B17 M.O.T. 4.6 – 04 DELAYED IGNITION TEST

B17.1 SCOPE

This method applies to all appliances having burners that are ignited manually.

B17.2 METHOD

The normal lighting procedure is carried out with a 10 s delay, or 5 s in the case of a burner fitted with a safety shut off system, after turning on the gas. It is observed whether ignition is complete and effective.

B17.3 APPARATUS

- 1 Equipment as specified in Clause 3.2.6.
- 2 Suitable timing device.

B17.4 MATERIALS

- 1 Specified limit gases.
- 2 Cold water supply.

B17.5 PREPARATION OF APPARATUS

- 1 Set up the appliance in an accessible draught-free position, in a room that can be darkened, in accordance with Clause 3.2.
- 2 Fill heater with water.
- 3 Connect to specified gas supply as in Step 1 of the Procedure.

B17.6 PROCEDURE

1 Without lighting the appliance adjust the manifold pressure until the test point pressure is at the appropriate proportion of nominal test point pressure as shown in Table B7.

Appliance gas type	Maximum condition		Minimum condition	
	Limit gas	Test point pressure*	Limit gas	Test point pressure*
NG	Na	1.10 × Pt	Nb, Nc, S	$0.75 \times Pt$
Propane	Х	1.25 × Pt	Х	$0.75 \times Pt$
Butane	Y	1.25 × Pt	Y	$0.75 \times Pt$
Universal LPG	Y	1.25 × Pt	Х	$0.75 \times Pt$
TLP	Та	$1.10 \times Pt$	Tb	$0.75 \times Pt$
TG	А	$1.10 \times Pt$	B, C	$0.75 \times Pt$

TABLE B7 LIMITING CONDITIONS—DELAYED IGNITION

*Pt = nominal test point pressure

- 2 Darken the room, turn on gas control valve and start the timing device at the same time.
- 3 After 10 s, or 5 s in the case of a burner fitted with a safety shut off system, apply source of ignition.
- 4 Turn off burner and repeat Steps 2 and 3 with any compartment door closed if it is possible to operate the correct ignition sequence under these conditions.

B17 M.O.T. 4.6 – 04 DELAYED IGNITION TEST (Cont'd)

5 Turn off burner and repeat at other specified limiting conditions. NOTE: Ensure that the appliance is adequately purged of gas before attempting any lighting of the appliance.

B17.7 RESULT

The appliance shall have passed this requirement if the burner-

- (a) ignites completely;
- (b) remains alight;
- (c) does not light back;
- (d) does not burn outside the appliance;
- (e) does not extinguish any other burner; and
- (f) does not damage the appliance.

B18 M.O.T. 4.7 – 90 FLAME STABILITY TO DRAUGHT

B18.1 SCOPE

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

B18.2 METHOD

An 8 km/h horizontal draught is applied to the appliance at stipulated angles while the burner is at turndown gas consumption and the burner shall completely reignite when the draught is removed.

B18.3 APPARATUS

- 1 Equipment as specified in Clause 3.2.6.
- 2 A calibrated draught machine capable of delivering an 8 km/h draught over an area of 1.0 m^2 .
- 3 Suitable timing device.

B18.4 MATERIALS

- 1 Specified limit gases.
- 2 Cold water supply.

B18.5 PREPARATION OF APPARATUS

- 1 Set up the appliance in an accessible and draught-free position in accordance with Clause 3.2.
- 2 Connect to water and specified limit gas.

B18.6 PROCEDURE

1 The test is carried out with the limit gases listed in Table B8.

TABLE B8

LIMITING CONDITIONS—FLAME STABILITY TO DRAUGHT

Appliance gas type	Limit gases
NG	Nb, Nc, S
Propane	Х
Butane	Х, Ү
Universal LPG	Х, Ү
TLP	Тb
TG	В, С

- 2 Adjust burner to turndown gas consumption.
- 3 Place the draught machine so that the appliance is located centrally in the area of 1.0 m^2 .
- 4 Turn on the draught machine and subject the burner to a horizontal draught of 8 km/h for periods of 1 min directed from front, sides and intermediate points at 15° intervals.

B18.7 RESULT

The burner complies with the requirement if complete reignition occurs when the draught is removed or the burner locks out.

B19 M.O.T. 4.10 - 04 PILOT FLAMES—IGNITION AND STABILITY

B19.1 SCOPE

This test applies to all permanent pilots.

B19.2 METHOD

The pilot flame is ignited in accordance with the manufacturer's instructions. An 8 km/h horizontal draught is applied to the appliance at stipulated angles. The gas to the main burner is also turned off and on in the normal manner. The pilot flame shall light satisfactorily and shall not be extinguished.

B19.3 APPARATUS

- 1 Equipment as specified in Clause 3.2.6.
- 2 A calibrated draught machine capable of delivering an 8 km/h draught over an area of 1.0 m^2 .
- 3 Suitable timing device.

B19.4 MATERIALS

- 1 Specified limit gases.
- 2 Cold water supply.

