances should be covered by a separate specification which is now in the course of preparation. Since the negotiating procedure necessary for this specification to achieve the status of a European Standard will take some time, the responsible Gas Industry Technical Committee agreed that a British Standard should be published to meet the need for an up-to-date specification for gas fires during the intervening period. This Part of BS 5258 has therefore been prepared by revising those clauses of BS 1250: Parts 1 and 4 and BS 2773 that relate to safety and adding requirements appropriate to appliances burning 2nd family gas. While the requirements and methods of test follow existing UK practice, they are in no way intended to prejudice the future negotiation of a European Standard.

The constructional requirements for gas taps, specified in clause 19, to ensure continued safe operation of these components, are based on those in BS 1250. It is, however, recognized that with modern materials and methods of manufacture it is possible to obtain the desired level of performance by other designs and, in particular, without strict adherence to the dimensional criteria specified in 19.4. The Gas Industry Standards Committee has therefore agreed that the technical committee responsible for gas cocks should prepare a separate standard for appliance gas taps, which will eventually supersede these requirements.

Section one. General

1. Scope

This Part of BS 5258 specifies safety requirements and associated methods of test for gas fires designed for discharging combustion products via an open flue to the outside air. Catalytic heaters are not included.

In specifying requirements for appliances burning

2nd family gases it is assumed that a meter governor will be fitted, and for appliances burning 3rd family gases it is assumed that the gas supply from the container will be governed by a pressure regulator complying with the requirements of BS 3016.

Requirements for controls, given herein, relate to controls fitted as part of, or supplied with, particular appliances; they do not necessarily provide a complete specification for controls intended for general use.

This standard does not take into account the special hazards which exist in nurseries and other places where there are young children or aged or infirm persons without supervision; in such cases additional requirements may be necessary.

2. References

The titles of the British Standards and of the International Standard referred to in this standard are listed on the inside back cover.

3. Definitions

For the purposes of this Part of this British Standard the following definitions, together with those in BS 1179 and in the relevant British Standard codes of practice, apply.

3.1 adjustment pressure. The pressure, measured at the test point, that is required to obtain the rated heat input using the reference test gas.

3.2 closed fronted fire. A gas fire in which the glowing area is substantially covered by means of a transparent or translucent screen while air for combustion is drawn from the room.

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

3.4 hot condition. A condition of the appliance required for some tests and obtained by heating to thermal equilibrium at the adjustment pressure, any thermostat remaining fully open.

3.5 manufacturer's recommended setting pressure. The pressure, measured at the test point, that is specified by the manufacturer for the purpose of adjusting the appliance heat input.

3.6 rated heat input. The manufacturer's declared heat input for the appropriate reference test gas.

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4. Classification of appliances

4.1 By category. BS 4947 describes the category system of appliance classification, by which an appliance is denoted by a category number, I, II or III, according to the number of gas families that it is designed to burn, and the families are identified by subscripts, T, N and L, for the 1st, 2nd and 3rd gas families respectively.

For the purposes of this Part there are no restrictions on the categories of appliances that are permitted, but within a given category the changes that are allowed in adapting an appliance from operation on one gas or gas family to operation on another are limited as follows.

- (a) Change of gas family.
 - (1) Adjustment of governor setting or exchange of governor springs or immobilization of the governor (when fitted).
 - (2) Exchange of injectors or non-aerated burner assemblies.
 - (3) Adjustment of aeration.
 - (4) Exchange or adjustment of auxiliary components (e.g. pilots, igniters, restrictors, etc.).
- (b) Change of gas group within 1st family.
 - (1) Adjustment of governor setting.
 - (2) Exchange of injectors or restrictors or non-aerated burner assemblies.
 - (3) Adjustment of aeration.
- (c) Change of gases within 3rd family.
 - (1) Adjustment of aeration.

4.2 By flue type. For the purposes of this standard, appliances are also classified into the following types according to the flue system for which they are designed and the source of the combustion air:

- type A : flueless appliances
- type B : open flued appliances
- type C : room-sealed appliances
- type C₁ : balanced flue appliances
- type C₂ : Se-duct appliances.

