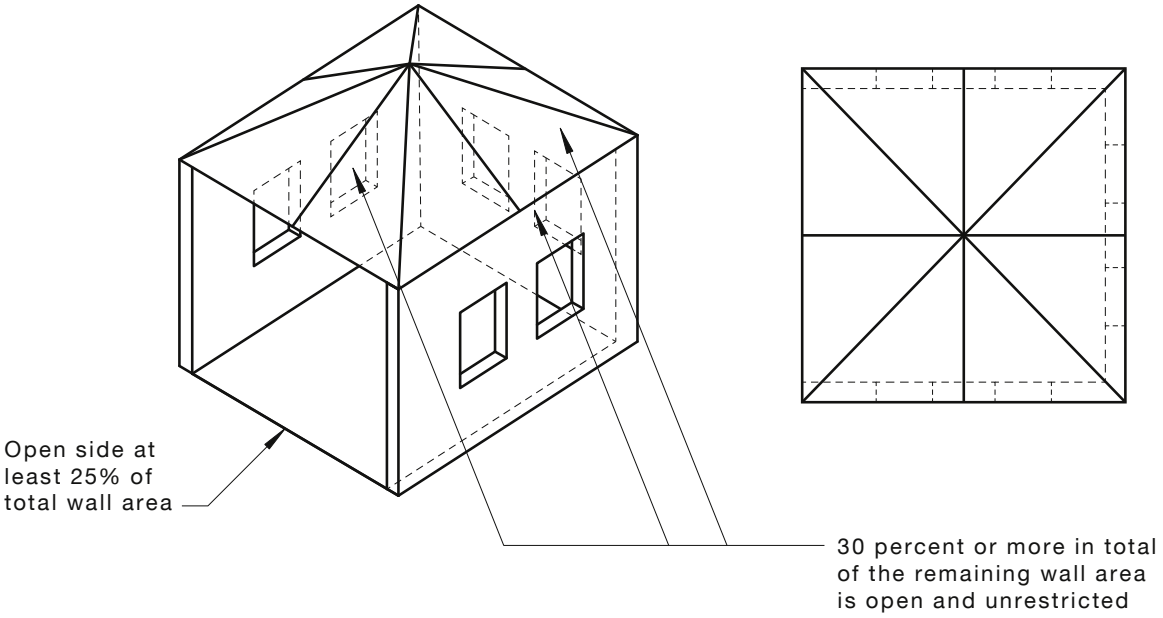

FIGURE G5 OUTDOOR AREA—EXAMPLE 5

APPENDIX H

GUIDELINES ON PROVIDING WRITTEN APPLIANCE SPECIFICATIONS

(Informative)

The primary function of an appliance specification is to provide a record that defines exactly the appliance to which a test report and/or a certificate of compliance may apply. It is therefore important that the specification gives an adequate description of those features and dimensions that contribute to the essential functioning of the appliance.

NOTE: Applicants for certification should contact the certifying body to confirm whether the agency has additional requirements to those listed in this Appendix.

The following shows by list and example the form in which these specifications may be prepared.

GENERAL SPECIFICATIONS

Name of appliance:	
Manufactured by:	
Certificate No:	
Date:	

Type:	General description of the type of appliance, alternative models, optional extras, etc.
Capacity/Thermal output:	The heat output or capacity of the appliance (for example, the heat output by a heater or the storage capacity of a water heater)
Fuel:	The gas (or gases) the appliance is designed to operate on
Nominal gas consumption:	Nominal gas consumption in MJ/h for each main and pilot
Injector diameter:	Give alternatives if necessary for different gases; injector size to be specified in millimetres
Overall dimensions:	Include dimensions of the basic unit, plus additional dimensions over projections, such as connections, controls, flue connections, etc.
Weight:	The weight of the appliance. This is the ‘dry’ or empty weight of an appliance intended to heat water, oil or similar
Marking:	Description and location of data plate, name plates, instructions, temporary labels, etc.

