The ignition device or any other means of ignition is operated after a short delay. At the end of this test, the gas supply to the burner is interrupted, the compartment is ventilated and the appliance cooled to room temperature.

The test is repeated several times gradually increasing the delay until the most critical delay is reached. After each ignition test the compartment is ventilated and the appliance is cooled to room temperature.

The requirements of 5.2.12.2 are deemed satisfied if, on reaching the most critical delay:

— there is no damage to or distortion of the appliance;

— the compartment door does not open itself;

— no flame is emitted from the front of the appliance.

However, if at any time during the delayed ignition tests, one of the above phenomena is observed, the tests are halted and the appliance is deemed not to comply with the requirements of 5.2.12.2.

For these tests, devices for remotely controlling the ignition and the gas supply to the burner shall be used.

7.2.4 Appliances with a glass lid having a device for shutting off the gas to the hotplate burners

The appliance is installed in accordance with the requirements in 7.1.3.3 and supplied with the reference gas with the lowest Wobbe index of the category, in accordance with 7.1.1.1 under the normal test pressure.

It is adjusted in accordance with ▌AC〉 7.1.3.2.1 〈AC▐. If necessary, it is supplied with electricity at the rated voltage.

With the lid open to the maximum permitted by the test installation, all the burners of the hotplate are ignited and operate for 5 min, with their control devices at their highest setting. The following tests are then carried out:

1) the lid is lowered until it has gone through an angle of 5° from its fully open position. With the lid in this position, it is verified that the requirements of 5.2.8.1 (paragraph 10, subdivision b) 1)) are respected;

2) the lid is lowered until it has gone through an angle of 45° from its fully open position. 5 s after the lid has reached this position, it is verified that the requirements of 5.2.8.1 (paragraph 10, subdivision b) 2)) are respected.

7.2.5 Food hygiene in time controlled ovens

The appliance is installed in a room in which the ambient temperature does not vary by ± 2 °C during the maximum period permitted by the oven programmer.

Using each of the reference gases at supply pressure, each oven pilot is adjusted in accordance with the technical instructions.

The test starts when the appliance has reached thermal equilibrium, at the ambient temperature. The oven pilot is ignited and the programmer is set to the position giving the maximum delay time.

The temperature at the centre of the oven and the ambient temperature are measured by means of thermocouples and recorded continuously. The appliance and the thermocouple measuring ambient temperature are protected from the effects of sun and draughts.

The test continues for the maximum period permitted by the programmer.

Using the temperature recording, a period of 1 h is chosen during which there are the fewest fluctuations in the oven temperature and ambient temperature.

The difference between the oven temperature and ambient temperature is then determined by the average of the temperatures measured during this 1 h period.

In these conditions, the specification of 5.2.13 shall be satisfied.

7.3 Verification of performance characteristics

7.3.1 General tests

7.3.1.1 Soundness

The gas carrying parts are tested under the following conditions:

— test no. 1: With all taps and shut-off devices closed;

— test no. 2: With all taps in the "on" position, the injectors of burners and pilots temporarily blocked and any shut-off devices, for example the valves of flame supervision devices, where present, in the open position.

The tests are carried out cold, with air.

For the tests, the pressure upstream of the appliance is adjusted to 150 mbar.

These tests are carried out:

— in the delivery condition;

— immediately after the strength tests described in 5.1.4;

— at the end of all the tests to which the appliance is subjected with its original equipment without changing any parts (injectors, pilots etc.);

— after the five disconnections and re-assemblies described in 5.1.5 and carried out after the above test.

The leakage shall be measured in such a way that the accuracy of measurement is within 0,01 l/h (0,01 dm^3/h).

7.3.1.2 Obtaining the rates

7.3.1.2.1 Obtaining the nominal heat input

7.3.1.2.1.1 General

a) The nominal heat input is verified by using the reference gas or gases indicated in 7.1.1.1 and 7.1.3 depending on the category of the appliance, at the appropriate test pressures defined in 7.1.2 corresponding to the pressure data on the appliance (see 8.1) and using the corresponding injectors.