Relevant definitions for these types of appliance are given in BS 1179.

This Part covers type B appliances only.

5. General requirements

The appliance shall comply with the requirements of this standard when tested using the specified test gases of the appropriate gas family. Full details of the test gases are given in BS 4947.

Any 1st family gas appliance tested and found satisfactory according to this standard will be suitable for use on gases in groups G4 and G5.

Appliances for use on 3rd family gases may be designed for use with either commercial butane or commercial propane or both.

Notwithstanding the requirements specified in this standard, any new designs, materials and methods of assembly giving at least equivalent results are acceptable.

Any new features incorporated in an appliance for which no provision for testing is made in this standard shall be examined in the light of the manufacturer's claims and instructions. The claims shall be checked against the instructions and shall be valid.

6. General conditions of test

6.1 Test room. The room shall be adequately ventilated but free from draughts likely to affect the performance of the appliance. If the test results are influenced by the temperature of the ambient air, the room temperature shall be maintained at $20 \pm 5^\circ\text{C}$.

6.2 Preparation of appliance. The appliance shall be installed and adjusted in accordance with the manufacturer's instructions, using the appropriate reference test gas at the following inlet pressure.

Family	Test gas	Inlet pressure
		mbar*
1st	TGA	17.5
2nd	NGA	20
3rd	LPGA	28
	LPGC	37

* 1 mbar = 0.1 kPa = 10^2 N/m^2 .

Before any tests are made the appliance shall be operated at its full working temperature for a period sufficient to dry the insulation and remove any temporary finish which might interfere with observations.

6.3 Test procedure For normal test purposes, hose tests for which no particular flue suction is specified may be carried out with a standard test box (see figure 1). To remove the products of combustion this may be fitted with a 125 mm nominal diameter round flue pipe to a height of 3 m measured from the base of the test box, or other suitable means for providing the necessary suction.

The gas connections and system up to and including the burner shall be examined for soundness both before and after test. The test results are deemed invalid unless the system is sound (see 8.1).

The appliance shall be at room temperature at the start of each test unless otherwise stated.

During testing, the initial adjustment of the appliance shall not be altered unless specifically required by the test method.

Precautions shall be taken to prevent thermostats or other variable controls from acting to interfere with the gas flow, except as necessitated by the test.

