Where safety shutdown occurs, automatic restart shall be possible only after a minimum waiting time of 10 min. The manufacturer shall state the actual waiting time of the appliance in the technical instructions.

Table 7 **Shutdown times**

Degree of blockage	Diameter of opening in the blockage plate d	Maximum shutdown time (sec)	
		Q_n	Q_m
Complete blockage	0	200	$200 \times \frac{Q_n}{Q_m}$
Partial blockage	0.6 D	600	—

where:

D = internal diameter of the test flue at its top;

Q_n = nominal heat input;

Q_m = minimum heat input for modulating appliances or appliances with several rates

6.6.2.3.2 Test with complete blockage

With the appliance at the maximum setting and at thermal equilibrium, completely block the flue. Measure the reaction time between the flue being blocked and shutdown. For appliances without lockout, maintain the obstruction and measure the time between shutdown and ignition of the main burner.

Repeat the test at the minimum heat input.

6.6.2.3.3 Test with partial blockage

Fit the appliance with a telescopic flue (see Figure D.11) and bring it to thermal equilibrium at the nominal heat input. If the manufacturer specifies a minimum flue height, carry out the test using a flue of that height.

Reduce the length of the telescopic flue until the point when spillage almost occurs. If this condition is not obtainable at the minimum height of the telescopic flue, then fit a concentric annulus to the flue to reach this point.

If the device is actuated before this length is obtained, then shutdown is deemed to conform to Table 7.

If not, then cover the test flue with a blocking plate which has a concentric circular orifice of which the diameter is equal to 0.6 times the diameter D (see Table 7) of the test flue at its upper extremity (see Figure D.11).

If spillage is not achieved with the telescopic test flue, cover it with a plate incorporating a circular hole of diameter D' which allows the limit of spillage to be obtained.

Replace the plate by another blocking plate incorporating a circular hole of diameter d which is equal to $0.6D'$.

Measure the time between the blocking plate being put into position and shutdown. Check whether the shutdown times conform to Table 7.

6.7 Cyclic use

6.7.1 Requirements

The heat input shall not have changed by more than 10% from its initial value (see **6.3**) at the manufacturer's recommended hot-setting pressure.

No part of the appliance shall suffer any breakdown or distortion liable to lead to a reduction in the life of the components or to affect the safety of the appliance.

There shall be no deterioration of the inside of the appliance (e.g. cases made of wood or similar material) likely to affect its safe operation.

There shall be no seizure of screws or other changes likely to cause undue difficulty in subsequent maintenance.

Any tap shall be easy to turn, both when the appliance is hot and when it has cooled down.

After cooling down, the appliance shall conform to the soundness requirements of **6.2** and the combustion requirements of **6.5.1.1** when tested in accordance with **6.5.2.1**a) and **6.5.2.1**b).

When tested on reference gas in accordance with **6.4.6.1.2.2** the appliance shall meet the requirements of **6.4.6.1.1**. Ignore any deposition of soot.

6.7.2 Test

Install the appliance in the standard test box (see Figure D.2) in accordance with **6.1.6.3**, in a draught free position, and initially adjusted in accordance with **6.1.3.2.1**.

Carry out the test with the appliance supplied with one of the appropriate reference gases (see Table 2) according to its category. Adjust the burner to a rate equal to 1.15 times the nominal heat input in the case of 2nd family gases and 1.12 times the nominal heat input in the case of 3rd family gases.

Successively light and extinguish the appliance to give 100 cycles each of 2 h on and 1 h off.

Where all cyclic use tests are performed on one appliance, perform the test after all the other cyclic-use tests.

6.8 Efficiency

6.8.1 Requirement

When tested in accordance with **6.8.2**, the efficiency obtained with the appliance operating at its nominal heat input shall be at least 80% for class I and 70% for class II.