The measuring equipment shall enable the rate to be determined to an accuracy of ± 1,7 %.

The nominal heat input Q_n indicated by the manufacturer is given by one of the following equations:

$$Q_n = 0{,}278\ M_n \cdot H_s \qquad (4)$$

or :

$$Q_n = 0{,}278\ V_n \cdot H_s \tag{5}$$

where

Q_n is expressed in kilowatts;

M_n is the mass flow rate of dry gas under reference conditions corresponding to the nominal heat input in kilograms per hour;

V_n is the volume rate of dry gas under reference conditions corresponding to the nominal heat input in cubic meter per hour;

H_s is the gross calorific value of the reference gas in Tables 7 and 8, given in megajoules per cubic meter or megajoules per kilogram.

b) The mass (M_n and M_o) and volume (V_n and V_o) inputs correspond to a measurement and flow of the reference gas, under reference conditions, i.e. assuming a dry gas at 15 °C and under a pressure of 1 013,25 mbar. In practice, the values obtained during the tests do not correspond to these reference conditions, they shall therefore be corrected in order to bring them to the values which would actually have been obtained if these reference conditions had been achieved during the tests, at the injector outlet.

The corrected mass flow rate is calculated using the following formula, according to whether it has been determined by weighing or on the basis of a volume rate:

— determination by weighing:

$$\frac{M_o}{M} = \sqrt{\frac{1\,013{,}25 + p}{p_a + p} \cdot \frac{273{,}15 + t_g}{288{,}15} \cdot \frac{d_r}{d}} \tag{6}$$

— determination on the basis of volume rate:

$$\frac{V_o}{V} = \sqrt{\frac{1\,013{,}25 + p}{1\,013{,}25} \cdot \frac{p_a + p}{1\,013{,}25} \cdot \frac{288{,}15}{273{,}15 + t_g} \cdot \frac{d}{d_r}} \tag{7}$$

The corrected mass flow rate is calculated using the following equation:

$$M_o = 1{,}226\ V_o \cdot d_r \tag{8}$$

where

M_o is the mass flow rate of dry gas which would have been obtained under reference conditions (see 3.1.3) in kilogram per hour;

M is the mass flow rate obtained under test conditions in kilograms per hour;

V_o is the volume rate of dry gas which would have been obtained under reference conditions (see 3.1.3) in cubic meter per hour under the same conditions;

V is the volume rate obtained and expressed under test conditions in cubic meter per hour;

p_a is the atmospheric pressure, in millibar;

p is the gas supply pressure at the measuring point in millibar;

t_g is the gas temperature at the measuring point, in degrees Celsius;

d is the relative density of the dry (or wet) test gas relative to dry air;

d_r is the relative density of the dry reference gas relative to dry air.

These equations shall be used to calculate, from the mass input M or volume input V measured during the test, the corresponding rates M_o or V_o which would have been obtained under reference conditions.

It is these values M_o and V_o which shall be compared with the values M_n and V_n calculated from the nominal heat input using the equations given in a) of this subclause.

These equations are applicable if the test gas used is dry.

If a wet meter is used or if the gas used is saturated, the value d (relative density of dry gas in relation to dry air) shall be replaced by the value of the relative density of the wet gas d_h given by the following equation:

$$d_h = \frac{(p_a + p - p_{ws})d + 0{,}622\ p_{ws}}{p_a + p} \tag{9}$$

where

p_{ws} is the saturation vapour pressure (expressed in mbar) at temperature t_g.

The saturation vapour pressure at t_g can be taken as equal to:

$$p_{ws} = \exp\left(21{,}094 - \frac{5.262}{273{,}15 + t_g}\right) \tag{10}$$

NOTE In the case of 2nd family gases, this correction is negligible.

7.3.1.2.1.2 Operating conditions

The measurements are taken with the burner operating under the following conditions.

