B4 M.O.T. 2.4.10—BURNER OPERATION—UNBURNT GAS RELEASE FROM BURNER SYSTEM

B4.1 Scope

This test applies to all aerated burners.

B4.2 Principle

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.

B4.3 Apparatus

Suitable generator for producing a continuous series of high voltage sparks.

B4.4 Materials

Supply of appropriate test gas at underload pressure (see Table 9.2(c) or Clause 9.2.2).

B4.5 Preparation of apparatus

Set up the appliance in accordance with Clause 9.2 adjusted to underload pressure as shown in Table 9.2(c) or Clause 9.2.2.

B4.6 Procedure

The test is carried out as follows:

- (a) Test with the gases as listed at underload condition as shown in Table 9.2(c) or Clause 9.2.2 at any gas control setting to support a flame on the burner ports.
- (b) Scan primary air openings and burner system up to the burner ports with spark.

B4.7 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.

B5 M.O.T. 2.5.7—ZINC ALLOY

B5.1 Scope

This test applies to zinc alloys.

B5.2 Principle

Three test samples are suspended above heated water for 10 d.

B5.3 Apparatus

A chamber of suitable size to enclose the test samples suspended above a quantity of water heated to a temperature of 97 $\pm 2^{\circ}$ C. The water level shall be maintained automatically.

B5.4 Procedure

The procedure shall be as follows:

- (a) The pressure in the chamber shall be maintained at atmospheric pressure via a water filled S trap.
- (b) Suspend the three samples above the water for 10 d.

B5.5 Result

The castings are deemed to have failed if they develop cracks, swell significantly or, in extreme cases, crumble. The presence of white rust on the surface of castings is not regarded as a failure.

B6 M.O.T. 2.7.10—DISPLACEMENT TEST

B6.1 Scope

This test applies to all appliances.

B6.2 Principle

The appliance is subjected to a critical examination to ascertain if vibration could cause dislocation of components resulting in malfunction of the gas system(s). Also, those components intended for removal for cleaning are removed and reassembled, and the ignition system(s) checked to ensure that the relative positions of components have been sufficiently retained to allow satisfactory operation of the appliance.

B6.3 Materials

Supply of appropriate test gas (see Table 9.2(a) or Clause 9.2.2) at normal test gas pressure.

B6.4 Preparation of apparatus

- (a) Set up the appliance in accordance with Clause 9.2.
- (b) Connect the gas and adjust the ignition system(s) (if necessary) to the manufacturer's specification.

B6.5 Procedure

The procedure shall be as follows:

- (a) Carefully examine all gas system components for relative movement that could be displaced by vibration (e.g. during transport).
- (b) If relative movement is evident test the gas system for normal operation at all possible positions of the components.
- (c) Observe that ignition is satisfactory in all cases.
- (d) Disassemble all components intended to be removable.
- (e) Reassemble.
- (f) Check by observation that the relative position of components has been maintained and also verify that the ignition system continues to operate normally.

B6.6 Result

The appliance complies with the requirement if the relative position of components can be maintained, the ignition remains satisfactory and the appliance operates normally.

B7 M.O.T. 2.10.1—GAS LEAKAGE—FULLY ASSEMBLED APPLIANCES

B7.1 Scope

This applies to fully assembled appliances.

B7.2 Principle

The appliance is connected to a supply of air at the appropriate pressure and any leakage is observed and measured.

B7.3 Apparatus

- (a) Leak detector capable of measuring 1 mL/min with an accuracy of ±0.3 mL/min, e.g. bubble leak detector (see Figure A2) or an electronic leak detector.
- (b) Two pressure gauges with an appropriate range and an accuracy of $\pm 5\%$.

B7.4 Materials

- (a) A means for sealing injectors without removal.
- (b) Supply of air at—
 - (i) 2 600 kPa for appliances designed for use with propane or universal LP Gas; or
 - (ii) 1 000 kPa for appliances designed for use with butane only.
 - (iii) 14 kPa or twice the overload pressure [see Clause 9.2.4(b)], whichever is greater, for regulated parts of appliances.

B7.5 Preparation of apparatus

- (a) Prepare the appliance for testing in accordance with Clause 9.2.
- (b) Where a leak detector is used, check its fittings for gas-tightness and if using a bubble leak detector, adjust to the correct water level.