6.8.2 Test

Fit the appliance with the flue spigot restrictor, if supplied by the manufacturer, and initially adjust it with the reference gas to obtain the nominal heat input as specified in **6.3.1**. Connect it to the efficiency test box and 1 m high test flue (see Figure D.12) in accordance with the manufacturer's instructions, and completely block any chimney relief in the closure plate.

Before commencing the test:

a) operate the appliance at its full working temperature for a period sufficient to dry any insulation and remove any temporary finish which might interfere with observations;

b) ensure that the appliance conforms to **6.4.2.2.1** when tested on the efficiency rig in accordance with **6.4.2.2.2**.

Sample the products of combustion and measure the temperature 200 mm down from the upper end of the flue using the probe specified in Figure D.9. The rate of sampling of the flue products shall be approximately 10L/min, ±10%.

When thermal equilibrium has been reached, determine the efficiency in accordance with **6.8.3**.

The temperature of the room shall be approximately 20 °C. Measure this temperature at a height of 1.5 m at least 3 m from the appliance and with a thermometer which is protected against direct radiation from the appliance.

If the CO_2 content in the flue is less than 1.5%, the temperature of the room is taken as the temperature of the combustion air.

If the CO_2 content in the flue is 1.5% or greater, the temperature of the combustion air is measured:

a) inside the case of the fire in a path between where the air enters the case and the mouth of the burner venturi;

b) using a thermocouple which is shielded from undue influence by radiation such that the temperature measured does not differ from the room air temperature by –0 °C or + 10 °C.

If the measured combustion air temperature differs from the room air temperature by more than –0 °C or +10 °C then the conditions of measurement shall be investigated further and rectified.

NOTE 1 The thermocouple should be positioned in the stream of air which will enter the burner as combustion air, but it should not receive direct radiation from hot parts of the fire such as radiants, ceramic fuel effect or hot metal components.

NOTE 2 It is appreciated that the appliance can influence the temperature of the combustion air; care should be taken that the method of measurement is not unduly influenced e.g. by such as radiation from the hot metalwork or the ceramic effect of the gas fire or any metal shield used to shield the thermocouple. A metal shield might itself become hot and radiate heat onto the thermocouple, the shield can be made from a double skin or the underside can be covered in a suitable material such as ceramic paper in order to avoid this.

NOTE 3 The positioning and shielding of the thermocouple should be such that the normal flow path of the combustion air is not significantly disturbed; this should be verified using a suitable smoke visualization technique.

6.8.3 Determination of efficiency

The efficiency, n, refers to the net calorific value and is specified by the equation:

$$n = 100 - (q_1 + q_2)$$

where:

q_1 is the heat of the dry products of combustion (%);

q_2 is the heat of the water vapour contained in the products of combustion;

q_1 is specified by the equation:

$$q_1 = C_1 \times V_f \frac{t_2 - t_1}{H_i} \times 100$$

where:

C_1 is the mean specific heat of the dry products of combustion in megajoules per cubic metre Kelvin (MJ/m^3K) (see Figure D.13);

V_f is the volume of dry products of combustion per unit volume of gas in cubic metres per cubic metre (m^3/m^3);

t_2 is the average temperature of the products of combustion in degrees Celsius (°C);

t_1 is the average combustion air temperature in degrees Celsius (°C);

H_i is the net calorific value of the gas in megajoules per cubic metre (MJ/m^3);

V_f is calculated from the volume of CO_2 produced by the combustion of 1 m^3 of gas $\left(V_{CO_2}\right)$ and from the CO_2 content of the products combustion $\left(V_{CO_2,M}\right)$:

$$V_f = \frac{V_{CO_2}}{V_{CO_2,M}} \times 100$$

and

q_2 is specified by the equation:

$$q_2 = 0.077 \times \frac{H_s - H_i}{H_i} \times (t_2 - t_1)$$

where:

H_s is the gross calorific value.