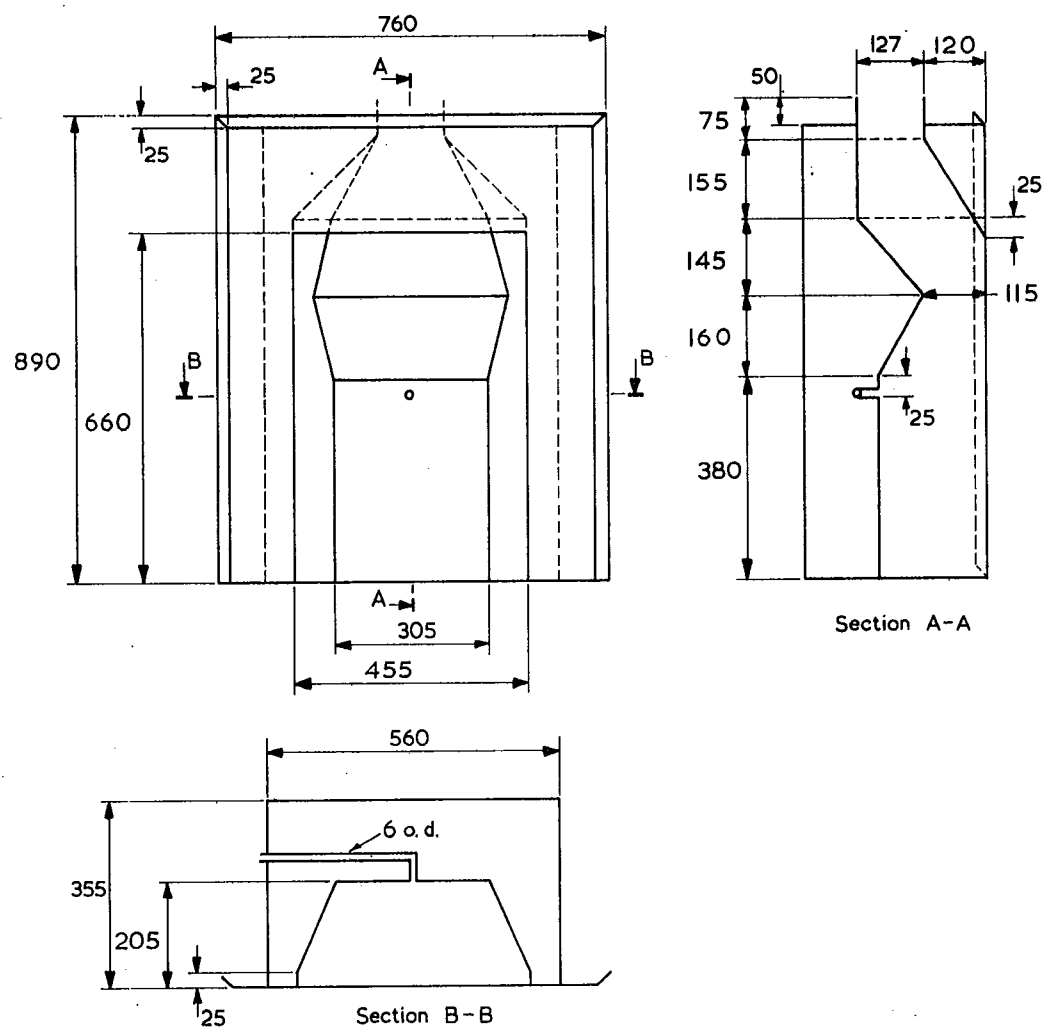
Test pressures shall be measured correct to 0.2 mbar and controlled so that the variation does not exceed $\pm 0.2 \text{ mbar}$.

In general, except for tests involving governor performance, the appliance governor, if any, may be put out of operation and the specified test pressure obtained by adjustment of the gas pressure at the inlet to the appliance.

BS 4947 gives guidance on the measurement of heat input rate.

Tables giving details of the test gases (and, where appropriate, their conditions of application) to be used for each of the gas families are inserted in relevant clauses. For 3rd family gas appliances, test gases LPGA and LPGB are used with the appliance adjusted for butane and test gases LPGC and LPGE with the appliance adjusted for propane.

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All dimensions in millimetres.

Figure 1. Standard test box

7. General design and construction

7.1 Materials, fittings and finishes. Materials, fittings and finishes, the failure of which may affect the safe operation of the appliance, shall comply with the requirements of the relevant British Standards, and shall be appropriate to the conditions arising in the part of the appliance in which they are used. The appliance shall be free from swarf, grit or other foreign matter.

7.2 Removal and reassembly of parts by user. Parts that are intended to be removable by the user, e.g. for cleaning, shall be readily accessible, shall not require the use of tools for their removal, shall be easy to assemble correctly and difficult to assemble incorrectly.

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

7.3 Materials in contact with gas

7.3.1 Copper tubing Copper tubing shall not be used where it would be exposed to temperatures above 100 °C.

7.3.2 Non-metallic materials: 3rd family gases.

Diaphragms shall comply with 3.3(1) and 3.3(6) of BS 3016 : 1972.

Valve pads shall comply with 3.4(1), 3.4(4) and 3.4(5) of BS 3016 : 1972.

All non-metallic materials shall show no marked deterioration when subjected to an accelerated ageing test for 7 days at a temperature 20 °C in excess of the manufacturer's maximum recommended temperature.

NOTE. The requirements of the above three paragraphs may not be met by materials made of some silicone rubbers although these rubbers are claimed to be satisfactory. Criteria for testing silicone rubber materials are still under consideration and, in the meantime, components and appliances containing such a material will be considered acceptable provided that the appropriate manufacturer can demonstrate that it has proved satisfactory in use.

