B14 M.O.T. 3.6.1(b)/(e)—IGNITION OF A BURNER PROTECTED BY A FLAME SAFEGUARD SYSTEM

B14.1 Scope

This test applies to all burners that are protected by a flame safeguard system actuated by a pilot.

B14.2 Principle

The pilot burner is adjusted to just keep the flame safeguard system open. At this setting it shall ignite the main burner when tested at nominal gas consumption and at any other rate at which it can be controlled automatically. If the pilot burner has more than one flame port, the test is repeated when all ports are blocked other than the one activating the flame safeguard sensor.

B14.3 Apparatus

Equipment as specified in Clause 3.2.6.

B14.4 Materials

Supply of appropriate test gas (see Clause 3.1.1).

B14.5 Preparation of apparatus

(a) Set up the appliance in accordance with Clause 3.2.

(b) Connect to gas.

B14.6 Procedure

The procedure shall be as follows:

(a) Light the gas at both pilot and main burners.

(b) Adjust the gas consumption of the main burner so that it is within ±5% of the nominal gas consumption.

(c) Turn off the main burner.

(d) Reduce the gas rate to the pilot in small steps. At each reduction light the main burners, then turn off gas to main burner.

(e) Continue to reduce the gas rate to the pilot in small steps until either:

  (i) ignition of the main burner is unsatisfactory, or

  (ii) the flame safeguard system shuts off the gas supply.

(f) Repeat (d) and (e) with all ports blocked other than the one activating the flame safeguard sensor.

(g) Repeat (d), (e) and (f) with the main burner reduced to the lowest rate at which it can be controlled automatically.

B14.7 Result

The appliance complies with this requirement if no unsatisfactory or explosive ignition of the main burner takes place before the flame safeguard system shuts off the gas supply.

B15 M.O.T. 3.6.1(f)—IGNITION—OPENING OF FLAME SAFEGUARD SYSTEM

B15.1 Scope

This test applies to all manually ignited atmospheric burners protected by a thermoelectric flame safeguard system.

B15.2 Principle

The burner actuating the flame safeguard is lit from a cold start. The time which elapses between the lighting of the actuating pilot and the holding open of the flame safeguard is observed.

B15.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) Suitable timing device.

B15.4 Materials

Supply of appropriate test gas (see Clause 3.1.1) at normal test gas pressure.

B15.5 Preparation of apparatus

(a) Set up the appliance in an accessible draught-free position in accordance with Clause 3.2.

(b) Connect to gas.

B15.6 Procedure

The procedure shall be as follows:

(a) Light the appliance according to the manufacturer's instructions.

(b) Simultaneously with lighting, start timing device.

(c) After 1 min exactly release the flame safeguard manual reset button if installed.

(d) If necessary turn on main burner gas control to 'ON' position.

(e) Observe whether main burner ignites satisfactorily.

B15.7 Result

The appliance complies with this requirement if the gas supply to the burner(s) is established in no more than 1 min.

B16 M.O.T. 3.6.1(h)—COOKER HOTPLATE BURNER IGNITION

B16.1 Scope

This test applies to all cooker hotplate burners.

B16.2 Principle

The burner is supplied with the appropriate gas at turndown gas consumption and is observed for completeness of ignition with the standard vessel in position.

B16.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) Vessel(s) in accordance with the Table 1.1.

(c) Source of ignition.

B16.4 Materials

All limit gases.

B16.5 Preparation of apparatus

(a) Set up the cooker in accordance with Clause 3.2 in an accessible draught-free position.

(b) Supply the appropriate limit gas to the burner.

B16.6 Procedure

The procedure shall be as follows:

(a) Place standard vessel containing approximately 2.3 kg of water on the burner.

(b) Adjust the burner to turndown or by-pass gas consumption.

In the case of hotplate burners with simmerstats this may be achieved by heating the vessel for a period of 10 min and then turning the control to the lowest setting or by turning the control to a dedicated by-pass setting if this is available.

(c) Apply source of ignition to one point of the burner and observe for complete flame run. Repeat four times, applying the source of ignition at a different point of the burner each time.

B16.7 Result

The cooker complies with this requirement if all burners ignite completely under the conditions specified.

B17 M.O.T. 3.6.1(o)—OPERATION OF SAFETY SHUT OFF SYSTEM

B17.1 Scope

This test applies to atmospheric type main burners, fitted with a safety shut off system, with a total gas consumption up to and including 50 MJ/h.

B17.2 Principle

The appliance is operated at nominal gas consumption for 1 h or until thermal equilibrium is reached. The gas is then turned off and the time taken for the gas valve to close is determined.