7 Marking and instructions

7.1 Marking on the appliance

7.1.1 Data plate

The following information shall be firmly and durably applied, in indelible characters, to the appliance so that it is visible to, and can be read by, the installation or service engineer. The data plate(s) and /or label(s) shall give at least the following information:

a) the manufacturer's[3)] (see **3.6**) name, and/or identification symbol;

b) the trade name of the appliance;

c) the serial number;

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3) "Manufacturer" means the organization or company which assumes responsibility for the product (see **3.6**).

d) the type of gas and gas category in relation to the pressure for which the appliance has been adjusted; any pressure indication shall be identified in relation to the corresponding category (see **7.3.2** and **7.3.3**).

e) the nominal heat input expressed in kilowatts (kW), and a statement as to whether it is based on net or gross calorific value;

f) the direct country, or countries, of destination of the appliance;

g) the class of efficiency of the appliance;

h) the setting pressure;

i) the nature and voltage of the current used and the specified fuse rating.

No other information shall be included on the appliance if this could lead to confusion with regard to the current state of adjustment of the appliance and the corresponding appliance category (or categories) and the direct country (or countries) of destination.

The indelibility of the marking shall be checked in accordance with BS EN 60335-1:1995, **7.14**.

7.1.2 Clearance test notice

A notice giving details of the manufacturer's test method for confirming products clearance shall be firmly and durably applied to the appliance.

7.1.3 Ventilation

The appliance shall be marked with the following text:

> "This appliance must be installed in accordance with the rules in force, and only used in a sufficiently ventilated space. The relevant instructions must be read before installation and use."

7.1.4 Closure plate

The closure plate, where supplied, shall be indelibly and durably marked with the appliance name or number and, if the plate is separate from the appliance, the following text:

> "This plate must accompany the appliance and be properly installed as part of it."

7.1.5 Dress guard

If a dress guard is supplied, a label shall be affixed to the guard carrying the following information:

> "THIS LABEL SHALL BE REMOVED ONLY BY THE USER.
>
> THE GUARD IS TO PREVENT RISK OF FIRE OR INJURY FROM BURNS AND NO PART OF IT SHOULD BE PERMANENTLY REMOVED.
>
> IT DOES NOT GIVE FULL PROTECTION FOR YOUNG CHILDREN, THE ELDERLY OR THE INFIRM."

7.1.6 Warning labels

Appliances shall have affixed to them a customer removable label headed "To be removed only by the purchaser" and bearing the capital letters not less than 8 mm high the words:

"WARNING: THIS APPLIANCE BECOMES HOT IN USE, A SUITABLE GUARD SHOULD BE USED FOR THE PROTECTION OF YOUNG CHILDREN, THE ELDERLY OR THE INFIRM."

7.2 Marking of the packaging

The packaging shall carry at least the following information:

a) the type of gas and gas category in relation to the pressure, for which the appliance has been adjusted; any pressure indication shall be identified in relation to the corresponding category index (see **7.3.2** and **7.3.3**);

b) the direct country or countries of destination of the appliance (see **7.3.4**);

c) the words: "This appliance must be installed in accordance with the rules in force, and used only in a sufficiently ventilated space. Consult instructions before installation and use of this appliance";

d) the "CE" mark.

No other information shall be included on the packaging if this could lead to confusion with regard to the requirements a) to d).

7.3 Utilization of symbols on the appliance and packaging

7.3.1 Electrical supply

The marking concerning electrical values shall conform to BS EN 60335-1.

7.3.2 Type of gas

The type of gas and the gas supply pressure for which the appliance has been adjusted shall be identified according to the appliance category as given in Table 8. The symbol of the type of gas shall be in accordance with Table 8.

Table 8 **Identification of the type of gas and the gas supply pressure for which the appliance has been adjusted**

Appliance category	Type of gas	Gas supply pressure
Cat I_{2H}	Natural gas G 20	20 mbar
Cat I_{3P}	Propane G 31	37 mbar
Cat II_{2H3P} :		
when adjusted for natural gas	Natural gas G 20	20 mbar
when adjusted for propane	Propane G 31	37 mbar

NOTE The word "Cat" is not obligatory.