— **hotplate burners:**

  — a pan is placed on an uncovered burner in accordance with 7.1.4.1;

  — with the appliance at ambient temperature, the burner is ignited and operated for 10 min;

  — measuring begins at the end of the tenth minute and finishes at the latest at the end of the thirteenth minute, or when the highest number of complete revolutions of the meter have been made before the end of the thirteenth minute. The measurement shall be taken over at least one complete revolution of the meter.

— **ovens with or without thermostat:**

  — measuring begins from ignition, with the thermostat or control device at the maximum setting and with the door open, and ends at the latest at the end of the fifth minute or when the highest number of complete revolutions of the meter have been made before the end of the fifth minute.

— **grills:**

- the burner is ignited and operates for 10 min, with the control device at its highest setting and the door open;
- measuring begins at the end of the tenth minute, and ends at the latest at the end of the thirteenth minute, or when the highest number of complete revolutions of the meter have been made before the end of the thirteenth minute.

- **for burners without gas rate adjusters:**
  - the heat input is measured for each reference gas supplying the appliance at a corresponding normal test pressure. The values obtained shall comply with the requirements of 6.1.2.1.

- **for burners with gas rate adjusters:**

test no. 1

- With the adjuster in the maximum flow position, the supply pressure is adjusted to the minimum value.
- The values obtained shall comply with the requirements of 6.1.2.1.

test no. 2

- This test is carried out immediately after test no. 1 without cooling down the appliance. With the adjuster in the minimum flow position, the test pressure is adjusted to the maximum value.
- The values obtained shall comply with the requirements of 6.1.2.1.
- If the adjustment of the gas rate is made by varying the pressure upstream of the injector, these verifications are carried out with gases G20, G25, G110.
- However, if the adjustment is made by varying the cross-section of the injector, test no.1 is only carried out with the reference gas with the lowest Wobbe index. It is verified with the reference gas with the highest Wobbe index, under the corresponding normal test pressure, that the injector size corresponds to the nominal heat input in accordance with the requirements of 6.1.2.1.
- The values obtained shall comply with the requirements of 6.1.2.1.

test no. 3

- The burner is adjusted according to the manufacturer's instructions under normal pressure. Using the reference gas or gases under normal test pressure, it is verified that the heat input complies with the requirements of 6.1.2.1 which apply to burners which are not fitted with a gas rate adjuster.

7.3.1.2.2 Obtaining the reduced heat input

7.3.1.2.2.1 General

The burner is supplied according to its category with the reference gas or gases in accordance with 7.1.1.1 and [AC> 7.1.3.2.1 <AC], and at the normal test pressure given in 7.1.2.

The same vessels are used as for the measurement of nominal heat input.

The equations given in 7.3.1.2.1.1 for correcting the input values obtained during testing are applicable for verifying the requirements of 6.1.2.2.

7.3.1.2.2.2 Operating conditions

After operation under the conditions described below, the tap handle is moved to the reduced rate or minimum temperature position:

a) hotplate burners and grills

The measurement is taken after 10 min of operation at nominal heat input, or immediately after the measurement for obtaining nominal heat input.

b) oven

The door is closed. The oven operates according to 7.1.5.

The measurement is taken after 30 min of operation.

7.3.1.3 Flame supervision device

7.3.1.3.1 Opening and extinction delay times

The tests designed to verify the opening and extinction delay times of the flame supervision devices specified in 6.1.3 are carried out with the appropriate reference gas" corresponding to the appliance category, at the normal test pressure. With these supply conditions, the appliance is first adjusted to its nominal heat input, where adjusters are permitted.

Any pilot gas rate adjuster is adjusted as specified in the technical instructions.

After these adjustments, the appliance is shut off until it is cooled to ambient temperature. The gas supply is restored and any pilot is lit. The opening time is that between the moment when the gas is lit at the pilot or main burner (if there is no pilot) and that when the flame supervision device allows admission of the gas to the burner without manual interruption.