B17.3 Materials

(a) Supply of appropriate test gas (see Clause 3.1.1) at normal test gas pressure.

(b) Air at normal test gas pressure.

B17.4 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) Two-way valve.

(c) Suitable timing device.

(d) Air flow meter of adequate capacity.

B17.5 Preparation of apparatus

(a) Place the appliance in a draught-free location.

(b) Set up test equipment.

(c) Install in accordance with Clause 3.2.2.

(d) Connect two-way valve at the appliance inlet with one inlet connected to gas supply and the other to air supply.

(e) Connect air flow meter into the air supply.

B17.6 Procedure

The procedure shall be as follows:

(a) With the appliance at room temperature light the gas at burners.

(b) Operate with normal test gas pressure at appliance inlet for 1 h or until thermal equilibrium is reached.

(c) Turn two-way valve from gas supply to air supply.

(d) Observe actuating flame and start the timing device at the instant the flame extinguishes.

(e) Stop the timing device at cessation of flow of air as indicated by flow meter.

B17.7 Result

The safety shut off system meets this requirement if the observed time does not exceed 90 s for atmospheric type main burners with gas consumption up to and including 50 MJ/h.

B18 M.O.T. 3.6.2.1.2(c)—START FLAME ESTABLISHMENT PERIOD—DELAYED IGNITION TESTS

B18.1 Scope

This test applies to all burners with automatic ignition systems which are not based on permanent pilots and which do not comply with any other requirements of Clause 3.6.2.1.2.

B18.2 Principle

The normal start flame establishment period is timed. The automatic ignition system is then bypassed so that the start gas flow and spark initiation are under manual control. Ignition tests are carried out at various delay periods up to twice the determined start flame establishment period and it is observed whether ignition is complete and effective.

B18.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) Suitable timing device.

B18.4 Materials

(a) Supply of appropriate test gas (see Clause 3.1.1) at normal test gas pressure.

(b) Electricity supply at the required voltage.

B18.5 Preparation of apparatus

CAUTION: BEFORE ATTEMPTING DELAYED IGNITION TESTS ENSURE THERE IS ADEQUATE EXPLOSION RELIEF OPENING (REFER TO AS 1375). FOR SAFETY REASONS, THE DELAY FROM ZERO SHOULD BE INCREASED IN SMALL STEPS.

(a) Set up appliance in accordance with Clause 3.2.

(b) Connect to gas.

(c) Using the timing device, measure the start flame establishment period with the ignition system operating through the normal sequence without gas flow. Record the time.

(d) Bypass the automatic ignition system in a manner which will provide manual control of the start gas flow and spark initiation.

B18.6 Procedure

The procedure shall be as follows:

(a) Initiate gas flow and ignition spark simultaneously.

(b) Over successive tests, gradually increase the delay period between initiation of start gas flow and initiation of ignition spark until the time interval is twice the determined start flame establishment period.

NOTE: As this is a safety test under abnormal operation, explosive noise and flame roll-out may be acceptable provided—

(a) there is no damage to the appliance;

(b) the burner does not light back; and

(c) there is no danger to persons or adjacent property.

(c) The extent of any flame roll-out at the appliance perimeter and at the flue outlet shall be reported.

B18.7 Result

The appliance complies with this requirement if ignition up to twice the start flame establishment period is satisfactory with no excessive noise or evidence of flame outside the appliance.

B19 M.O.T. 3.7.1—FLAME STABILITY TO DRAUGHT

B19.1 Scope

This test applies to all burners that can be turned down.

B19.2 Principle

A 5 km/h horizontal draught is applied to the flame at stipulated angles while the burner is at turndown gas consumption and the burner shall completely reignite when the draught is removed.

B19.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) **A calibrated draught machine—**capable of delivering a 5 km/h draught over an area of 1.0 m^2.

(c) Suitable timing device.

(d) Vessel(s) in accordance with Table 1.1.

B19.4 Materials

Supply of appropriate test gas (see Clause 3.1.1).

B19.5 Preparation of apparatus

(a) Set up the appliance in an accessible and draught-free position according to Clause 3.2.

(b) Connect to gas.

B19.6 Procedure

The procedure shall be as follows:

(a) In the case of dispute or borderline results, the test gases listed in Table B1 shall be used.

TABLE B1

TEST GASES FOR FLAME STABILITY TO DRAUGHT

	Test gases
Natural gas	N
Propane	X
Butane	X, Y
Universal LPG	X, Y
TLP gas	T
Town gas	D

(b) Adjust burner to turndown or bypass gas consumption and, for a hotplate burner, place the standard test vessel containing hot water centrally over the burner.