7.3.3 Gas supply pressure

All gas supply pressures shall be in milllibars (mbar).

7.3.4 Country of destination

The names of countries shall be represented by the codes specified in BS EN ISO 3166-1. For the United Kingdom, it is: GB.

7.3.5 Category

The category may be expressed uniquely by its designation in accordance with BS EN 437. The term "category" if used shall be symbolized by "Cat".

7.4 Instructions

7.4.1 General

Instructions shall be written in English.

7.4.2 Technical instructions for installation and maintenance

The technical instructions for installation, commissioning and maintenance shall be supplied with the appliance and shall specify that the installation shall be undertaken by a competent person.

The instructions shall contain all the information necessary to enable a competent installer to make a safe installation.

The technical instruction may include information indicating, where appropriate, that the appliance has been certified for use in countries other than those stated on the appliance (indirect countries of destination). If such information is specified, the instructions shall include a warning that a modification of the appliance and its method of installation are essential to use that appliance safely and correctly in any of these additional countries. This warning shall be repeated in the official languages(s) of each of these countries. Furthermore, the instructions shall indicate how to obtain the information, instruction and parts necessary for safe and correct use in the countries concerned. They shall include the following statement:

> "Prior to installation, ensure that the local distribution conditions (identification of the type of gas and pressure) and adjustment of the appliance are compatible."

The instructions shall refer to the following:

a) the method of connection and the relevant installation regulations;

b) the method of assembly and any fixing of the appliance;

c) the use or siting of thermostats and other controls;

d) the siting of the appliance, including the minimum clearances around the appliance, the minimum height above the floor, whether or not the appliance can be placed against a wall of combustible material, and whether or not the appliance requires a non-combustible hearth;

e) any recommended ventilation requirements;

f) the gas and electricity supply and connections and, where appropriate, a wiring diagram;

g) the procedure to be followed for commissioning the appliance;

h) details for the replacement of exchangeable parts;

i) the minimum dimensions for the flue system required, including the minimum equivalent flue height;

j) guidance on fitting to various types of builder's openings and fireplace openings;

k) give details of any special flue systems necessary for the appliance and any installation limitations;

l) for category II appliances, the instructions necessary to allow a competent person to change from gas of one family to gas of the other family;

m) the procedure for checking the clearance of products when installed highlight the need for this to be done;

n) that damper plates or flue restrictors shall be removed and no restrictor plate shall be fitted in the flue

o) advice that if a chimney has been used for solid fuel, it shall be swept before installation;

p) a dimensioned drawing of the closure plate, if appropriate;

q) appliance heat input and the burner pressure;

r) injector identification;

s) physical dimensions and weight;

t) any other technical data that might be required by the installer or the commissioning engineer;

u) that the instructions for installation and maintenance and the user instructions shall be handed to the user;

v) a declaration by the manufacturer of area(s) to be considered as a working surface;

w) NO_x level of the appliance (see **6.5.5**); if the appliance is designed for use on more than one gas and the NO_x levels are different when changing from one gas to the other, the lowest class, i.e. the class that gives the highest NO_x limit.

7.4.3 User instructions

Instructions intended for the user shall be supplied with the appliance.

These instructions shall provide all the necessary information for the safe use of the appliance in clear and simple terms. Wherever necessary, diagrams and or photographs shall augment the text.

The user instructions shall also stress that the appliance shall be installed by a competent person. They shall deal briefly with the regulations regarding ventilation, and the need for regular servicing, with particular attention to the need for periodic inspection of the flue and fireplace opening.

The user instructions shall include:

- the manufacturer's[4)] name and address;
- the name or number of the appliance;
- the operations of ignition, cleaning and user maintenance;
- a recommendation for any additional guard that might be required for the protection of young children, aged or infirm persons;

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4) "Manufacturer" means the organization or company which assumes responsibility for the product (see **3.6**).