CONSTRUCTION

Description of the type of construction and assembly used. This should describe briefly but clearly how the appliance is put together, with details of outer panels, supporting members and fixings, etc. Dimensions, types of material, thicknesses, and finishes should be given.

Locations, dimensions, types of material, thicknesses, finishes and other relevant information should be given for at least the following items where applicable:

(a) Outer case.

(b) Cylinder support (where applicable).

(c) Burner support.

(d) Combustion air inlet.

(e) Combustion chamber.

(f) Primary flue.

(g) Primary flue baffle (where applicable).

(h) Draught diverter (where applicable).

(i) Secondary flue connection.

(j) Description, location, dimensions, material, finishes.

(k) Dust tray.

(l) Insulation.

GAS SYSTEM

Gas piping system:	A brief description of the gas piping system from the inlet connection to the burner. Details may be left to the following.
Gas inlet connection:	Type, location, sizes, alternative methods of connecting
Regulator:	Make, model, capacity, certification number
Piping:	Nominal sizes, dimensions, finishes, sizes and types of connections
Gas control:	Type of control system, type and model of any gas valve, filter, thermostat, shut-off control. Where a certified component is included its model number may be quoted, together with its certification number and location, otherwise a full description including dimensions, materials and finishes should be supplied
Burner:	Description, location, dimensions, materials, finishes, method of mounting. Details required of the primary air control, primary air port, mixing tube, burner head, burner ports, gas jets or injector nipples
Pilot:	Make, model, or alternatively detailed description. Location relative to other burners, jet size, type of cock or control, details of adjustment system
Pressure test point:	Type or description, location

CONVERSION DETAILS

Conversion instructions—an indication as to whether the appliance is readily convertible between gases. If conversion is possible, include a step by step procedure for converting the appliance between applicable gases.

Descriptions, including the manufacturer's part numbers and the quantity required of all parts necessary for the conversion of the appliance. Drawings should be supplied where this will clarify and facilitate the conversion procedure.

HEATING SYSTEM (where applicable for heaters)

Type:	General description of the type of heating method used
Heat exchanger:	Type, location, dimensions, materials, finishes, description of air flow system
Return air inlet:	Location, size, provisions for duct connection
Warm air outlet:	Location, size, provisions for duct connection
Radiants:	Location, method of assembly or support, dimensions, materials, finishes
Other ceramics:	Description, dimensions, location

APPENDIX ZA

PRELIMINARY TEST METHODS

(Normative)

ZA1 GAS LEAKAGE TEST

ZA1.1 Scope

This method sets out the procedure to assess the gas leakage of an appliance.

ZA1.2 Principle

The appliance is connected to a supply of air at the appropriate pressure and any leakage is observed and measured. The tests are carried out at ambient temperature and a pressure of 1.5 times rated working pressure or 14 kPa, whichever is the greater upstream of the appliance.

ZA1.3 Apparatus

The following apparatus shall be used:

(a) Leak detector capable of measuring 1 mL/min with an accuracy of ±0.3 mL/min, e.g. bubble leak detector (see Figure A1), electronic leak detector.

(b) A pressure gauge with an appropriate range and an accuracy of ±5%.

(c) Suitable timing device.

ZA1.4 Materials

The following materials shall be used:

(a) A supply of air at the appropriate pressure.

(b) Suitable materials to seal injectors.

ZA1.5 Preparation of apparatus

The apparatus shall be prepared as follows:

(a) The appliance is prepared for testing in accordance with Clause 3.2.

(b) The leak detector and its fittings are checked for gas tightness. If using a bubble leak detector, the correct water level is adjusted.

ZA1.6 Procedure

The procedure shall be as follows:

(a) Connect the leak detector to the inlet gas connection of the appliance.

(b) Connect a pressure gauge to the pressure test point.

(c) Close all control valves on the appliance and supply air at the required pressure to the inlet of the leak detector.

(d) Open the pressure regulator valve and any safety shut off valve by heating the actuating element or by other means.

(e) Allow approximately 1 min for pressures to stabilize.