Jointing compounds shall comply with the relevant requirements of BS 5292.

7.4 Aeration adjusters. Any aeration adjuster shall not be liable to inadvertent movement, shall not be capable of closing the air inlet completely and shall not be capable of being set in such a manner as to cause gas to spill from the burner venturi throat.

7.5 Insulation. Thermal or acoustic insulation shall be non-combustible (see BS 476: Part 4), shall be securely located and shall be protected against mechanical damage and condensate.

7.6 Stability

7.6.1 Requirement. A gas fire that is not, according to the manufacturer's instructions, to be fixed to a wall shall not fall forwards when subjected to the test described in 7.6.2.

7.6.2 Method

(a) Stand the appliance (without any connection being made to the gas supply or the flue spigot) on a horizontal plane provided with a stop to prevent the front supports of the fire from moving forward and level it in accordance with the manufacturer's instructions. Apply a horizontal force of 6 N to the top of the case in the forward direction.

(b) With the appliance standing level on the plane as described in (a) and with no horizontal force applied, slowly tilt the plane in the forward direction until it is inclined at an angle of 5° to the horizontal.

7.6 Stability. When the appliance is installed as described in the manufacturer's instructions, it shall be stable.

7.7 Refractories. The bricks, radiants and burner shall be so located with respect to each other that, at the limit of movement allowed, the performance of the appliance shall be satisfactory.

7.8 Guards. Any appliance shall be provided with a guard in accordance with current Regulations and complying with the requirements of BS 1945.

8. Soundness

8.1 Gas soundness

8.1.1 General. All gas-carrying parts of the appliance shall be sound and, when connected, shall form a complete assembly which is sound. The basic test shall be carried out on the complete assembly but additional and more stringent tests may be required by other standards for certain components to ensure an adequate margin of safety.

8.1.2 Complete assembly. The fully assembled appliance shall be sound at the internal pressure given in the following table.

Family	Air pressure
	mbar
1st	30
2nd	40
3rd	150

Appliances for use on more than one gas family shall be tested at the highest appropriate pressure.

This requirement shall be deemed to be met if the leakage rate (see note) does not exceed 85 cm³/h over a period of 1 min.

NOTE One convenient method of measuring the leakage rate is by the bubble leak indicator illustrated in figure 2. A rate of 6 bubbles per minute should be equivalent to 85 cm³/h but this should be checked before the indicator is used.

8.1.2.1 Method. Connect to the appliance inlet an air supply maintained constant at the appropriate pressure and embodying a suitable meter for measuring air flow. Carry out tests under the following conditions:

- (a) with all gas taps in the OFF position;
- (b) with all gas taps turned to the ON position, any flame failure device being maintained by suitable means in the open position and all injectors and pilots capped off.

Care shall be taken to ensure that any means (e.g. thermal or mechanical) used to maintain the flame failure device in the open position is compatible with the normal operation of the device.

9. Heat input

9.1 Definition and conditions of measurement. For the purposes of this clause, the heat input is that which would be obtained with a reference gas of the following Wobbe number. The heat input shall be measured with the appliance at thermal equilibrium and fitted in the standard test box. (See BS 4947 for guidance on the measurement of heat input.)

Family	Test gas	Wobbe number
		MJ/m ³
1st	TGA(4) TGA(5)	27.6 25.2
2nd	NGA	50.8
3rd	LPGA LPGC	85.5 77.0