- a specified minimum distance between the appliance, a shelf or any flammable material;
- explicit instructions, if applicable, for the correct replacement of radiants or artificial fuel or any parts of the fuel bed intended to be removed by the user, and a warning against changing the fuel bed layout or the quantity of fuel;
- where appropriate, a statement that the appliance shall not be used if the glass door or panel is broken, removed, or is open;
- a brief explanation of the function of the spillage monitoring system and the action to take if it repeatedly shuts down the appliance.

8 Particular requirements for inset live fuel effect gas appliances (see Figure D.1) not exceeding a net heat input of 15 kW based on the net calorific value

8.1 Construction

8.1.1 General

Appliances shall be classified in accordance with Clause **4**.

8.1.2 Materials and method of construction

Materials and methods of construction shall conform to **5.1.1** to **5.1.9** and **5.1.11** to **5.1.17**.

8.1.3 Appliance location

If, on installation, a gap is required between the back of the appliance and the back of the fireplace recess or builder's opening, stops shall be incorporated on, or be supplied with, the appliance.

8.1.4 Adjusters, controls and safety devices

Adjusters, controls and safety devices shall conform to **5.2.1** to **5.2.12** and **5.2.14** to **5.3**. Burners shall conform to **5.2.13.1** with the additional following requirements.

a) For those appliances using a particulate gas distribution medium, e.g. sand, a container shall be provided to define and locate the quantity of distribution medium.

b) Ignition burners and ignition devices shall be protected by design and position against diminution or extinction resulting from, for example, draughts, products of combustion, overheating, condensation, corrosion or matter falling from above.

c) If different ignition burners are used for the different gases, they shall be marked, easy to substitute for one another and easy to fit. The same applies to injectors where only they have to be changed. Injectors shall carry an indelible means of identification and shall only be removable with the aid of a tool.

8.2 Performance and test methods

8.2.1 General

Performance and test methods shall conform to **6.1.1**, **6.1.2**, **6.1.3**, **6.1.4** and **6.1.5**.

8.2.2 General test conditions

8.2.2.1 Test room

The appliance shall be installed in a well-ventilated, draught-free room which has an ambient temperature of (20 ±5) °C; a wider temperature range can be used provided that the test results are not affected.

8.2.2.2 Test installation

The appliance shall be installed in accordance with the manufacturer's instructions, with particular reference to minimum declared clearances around the appliance.

If requested by a test authority, any special components e.g. non-standard flues, necessary to test to the manufacturer's instructions shall be supplied by the manufacturer to the test authority.

NOTE For the convenience of carrying out tests, the appliance may be installed at a height above the floor other than that specified in the manufacturer's instructions, provided that this does not affect the performance of the appliance.

Unless otherwise specified, tests shall be as follows.

- With a standard basic test box (see Figure D.14) and shall be constructed in accordance with Figure D.15, Figure D.16 and Figure D.17, as appropriate. Insulate the test box and flue as shown in Figure D.14, Figure D.15 and Figure D.17. Position the sample probe (see Figure D.18) 605 mm above the top of the test box.
- Where the appliance is to be used with a surround and/or spacer, specific to the appliance, this surround and/or spacer to be supplied by the manufacturer for the purposes of testing the appliance. The surround shall be of the minimum thickness specified in the manufacturer's instructions.
- The appliance is to be at room temperature at the start of each test.
- During testing, the initial adjustment of the appliance is not to be altered.

The gas connections and system up to and including the burner shall be examined for soundness before testing and upon completion of testing.

The test pressures shall be measured and maintained to ±0.2 mbar.

8.2.2.3 Electrical supply

Appliances which require a mains electrical supply, shall be connected to an electrical supply at the nominal voltage, unless otherwise specified.

8.2.3 Soundness of the gas circuit

The appliance shall conform to **6.2**.