B19.5 PREPARATION OF APPARATUS

1 Set up the appliance in an accessible and draught-free position in accordance with Clause 3.2.

B19.6 PROCEDURE

- 1 Connect to appropriate gas for minimum limit condition as shown in Table B9 (a).
- 2 Light the pilot and main burner and reduce appliance inlet pressure to obtain the minimum limiting conditions as indicated in Table B9 (a).

TABLEB9 (A)

LIMITING CONDITIONS—PILOT FLAMES, MINIMUM

Appliance gas type	Minimum condition		
	Limit gas	Appliance inlet pressure	
NG	Nb, S	0.75 kPa	
Propane	Х	2.0 kPa	
Butane	Y	2.0 kPa	
Universal LPG	Х	2.0 kPa	
TLP	Tb	0.5 kPa	
TG	_	_	

- 3 Turn off the main burner, leaving the pilot alight. Ensure that the correct appliance inlet pressure is maintained.
- 4 Turn off the pilot and re-light it in accordance with the manufacturer's instructions.
- 5 Place the draught machine so that the appliance is located centrally in the area of 1.0 m^2 .

B19 M.O.T. 4.10 - 04 PILOT FLAMES—IGNITION AND STABILITY (Cont'd)

- 6 Turn on the draught machine and subject the appliance to a horizontal draught of 8 km/h for periods of 1 min directed from the front, sides and intermediate points at 15° intervals.
- 7 Turn off the draught machine and turn the main burner off and on five times in the normal manner.
- 8 Turn off the appliance and connect to appropriate gas as shown in Table B9 (b).
- 9 Light the pilot and main burner and adjust the appliance inlet pressure to the value shown in Table B9 (b).

	Maximum condition		
Appliance gas type	Limit gas	Appliance inlet pressure	Test point pressure*
NG	Nc	3.0 kPa	1.10 × Pt
Propane	Х	3.5 kPa	Pt
Butane	Y	3.5 kPa	Pt
Universal LPG	Y	3.5 kPa	Pt
TLP	Tb	2.5 kPa	Pt
TG	С	2.5 kPa	1.10 × Pt

TABLE B9 (B)

LIMITING CONDITIONS—PILOT FLAMES, MAXIMUM

*Pt = nominal test point pressure

- 10 Check the pressure at the test point and if it is below that shown in Table B9 (b) adjust the appliance regulator until the pressure complies with the maximum limiting condition in Table B9 (b).
- 11 Repeat Steps 3 to 7 inclusive.

B19.7 RESULT

The pilot complies with the requirements provided the flame lights satisfactorily when the manufacturer's instructions are followed, and flame is not extinguished during the tests.

B20 M.O.T. 4.11 – 04 EFFECT OF APPLIANCE DOOR OPERATION ON BURNER STABILITY

B20.1 SCOPE

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

B20.2 METHOD

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

B20.3 APPARATUS

Equipment as specified in Clause 3.2.6.

B20.4 MATERIALS

- 1 Specified limit gases.
- 2 Cold water supply.

B20.5 PREPARATION OF APPARATUS

- 1 Set up the appliance in an accessible draught-free position in accordance with Clause 3.2.
- 2 Connect to water and the specified gas.

B20.6 PROCEDURE

1 Light the burner(s) and adjust to turndown gas consumption with limit gas listed in Table B10.

TA	BLE	B10

Appliance gas type	Limit gases
NG	Nb, Nc, S
Propane	Х
Butane	Y
Universal LPG	Х, Ү
TLP	Tb
TG	B, C

LIMITING CONDITIONS—DOOR OPENING

2 Open and close the appliance door and/or the associated cupboard doors in a normal manner and observe whether the burner flames extinguish. In addition, allow the appliance door(s) to close by self-closing action through the full arc of travel.

B20.7 RESULT

The water heater complies with this requirement if the burner flames are not extinguished or are automatically re-lit.

B21 M.O.T. 4.12 – 04 BURNER OPERATION—UNBURNT GAS SPILLAGE FROM BURNER SYSTEM

B21.1 SCOPE

This test applies to all aerated burners.

B21.2 METHOD

This test is performed by applying a high voltage spark to the primary air ports and any potential spillage points along the complete burner system. Ignition of spilled gas shall not occur.

B21.3 APPARATUS

- 1 Equipment as specified in Clause 3.2.6.
- 2 Suitable generator for producing a continuous series of high voltage sparks.

B21.4 MATERIALS

- 1 Specified limit gases to give the limiting conditions listed below.
- 2 Cold water supply.

B21.5 PREPARATION OF APPARATUS

- 1 Set up the appliance in an accessible draught-free position in accordance with Clause 3.2.
- 2 Connect to water and specified gas.

B21.6 PROCEDURE

- 1 Light the burner(s) and adjust the test point pressure as listed in Table B11.
- 2 Scan primary air openings and burner system up to the burner ports with spark.
- 3 Adjust the appliance to lowest gas consumption to which the burner control can be set.
- 4 Repeat Step 2.