At the end of test no. 2 of 7.3.2.4.1 for hotplate burners or for the oven and grill burners the tests in 7.3.3.2.3 that require the use of the reference gases, the extinction delay time is measured between the moment when the pilot if any and burner are purposely extinguished by shutting off the gas supply and the moment when, after immediately restoring the supply, the flow of gas controlled by the supervision device ceases through the action of this device.

7.3.1.3.2 Pilot flames

The tests designed to verify the operating characteristics of pilot flame supervision devices are carried out using each of the reference gases at maximum and minimum pressures, verifying in each case that the flame supervision device only opens or remains open when ignition is possible or has taken place satisfactorily when following the manufacturer's instructions for ignition.

Test no. 1

With the appliance cold, reduce the gas rate to the pilot to the minimum energy required to keep open the gas supply to the burner. Check that the burner is correctly ignited by the pilot.

Test no. 2

After heating the oven to a stable temperature in accordance with 7.1.5, close the oven tap and after a period of 3 min check ignition with the actuating flame of the flame supervision device reduced to the most critical heat input found in the previous test.

Test no. 3

In the case of pilots with several flame ports susceptible to blockage, the previous tests are repeated with all the holes blocked except for the one which supplies the actuating flame for the sensing element of the flame supervision device.

7.3.1.4 Safety of operation

7.3.1.4.1 Resistance to overheating

a) For all appliances:

The appliance is first supplied with reference gas and then with the light back limit gas, or gases, for the category to which the appliance belongs, using the appropriate injector. The maximum heat input at which each gas will burn either at the injector or inside the burner is determined in the following way:

— the burners are covered with a pan in accordance with 7.1.4.1;

— a temporary griddle is only tested as a griddle;

— the gas is intentionally lit at the injector at normal test pressure (see 7.1.2), if necessary after temporary removal of the burner head and also, if possible, at the burner head;

— if combustion cannot be maintained at the injector or within the burner when the burner operates at its full rate, the test is carried out by reducing the pressure to a point where combustion can be maintained, but without, however, lowering the pressure below the minimum test pressure.

If a reduced rate position is provided on the taps, and if the preceding test has not allowed combustion to be maintained at the injector or within the burner, the heat input is reduced by turning the tap towards the reduced rate position until the point is reached where combustion can be maintained in the injector or inside the burner.

The test for resistance to overheating is then carried out supplying the appliance with the gas which can burn at the highest rate at the injector or inside the burner, leaving the flame to burn under these conditions for 15 min.

The requirements of 6.1.4.1 shall be satisfied.

b) Appliances with hotplate burners:

If an appliance has hotplate burners, an additional test is carried out with reference gas(es) at normal test pressure.

Each hotplate burner is operated according to the instructions for use and maintenance with its control set in the reduced rate position.

The burners are operated simultaneously for 1h with no pan over them.

The requirements of 6.1.4.1 shall be satisfied.

7.3.1.4.2 Escape of un-burnt gas

7.3.1.4.2.1 Soundness of burner parts

The test is carried out with reference gas or gases for the appliance category, supplied at normal test pressure.

Each burner having a body comprising several parts is ignited with its taps or thermostat in the fully open position.

A suitable means (e.g. a match, a mobile ignition burner) is then used to search for gas leaks from the joints of the assembly which could be ignited.

If necessary, components other than those of the burner may be removed, provided that this does not alter the test conditions.

Checks are made that the requirements of 6.1.4.2.1 are met.

7.3.1.4.2.2 Spillage of un-burnt gas

The tests are carried out with reference gas(es) of the appliance category at normal test pressure.

Each burner is first tested at its nominal heat input (see [AC> 7.1.3.2.4 <AC]), then under the following conditions:

[AC>

a) **Hotplate burners**

The burner is supplied at the reduced rate obtained:

1) in the position specified for plug and disc type taps;

2) in the position giving the value indicated by the technical instructions for a needle type tap.

b) **Oven burners**

The oven is heated in accordance with 7.1.5.