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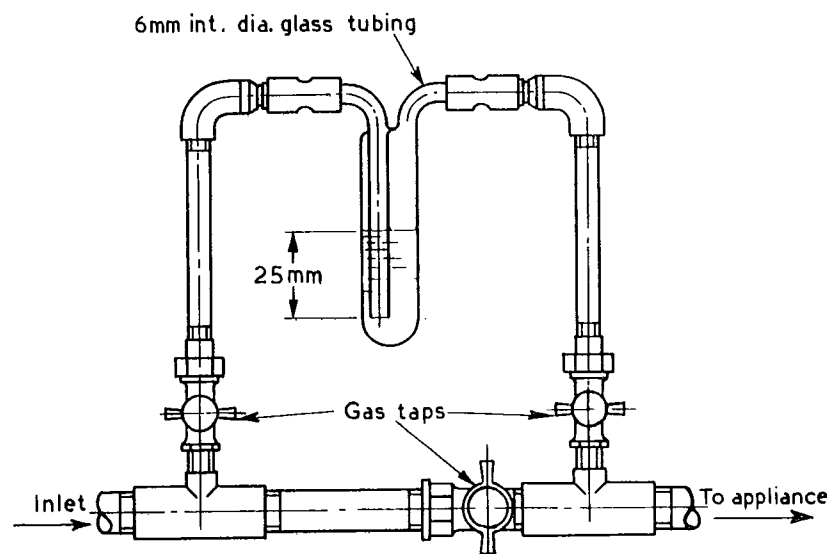


Figure 2. Bubble leak indicator

9.2 Tolerance. The heat input shall be within $\pm 5\%$ of the rated heat input when the appliance is adjusted to the manufacturer's recommended setting pressure with the following pressure applied to the inlet of the appliance.

Family	Test gas	Inlet pressure
1st	TGA	mbar 17.5
2nd	NGA	20
3rd	LPGA LPGC	28 37

9.3 Adjustment. If any means of adjustment to the heat input of the appliance is provided, it shall be designed to discourage unauthorized interference with the adjusting mechanism and shall not be liable to inadvertent movement.

NOTE. Suitable means of sealing the adjusting mechanism include locknuts, locking wire with seal, a cover screw with a screwdriver slot or any means that requires the use of tools to gain access to the adjusting mechanism.

10. Combustion

10.1 All appliances. With the appliance fitted in a standard test box (see figure 1) and tested in the fully heated condition at a flue suction of 38 pbar in accordance with the method described in 10.1.2, the CO/CO₂ (see note) ratio shall not exceed 0.02.

NOTE. For the purposes of this Part of this standard, the carbon dioxide and carbon monoxide contents of the products of combustion should be determined with respective accuracies of 0.05 % and 0.001 % of the volume of the sample. The concentration of the two gases can be determined conveniently with adequate accuracy by a variety of methods (see BS 1756) and the ratio is not appreciably affected by dilution of the products of combustion during sampling.

Family	Test gas	Conditions
1st	TGA	Minimum operational rate to 120 % of rated heat input
	TGB	Adjustment pressure
2nd	NGA	Minimum operational rate to 120 % of rated heat input
	NGB	Adjustment pressure
3rd	LPGA	Minimum operational rate to 112 % of rated heat input
	LPGC	Minimum operational rate to 110 % of rated heat input

10.1.1 Minimum operational rate. For the purposes of the requirement of 10.1 and of clause 13 the minimum operational rate is defined as follows.

- For any burner or section of a burner which is controlled by a thermostat, the minimum operational rate is the by-pass rate.
- For any burner which is manually controlled and which is subdivided into sections under control of a tap (e.g. duplex burners), the minimum operational rate applied to any section is 30 % of the normal rate of that section.
- For any burner which is manually controlled but which is not subdivided into sections (i.e. simplex burners), the minimum operational rate is 20 % of the normal rate.

Notwithstanding the above, for any burner which is manually controlled but where it is only possible to obtain certain pre-determined fixed settings, the minimum operational rate is the lowest rate obtainable in normal use.

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10.1.2 Method. Fit the appliance to the test box in accordance with the manufacturer's instructions. When the appliance has reached the hot condition at a flue suction of 38 pbar, make tests at a sufficient number of heat inputs to determine the combustion performance over the whole of the prescribed range. If this is done by plotting a curve of CO/CO_2 against heat input, no extrapolation shall be made. Collect the products of combustion, taking precautions to ensure that the sample drawn is mixed and representative.