In the case of thermostatically controlled burners this may be achieved by heating the vessel or oven for a period of 10 to 15 min and then turning the control to the lowest setting or by turning the control to a dedicated bypass setting if this is available.

Allow the burner to operate for at least 5 min before applying the draught.

(c) Place the draught machine so that the appliance is located centrally in the area of 1.0 m^2.

(d) Turn on the draught machine and subject the burner to a horizontal draught of 5 km/h for periods of 30 s directed from front, sides and intermediate points at 15° intervals.

B19.7 Result

The burner complies with the requirement if it shuts down safely or completely re-lights when the draught is removed without the aid of any automatic ignition system other than direct ignition from a permanent or intermittent pilot.

B20 M.O.T. 3.7.3—EFFECT OF APPLIANCE DOOR OPERATION ON BURNER STABILITY

B20.1 Scope

This test applies to all appliances with doors or appliances that are designed to be built into cupboard units.

B20.2 Principle

The appliance is operated at turndown gas consumption on available gases. The effect of normally opening and closing the appliance doors and associated cupboard doors on the burner flames is observed.

B20.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) **Standard cupboard**—with close-fitting doors (for built-in hotplates). See Figure A7.

(c) Vessel(s) in accordance with Table 1.1.

B20.4 Materials

Supply of appropriate test gas (see Clause 3.1.1).

B20.5 Preparation of apparatus

(a) Set up the appliance in an accessible draught-free position in accordance with Clause 3.2.

(b) Connect to gas.

B20.6 Procedure

The procedure shall be as follows:

(a) Light the burner and adjust to turndown or bypass gas consumption.

In the case of thermostatically controlled burners this may be achieved by heating the vessel or oven for a period of 10 to 15 min and then turning the control to the lowest setting or by turning the control to a dedicated bypass setting if this is available.

For a hotplate burner, place the standard vessel containing hot water centrally over the burner.

In the case of dispute or borderline results, the test gases listed in Table B2 shall be used.

TABLE B2

TEST GASES FOR APPLIANCE DOOR OPERATION—FLAME STABILITY

	Test gases
Natural gas	N
Propane	X
Butane	Y
Universal LPG	X, Y
TLP gas	T
Town gas	D

(b) Normally open and close the appliance door and/or the associated cupboard doors and observe whether the burner flames extinguish. In addition close the appliance doors by spring action through their full arc of travel. If an arrest position is incorporated in the mechanism to prevent full closure, gently push until spring action resumes to closed position.

(c) In the case of hotplate burners other than special purpose hotplate burners repeat the test with no vessel on the burner.

B20.7 Result

The burner complies with the requirement if it stays alight or completely re-lights when the draught is removed without the aid of any automatic ignition system other than direct ignition from a permanent or intermittent pilot.

B21 M.O.T. 4.2—DETERMINATION OF CO/CO_2 RATIO OF COMBUSTION PRODUCTS—SURFACE COMBUSTION BURNERS

B21.1 Scope

This test applies to all appliances incorporating surface combustion burners.

B21.2 Principle

The combustion products are sampled by means of an appropriate hood and analysed for CO and CO_2.

B21.3 Apparatus

(a) Equipment as specified in Clause 3.2.6.

(b) Flue gas sampling hood of stainless steel or aluminium (see Figure A3, Figure A4 and Figure A5).

(c) **Carbon monoxide analyser**—calibrated to give accurate and reproducible results.

(d) **Carbon dioxide analyser**—calibrated to give accurate and reproducible results.

B21.4 Materials

Appropriate test gases as specified in Table B3 and Table B5.

B21.5 Preparation of apparatus

(a) Set up the appliance in an accessible draught-free position in accordance with Clause 3.2.

(b) Connect to the test gas specified in Table B3 and Table B5.

(c) Ensure adequate safety precautions have been taken for the venting of unlit gas.

(d) Where necessary arrange for bypassing or operating flame safeguards without using a flame.

(e) Turn on the burner but do not light the gas.

(f) Adjust the test point pressure as shown in Table B3.

TABLE B3

MAXIMUM LIMITING CONDITIONS—SURFACE COMBUSTION BURNERS

	Maximum condition	
	Test gas	Test point pressure
Natural gas	N	1.40 Pt
Propane	X	1.25 Pt
Butane	Y	1.25 Pt
Universal LPG	Y	1.25 Pt
TLP gas	T	1.25 Pt
Town gas	D	1.40 Pt

Pt = nominal test point pressure.

(g) Place appropriate sampling hood above flue outlet.