(f) If using a bubble leak detector, ensure valve ‘A’ is closed and valves ‘B’ and ‘C’ are opened so that the air is directed through the dip tube (see Figure A1).

(g) Measure the leakage rate.

(h) 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.

ZA1.7 Test report

All relevant observations shall be reported, with the maximum measured leakage rate, in mL/min.

ZA2 GAS CONSUMPTION TEST

ZA2.1 Scope

This method sets out the procedure to determine the gas consumption of a burner or a set of burners of an appliance (or pilot).

ZA2.2 Principle

The appliance is supplied with the appropriate gas and the test point pressure is carefully set to the nominal value. The gas rate to the burner is measured accurately 15 min after ignition.

It is necessary to obtain the dry relative density of the gas, the gas temperature, and to note whether the gas is dry or saturated when passing through the gas meter, so that the corrected gas consumption can be calculated.

ZA2.3 Apparatus

The following apparatus shall be used:

(a) Equipment as specified in Appendix F.

(b) Suitable timing device.

ZA2.4 Materials

Supply of appropriate test gas shall be used. (See Clause 3.1.)

ZA2.5 Preparation of apparatus

The apparatus shall be prepared as follows:

(a) The appliance shall be prepared for testing in accordance with Clause 3.2.

(b) Supply the appropriate gas at normal test gas pressure to the appliance.

(c) Ensure that the meter is nominally at room temperature.

(d) If test gas has been changed ensure meter is adequately purged.

(e) Ensure that the thermostat or any other temperature control device is rendered inoperative, e.g. by immersing the sensing element in cold water.

(f) Adjust any heated air circulating fan (if fitted) to operate at its nominal design condition as specified by the appliance manufacturer.

ZA2.6 Procedure

The procedure shall be as follows:

(a) Turn on the gas fully to the burner, ignite the gas and if necessary set the test point pressure to the nominal value. Operate the burner/burners for 15 min.

(b) Measure the total gas rate Q_m within the next 2 min.

(c) Calculate the determined gas consumption R using the following equation:

$$R = Q_m \times \frac{(P_a + p)}{P_s} \times W_r \times \left[D_t \times \frac{T_s}{T_m} \frac{(P_s + h)}{(P_a + h)} \right]^{1/2} \times \left[1 - \frac{P_w}{(P_a + h)} \times \left(1 - \frac{D_w}{D_t} \right) \right]^{1/2}$$

where

R = determined gas consumption (MJ/h)

Q_m = measured total gas rate (m^3/h)

p = measured meter inlet gauge pressure (kPa)

P_s = standard absolute pressure (barometer) (101.325 kPa)

P_a = measured absolute ambient pressure (barometer) (kPa)

W_r = Wobbe index of reference gas (see Table ZA2.6)

D_t = measured test gas relative density (dry) (Air = 1.000)

T_s = standard absolute temperature (273.15 + 15, 0) (K)

t = measured meter temperature (°C)

T_m = meter absolute temperature (273.15 + t) (K)

P_w = water vapour absolute pressure (partial pressure) at t (kPa) (refer to Appendix B)

h = measured injector gauge pressure (nominal test point pressure) (kPa)

D_w = water vapour relative density (0.622)

NOTES:

1 For pilots, the effect of h is deemed to be negligible and its value is taken to be 0 kPa.

2 The last term in the square brackets equals unity (1) for NG, TG and all dry gases.

TABLE ZA2.6

W_r VALUES (DRY BASIS)

Appliance gas type	W_r MJ/m^3
TG	26.0
TLP	23.8
NG	50.0
Propane, Universal LP Gas	76.9
Butane	87.2

ZA2.7 Test report

All relevant observations shall be reported, including at least the following:

(a) The nominal gas consumption for each burner or set of burners and gas type.

(b) The determined gas consumption for each burner or set of burners and gas type.

(c) Percentage variation between the nominal and determined gas consumption, for each burner or set of burners and gas type.

ZA3 GAS PRESSURE REGULATORS TEST

ZA3.1 Scope

This method sets out the procedure to assess the performance of a gas pressure regulator.