10.2 Closed fronted fires. A closed fronted fire shall not give rise to a CO/CO_2 ratio exceeding 0.02 when tested in the hot condition in accordance with the following test conditions and method. (See also 12.4 and 13.5.)

Family	Test gas	Conditions
1st	TGA	Adjustment pressure
2nd	NGA	
3rd	LPGA LPGC	

10.2.1 Method. Fit the appliance in a test box (see figure 1) and, when the hot condition is reached, measure the CO/CO_2 ratio over the range of flue draught conditions from up-draught of $170 \text{ m}^3/\text{h}$ to down-draught of $170 \text{ m}^3/\text{h}$ including the zero flow condition.

10.3 Open fronted fires. An open fronted fire shall not give rise to a CO/CO_2 ratio exceeding 0.02 when tested in the hot condition in accordance with the following conditions and method.

Family	Test gas	Conditions
1st	TGA	Adjustment pressure
2nd	NGA	
3rd	LPGA LPGC	

10.3.1 Method. Fit the appliance in the standard test box (see figure 1) with the flue spigot sealed off. When the hot condition is reached, sample the flue gases from the canopy of the fire.

11. Ignition

11.1 General. Ignition of the pilot (or main burner if there is no pilot) shall be from an easily accessible position and may be obtained either with a match or by means of an ignition device incorporated in the appliance.

In the event of failure of the ignition device it shall be possible to light the appliance with a match.

It shall be possible to determine readily that the pilot (or main burner if there is no pilot) is alight.

Any specific instructions that are necessary in respect of the operation of the tap shall be stated by the manufacturer.

11.2 Ignition performance

11.2.1 Ignition from cold. When the appliance is operated in accordance with the manufacturer's instructions, ignition shall be satisfactory, i.e. ignition is smooth and flames carry across to all ports or jets and do not light back. Test gases and pressure shall be as follows.

Family	Test gas	Conditions
1st	TGA, TGB, TGC, TGD	Adjustment pressure
2nd	NGA, NGB, NGC, NGD	
3rd	LPGA, LPGB LPGC, LPGE	

11.2.2 Re-ignition. Ignition shall be satisfactory (see 11.2.1) when tested in accordance with the method in 11.2.1, with the appliance operated under the following condition. Ignition shall also take place at any thermostat setting down to that which will give the bypass rate.

Family	Test gas	Conditions
1st	TGA, TGB TGC, TGD	Adjustment pressure
2nd	NGA, NGB, NGC, NGD	
3rd	LPGA, LPGB, LPGC, LPGE	

11.2.2.1 Method. Heat the appliance to the hot condition, turn off the gas and then re-ignite in accordance with the manufacturer's instructions. If any delay period between turning off and turning on again is specified in the manufacturer's instructions this shall not exceed 2 min.

11.2.3 Conditions of pilot shortening. On an appliance which incorporates a permanent pilot, ignition in the cold condition shall take place and shall not be violent when the pilot is reduced to two thirds of its normal rate. In addition, on closed fronted fires, the ignition shall be such that the appliance is not damaged when the pilot is reduced to the point at which it will just remain alight when the main burner is turned on.

The arrangement of any flame failure device shall be such that, in the event of pilot flame shortening, the valve in the device shall close the supply of gas to the main burner before ignition becomes violent. The test gas and pressure are as follows.

Family	Test gas	Conditions
1st	TGA	Adjustment pressure
2nd	NGA	
3rd	LPGA LPGC	

11.2.3.1 Method. Carry out these tests by reducing the pilot rate using the tap or adjuster or, if no adjuster is fitted, by interrupting the pilot supply so that adjustment can be made.

11.2.4 Closed fronted fires. If ignition is delayed, either from cold or on re-ignition, there shall be no hazard to the user.

11.2.5 Operation at reduced inlet pressure

11.2.5.1 1st and 2nd family gases. The appliance shall be capable of continuing to operate safely when the inlet pressure is reduced to the value given below. In particular, ignition and cross-lighting shall occur without violence. In the case of burner devices which are not turned on by automatic means (e.g. a time control or snap action thermostat) it is permissible for the ignition to be achieved by means of a match.