B7.6 Procedure

B7.6.1 Procedure for unregulated parts of appliances

The procedure shall be as follows:

- (a) Connect the leak detector to the gas inlet connection of the appliance; and connect a means to measure the supply pressure.
- (b) For appliances supplied with a hose, apply a force of 150 N for 1 min to the axis of the hose, with the hose connected to the appliance.
- (c) Close all control valves on the appliance and supply air at—
 - (i) 2 600 kPa for appliances designed for use with propane and universal LP Gas; or
 - (ii) 1 000 kPa for appliances designed for use with butane only

to the inlet of the bubble leak detector, where used, with the detector valves open; or where a pressure gauge or electronic leak detector is used, to the appliance inlet.

- (d) When the appliance is fully pressurized, isolate the appliance from the air supply.
- (e) Open the regulator valve and all intermediate valves, and open any safety shut off valve(s).
- (f) Observe the bubble leak detector, electronic leak detector or pressure gauge, as appropriate.
- (g) Allow approximately 1 min for pressure to stabilize.

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- (h) Where the bubble leak detector is used, operate the detector valves so that the air is directed through the dip tube.
- (i) Check for gas leakage over an appropriate period with the appliance gas controls or valves closed.
- (j) Systematically check for leakage up to and including each injector by opening each control or valve and sealing the injector orifice. Perform each check over an appropriate period.

A3 **B7.6.2** *Procedure for regulated parts of appliances*

The procedure shall be as follows:

- (a) Connect the leak detector to the inlet gas connection of the appliance.
- (b) Close all control valves on the appliance and supply air at 14.0 kPa or twice the overload pressure [see Clause 9.2.4(b)], whichever is greater, to the inlet of the leak detector.
- (c) Open the pressure regulator valve and any safety shut off valve by heating the actuating element or by other means.
- (d) Allow approximately 1 min for pressures to stabilize.
- (e) If using a bubble leak detector, ensure valve 'A' is closed and valves 'B' and 'C' are opened so that the air is detected through the dip tube (see Figure A2, Appendix A).
- (f) Measure the leakage rate.
- (g) Where practicable, systematically check for leakage up to and including each injector by opening each control valve in turn and sealing the injector orifice, including the pilot line.

B7.7 Result

Results shall be as follows:

- (a) Where the bubble leak detector is used, record the average interval between successive bubbles for each check period. Calculate the leakage rate in m/L min.
- (b) Where the pressure gauge or electronic leak detector is used, the extent of any drop in the reading for each check period is recorded. Calculate the leakage rate in m/L min.

The appliance complies with the requirement if the leakage rate does not exceed 1 m/L min.

B8 M.O.T. 2.10.3(a)—NEEDLE VALVES—RESISTANCE TO TEMPERATURE

B8.1 Scope

This test applies to all needle valves that are not certified.

B8.2 Principle

A sample of three valves is checked with air at the pressure shown in Table B1.

B8.3 Apparatus

- (a) An appropriate pressure gauge to measure pressures within the pressure range shown in Table B1 with an accuracy of $\pm 5\%$.
- (b) An appropriate leak detector with an accuracy of $\pm 5\%$.

B8.4 Materials

- (a) A supply of air at the pressure shown in Table B1.
- (b) A means for sealing injectors.

B8.5 Preparation of apparatus

- (a) Connect each needle valve to the air supply.
- (b) Connect pressure gauge.

B8.6 Procedure

The procedure shall be as follows:

- (a) Connect the leak detector to the gas inlet connection of the valve, and connect a means to measure the supply pressure.
- (b) Close the valve and supply air at the appropriate pressure to the inlet of the bubble leak detector, where used, with the detector valves open; or where a pressure gauge or electronic leak detector is used, to the valve inlet.
- (c) When the valve is pressurized, isolate the valve from the air supply.
- (d) Observe the bubble leak detector, electronic leak detector or pressure gauge, as appropriate.
- (e) Allow pressure to stabilize.
- (f) Where the bubble leak detector is used, operate the detector valves so that the air is directed through the dip tube.
- (g) Check for gas leakage in all the conditions shown in Table B2.

B8.7 Result

The appliance complies with this requirement if at both the pressures shown in Table B1 the leakage rate is no greater than 0.05 L/h with the valves both open (injector sealed) and closed (injector open).