ZA3.2 Principle

A regulator reference setting is established, then the regulator outlet pressure is measured while the appliance inlet pressure is varied through the range specified.

ZA3.3 Apparatus

Equipment specified in Appendix F shall be used.

ZA3.4 Materials

Supply of appropriate test gas shall be used. (See Clause 3.1.)

ZA3.5 Preparation of apparatus

The apparatus shall be prepared as follows:

(a) The appliance shall be prepared for testing in accordance with Clause 3.2.

(b) Identify and note the location of the manufacturer's specified pressure test point(s).

(c) Ensure that the thermostat or any other variable restrictions in the gas line will not vary the gas flow-rate during the test, e.g. by immersing thermostat sensing element in cold water.

ZA3.6 Procedure

The procedure shall be as follows:

(a) Light all burners or as stated in the manufacturer's instructions.

(b) Adjust appliance inlet pressure to the minimum shown in Table 3.5.

(c) For regulators that are intended to be adjusted, set regulator outlet pressure to the nominal test point pressure while maintaining the correct appliance inlet pressure.

(d) Turn off burners to stabilize regulator, then turn burners on again and note regulator outlet pressure.

(e) If necessary, repeat Steps (c) and (d) until the regulator outlet setting can be reproduced within ±5% of nominal test point pressure.

(f) If unable to obtain regulator outlet settings within ±5% of nominal test point pressure discontinue test.

(g) Turn on all burners.

(h) Increase the inlet gas pressure gradually to the maximum shown in Table 3.5 and record the test point pressure and inlet pressure at intervals no greater than 0.5 kPa.

(i) Decrease the inlet gas pressure gradually to the minimum shown in Table 3.5 and record the test point pressure and inlet pressure at intervals no greater than 0.5 kPa.

ZA3.7 Test report

Report the maximum variation of the test point pressure and corresponding inlet pressure(s) and the position of the pressure test point (e.g. on regulator, on gas manifold, etc.).

ZA4 BURNER IGNITION—PILOT LIGHT BACK AND BLOCKED AERATION AND BLOCKED MULTI-PORT PILOTS TEST

ZA4.1 Scope

This method sets out the procedure to assess the safe operation of an aerated and/or multi-port pilot.

ZA4.2 Principle

The pilot is tested to determine if it can be operated in the light back condition. If so, it is then checked if ignition of the main burner is achieved or if the safety shut off valve closes.

The test is then repeated with the primary air opening closed.

If the pilot has more than one flame port the tests are repeated with all ports blocked other than the one activating the flame safeguard sensor.

ZA4.3 Apparatus

Equipment as specified in Appendix F shall be used.

ZA4.4 Materials

Supply of appropriate test gas (see Clause 3.1) at normal test gas pressure shall be used.

ZA4.5 Preparation of apparatus

The apparatus shall be prepared as follows:

(a) Prepare the appliance in accordance with Clause 3.2.

(b) Set up the appliance in a draught-free position.

(c) Connect to gas.

ZA4.6 Procedure

The procedure shall be as follows:

(a) Attempt to establish a light back condition at the pilot. If a light back condition cannot be established then skip to Step (e).

(b) Supply gas to the main burner.

(c) Observe that main burner ignites promptly, safely and without undue noise or that pilot causes the safety shut-off valve to close.

(d) Turn off main burner and pilot.

(e) Close the pilot primary air opening and attempt to relight pilot. If the pilot cannot be established then skip to Step (g).

(f) Repeat Steps (b) and (c).

(g) If the pilot burner has more than one flame port (including multi-ports joined by a cross-lighting strip), repeat Steps (a) to (f) with all ports blocked other than the one activating the flame safeguard sensor.

ZA4.7 Test report

Report on the main burner ignition observations (promptness, safety and noise), the operation of the safety shut-off valve and all other relevant observations when—

(a) the pilot is operated in a light back condition;

(b) the pilot primary air opening is closed; and

(c) all pilot flame ports, other than the one activating the flame safeguard sensor, are blocked (if applicable).