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Family	Test gas	Inlet pressure
1st	TGA	mbar
2nd	NGA	3.7
		12.5

For appliances fitted with a flame failure device, if the inlet pressure is progressively reduced below the value given above, the gas supply to the main burner shall be shut off before ignition of the main burner becomes violent.

11.2.5.2 Method. With the appliance adjusted in accordance with the manufacturer's instructions at the following inlet pressure, reduce the gas pressure at the appliance inlet by means of an externally fitted adjustable governor.

Family	Inlet pressure
	mbar
1st	17.5
2nd	20

11.3 Cross-lighting

11.3.1 Cold condition. The cross-lighting of an appliance having burners subdivided into sections (e.g. duplex burners) shall be smooth when the appliance is operated under the following conditions.

Family	Test gas	Conditions
1st	TGA, TGB, TGC, TGD	Adjustment pressure
2nd	NGA, NGB, NGC, NGD	
3rd	LPGA, LPGB, LPGC, LPGE	

11.3.1.1 Method

- Light the appliance in accordance with the manufacturer's instructions and immediately turn off any section(s) of the burner that are separately controlled. After 30 s turn these sections on again.
- Light the appliance at the full-on rate and repeat the test with any thermostat at that setting which will give the bypass rate.

11.3.2 Hot condition. The cross-lighting of appliances having burners subdivided into sections (e.g. duplex burners) shall be smooth when tested as described in 11.3.2.1.

11.3.2.1 Method. After heating the appliance to the hot condition, repeat the tests as described in 11.3.1.1, except that the delay before relighting the separately controlled sections shall be as specified in the manufacturer's instructions or longer if necessary to ensure that the burner does not relight from the radiants (see 11.2.2.1).

12. Ignition system

12.1 Pilots and igniters. Pilots and igniters shall be protected by design and position against diminution or extinction resulting from, for example, draughts, vitiation by products of combustion, overheating, condensation, corrosion or matter falling from above.

Permanent pilots shall be protected against blockage by gas-borne particulate matter.

Pilots and igniters shall be securely located in relation to every component with which they are designed to operate.

12.2. Pilot performance. No pilot shall light back, lift, roar, cause discoloration on any external surface of the appliance, deposit soot, or smell when tested under the following conditions.

Family	Test gas	Inlet pressure
1st	TGA, TGB, TGC, TGD	mbar 7.5 to 25
2nd	NGA, NGB, NGC, NGD	17.5 to 27.5
3rd	LPGA, LPGB, LPGC, LPGE	20 to 35 25 to 45

12.2.1 Method. Any appliance governor remains in circuit for these tests and any adjustable pilot shall have been previously adjusted at the following pressure in accordance with the manufacturer's instructions.

Family	Test gas	Inlet pressure
1st	TGA	mbar 17.5
2nd	NGA	20
3rd	LPGA, LPGC	28 37

Check the performance of the pilot(s) both without and with any burners (operating at full-on rate) that may have an adverse effect.

12.3 Pilot adjustment. Adjustment of the heat input to a permanent pilot is not mandatory but, where a pilot is provided with an adjuster for controlling the gas rate to the manufacturer's recommendation, the manufacturer's rating shall be obtainable at any inlet pressure in the following range.

Family	Test gas	Inlet pressure
1st	TGA	mbar 7.5 to 25
2nd	NGA	17.5 to 27.5
3rd	LPGA, LPGC	25 to 35 31 to 45

12.4 Closed fronted fires. When a closed fronted fire is tested as described in 10.2.1 its pilot shall remain stable and no nuisance shut-down shall occur.

12.5 Battery filament systems

- Batteries shall be protected by design and position against overheating.
- Batteries shall be readily replaceable by the user without the use of tools and, unless it is obvious or unnecessary, the correct positioning shall be indicated on the appliance and in the manufacturer's instructions.
- All connections shall be resistant to corrosion by design or position.