TABLE B11

LIMITING CONDITIONS—SPILLAGE OF UNBURNT GAS

Appliance gas type	Limit gas	Test point pressure*
NG	Nb	0.75 x Pt
Propane	Х	0.75 x Pt
Butane	Y	0.75 x Pt
Universal LPG	Х	0.75 x Pt
TLP	Tb	0.75 x Pt
TG	В	0.75 x Pt

*Pt = nominal test point pressure

B21.7 RESULT

The appliance complies with this requirement if there is no spillage of unburnt gas as indicated by ignition of gas at the primary air ports or any part of the burner system up to the burner ports.

B22 M.O.T. 5.2 – 04 DRAIN PERFORMANCE

B22.1 SCOPE

This test applies to all appliances containing more than 1 L of water.

B22.2 METHOD

The appliance is drained into a tared vessel and the time observed.

B22.3 APPARATUS

- 1 Platform scales.
- 2 Suitable timing device.

B22.4 MATERIALS

1 Cold water supply.

B22.5 PROCEDURE

- 1 Place the appliance on the platform scales.
- 2 Fill the appliance with cold water.
- 3 Drain the appliance in accordance with the manufacturer's instructions.
- 4 Determine the time from the opening of the drain point or drain valve, until 85% of nominal capacity has been drained.
- 5 Calculate average flow rate.

B22.6 RESULT

The appliance complies with this requirement if the rate obtained in Step 5 is not less than—

- (a) that specified by the manufacturer; or
- (b) in the absence of any specification, 9 L/m.

B23 M.O.T. 5.3.3 – 04 BLOCKED CONDENSATE DRAIN

B23.1 SCOPE

This test applies to appliances with fan assisted combustion systems that are fitted with a drain for the removal of condensed combustion products.

B23.2 METHOD

The appliance is checked for safe operation under conditions that simulate the accumulation of condensate within the appliance as the result of a blocked drain outlet.

B23.3 APPARATUS

- 1 Equipment as specified in Clause 3.2.6.
- 2 Flue gas sampling hood or other device of stainless steel or aluminium (see Figures A3 (a) and (b)).
- 3 Carbon monoxide analyser, calibrated to give accurate and reproducible results.
- 4 Carbon dioxide analyser, calibrated to give accurate and reproducible results.
- 5 Suitably sized funnel, hose and beaker for pouring water into the appliance via the condensate drain outlet.
- 6 Suitable timing device.

B23.4 MATERIALS

- 1 Supply of appropriate test gas (see Clause 3.1.1) at normal test gas pressure.
- 2 Supply of cold water.

B23.5 PREPARATION OF APPARATUS

- 1 The appliance is prepared for testing in accordance with Clause 3.2.
- 2 Connect a suitable hose and funnel to the condensate drain opening of the appliance.
- 3 Connect the appliance to the appropriate test gas at normal test gas pressure.
- 4 Place appropriate sampling device in a suitable position to collect flue gas samples from the flue outlet of the appliance.
- 5 Elevate the hose and funnel sufficiently so that the water will flow smoothly into the appliance (against the pressure developed by the appliance combustion fan) without causing pressure pulses that may disturb the normal function of the combustion airflow proving device.

B23.6 PROCEDURE

- 1 Light the appliance and adjust it to operate at nominal gas consumption.
- 2 Continuously monitor the CO and CO_2 and observe the flame for evidence of abnormality. When equilibrium is reached record the CO and CO_2 values.
- 3 Gradually pour water into the appliance (through the appliance drain opening) at a rate which will not disturb the normal function of the combustion airflow proving device and is sufficiently slow to permit continuous observation of the flame and monitoring of the CO/CO_2 values. Periodically assess the external cabinet of the appliance for evidence of temperature hazards by touch. If necessary attach and monitor thermocouples on the surface of the appliance in areas of potential temperature hazard.

B23 M.O.T. 5.3.3 – 04 BLOCKED CONDENSATE DRAIN (Cont'd)

- 4 Continue to pour water into the appliance and observe the flame and record the CO/CO_2 and surface temperature until the appliance shuts down or reaches an equilibrium condition.
- 5 Immediately following shutdown, and without draining any water from the appliance, attempt to restart the appliance by cycling the appliance thermostat. Observe the appliance for any ignition hazards.
- 6 If applicable, manually reset any limiting device and again attempt to restart the appliance while observing the appliance for ignition hazards. If necessary, remove a small quantity of water to permit the appliance to restart.
- 7 If applicable, drain the water from the appliance and adjust the appliance to the lowest gas consumption to which the burner control can be set.
- 8 Repeat Steps 1 to 6.

B23.7 RESULT

The appliance complies with the requirement if —

- (a) ignition is satisfactory;
- (b) the appliance continues to function safely;
- (c) no surface temperatures exceed those nominated in Clause 5.6; and
- (d) the CO/CO_2 ratio does not exceed 0.02 and no flame abnormality is observed.

If shutdown occurs, the 2 min prior to the point of shut down is disregarded.