Appliance designed for	Test pressure (kPa)	
	Low	High
Propane	50	1800
Butane	50	800
Universal LP Gas	50	1200

TABLE B1 AIR PRESSURE—NEEDLE VALVE LEAK TEST

TABLEB2

TEST CONDITIONS

Τ	Condition			
Iemperature	Valve	Pressure		
Ambient	On/sealed	High*	Low*	
	Off/open	High*	Low*	
Ambient after maintaining 40 ±5°C for 120 h	On/sealed	High*	Low*	
	Off/open	High*	Low*	
After cooling to -20°C for 24 h—in turn:				
0 ±5°C	On/sealed	High*	Low*	
	Off/open	High*	Low*	
70 ±5°C	On/sealed	High*	Low*	
	Off/open	High*	Low*	
Ambient	On/sealed	High*	Low*	
	Off/open	High*	Low*	

*Pressure values from Table B1.

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B9 M.O.T. 2.10.3(b)—NEEDLE VALVES—DURABILITY

B9.1 Scope

This test applies to all needle valves that are not certified.

B9.2 Principle

A sample of three valves is checked for leakage after 2000 cycles at ambient temperature with air at the pressure shown in Table B1.

B9.3 Apparatus

- (a) An appropriate pressure gauge to measure pressures within the pressure range shown in Table B1 and at 50 kPa with an accuracy of $\pm 5\%$.
- (b) An appropriate leak detector with an accuracy of $\pm 5\%$.
- (c) Equipment to turn valves on and off over 2000 cycles.

B9.4 Materials

A supply of air supply at the pressure shown in Table B1.

B9.5 Preparation of apparatus

- (a) Connect the needle valve to the cycling equipment.
- (b) Connect the needle valve to the air supply.

B9.6 Procedure

The procedure shall be as follows:

- (a) Supply air to the valve under test at 50 kPa.
- (b) Cycle the value at a rate of 6 ± 2 cycles min from the closed position to the fully open position (without applying force to the stop), and without stopping, reverse the rotation to the closed position with the application of a torque of 0.3 Nm.
- (c) At the end of 2000 cycles, close the valve with a torque of 0.5 Nm.
- (d) Check for gas leakage with the injector open and the valve in the off position at the low pressure shown in Table B1.
- (e) Check for gas leakage with the injector sealed and the valve in the on position at the high pressure shown in Table B1.

B9.7 Result

The appliance complies with this requirement if at the leakage rate is no greater than 0.05 L/h with the valve both open (injector sealed) and closed (injector open).

B10 M.O.T. 2.11.1—GAS CONSUMPTION TEST

B10.1 Scope

This test applies to the burners of all appliances.

B10.2 Principle

The appliance is operated with the appropriate test gas at the normal inlet pressure shown in Table 9.2(a) or Clause 9.2.2. The mass of gas passing per hour is measured accurately and used to calculate gas consumption.

B10.3 Apparatus

(a) A stopwatch.

- (b) A balance to weigh up to 20 kg with an accuracy of 1.0 g.
- (c) An appropriate pressure gauge to measure pressures within the range 0 to 1500 kPa with an accuracy of $\pm 5\%$.

B10.4 Materials

An appropriate container of test gas at normal inlet pressure (see Table 9.2(a) or Clause 9.2.2).

NOTE: Appliances intended for use with cartridges are to be fitted with the cartridge type marked on the appliance (see Clause 2.16.3 (f)).

B10.5 Preparation of apparatus

- (a) Prepare the appliance for testing in accordance with Clause 9.2.
- (b) Weigh the container of test gas, connected to the appliance, and record the mass.
- (c) Stabilize the container of test gas at nominal inlet pressure or temperature as shown in Table 9.2(a).

B10.6 Procedure

The procedure shall be as follows:

- (a) Turn on the gas fully, light the burner and simultaneously start the stopwatch.
- (b) Check the gas inlet pressure and adjust if necessary.
- (c) After 30 min, turn off the gas and stop the stopwatch.
- (d) Reweigh the container of test gas, connected to the appliance, record result. Determine the mass of gas consumed in kilograms (m).
- (e) Calculate the gas consumption as follows:

Gas consumption (g/h) =
$$\frac{m \times 60 \times 1000}{t}$$

Gas consumption (MJ/h) = $\frac{m \times 60 \times \mu}{t}$

where

t

μ

m = mass of gas consumed (kg)

= time elapsed (min)

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B10.7 Result

- A3 | The appliance complies with these requirements if, for each burner, the determined gas consumption is within the following limits:
 - (a) 20% of nominal gas consumption for burners with inputs less than 2 MJ/h.
 - (b) 15% of nominal gas consumption for burners with inputs greater than 2 MJ/h but less than 12 MJ/h.
 - (c) 10% of nominal gas consumption for burners with inputs greater than 12 MJ/h but less than 30 MJ/h.
- A3 (d) 5% of nominal gas consumption for burners with input 30 MJ/h or above.

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