The thermostat or tap is then moved to the position corresponding to the minimum temperature.

c) **Grill burners**

The tap is adjusted to the reduced rate position, if such exists.

When each burner is operated under the conditions described above, a combustible gas detector is used to search for un-burnt gas in the parts of the appliance where such gas could accumulate.

The requirements of 6.1.4.2.2 are satisfied if the maximum gas concentration in the air does not exceed 0,025 % by volume.

The concentration of gas in the air shall be determined to an accuracy of 0,005 % of the volume of the sample.

Care shall be taken to ensure that the sampling method used does not affect the flow of gas and air inside the burner. In particular, the sampling probe shall not be placed against the air inlet or burner body.

If the air is adjusted by closing it off inside the burner mixing tube, the test is carried out with this device adjusted to its maximum closed position. <AC]

7.3.1.4.3 Safety of operation at reduced pressure

The test is carried out in calm air and on each burner individually.

With the burner supplied with the reference gas G20, the requirements of 6.1.4.3 shall be verified under the following conditions:

Hotplate burners:

— Operate the burner initially for 10 min at full rate at normal test pressure;

— The burner tap is moved at normal speed to its reduced flow position and the appliance operates for 60 s under these conditions;

— The pressure is then reduced progressively to 14 mbar.

Oven burners:

— The burner is operated under normal test pressure with the thermostat in maximum position, or if there is no thermostat, with the tap set to the fully open position;

— After 30 min of operation, the control device is moved at normal speed to the position corresponding to minimum temperature and the appliance operates 60 s under these conditions;

— The pressure is then reduced progressively to 14 mbar.

Grill burners:

— Operate the burner initially for 10 min at full rate at normal test pressure;

— The burner tap is moved at normal speed to its reduced rate position, if any, and the appliance operates for 60 s under these conditions. If the reduced rate position does not exist, operation is maintained at full rate;

— The pressure is then reduced progressively to 14 mbar.

7.3.1.5 Heating

7.3.1.5.1 Test installation

7.3.1.5.1.1 All appliances

For these tests, the appliance is placed in the test installation specified in 7.1.3.3, but with the following alterations:

Unless otherwise indicated, if additional or replacement panels are specified, they shall be made of 19 mm to 25 mm thick wood and coated with matt black paint.

Temperature measurement on the panels is limited to the hottest zones with the thermocouple at the centre of a square of sides 100 mm on each of the panels. The thermocouples are introduced from the outside so that their junctions are 3 mm from the surface facing the appliance. Additional thermocouples may be added in areas susceptible to high temperatures.

This procedure applies for all classes of appliance.

In addition, the following supplementary installation conditions shall be complied with according to the class and subclass of the appliance.

7.3.1.5.1.2 Class 1 and class 2 subclass 1

a) **For all appliances with a hotplate**, an additional panel is placed vertically at the side of the appliance which produces the greater heating effect, at the minimum distance (see X_1 in Figure 12) indicated in the instructions. This panel shall be of a sufficient depth to extend from the back panel to at least 50 mm

beyond the front and of a sufficient height to extend from the work top to the top of the back panel. The gap between the lower panel and the upper panel shall be filled in by a horizontal panel.

b) **For wall-mounted grills**, additional panels are placed on each side of the appliance at the minimum distance indicated in the technical instructions. These panels are 600 mm deep and extend at least from the horizontal panel below the appliance to the horizontal panel described in c).

c) **For all appliances**, a panel of sufficient depth to exceed the corresponding dimension of the appliance by at least 50 mm and of sufficient width to reach the vertical side panels (including the additional panel described in a) if fitted) is placed horizontally above the appliance at the minimum distance (see X2 in Figure 12) indicated in the instructions.

d) **The back panel** is 1,8 m high or of such a height that it extends at least up to the horizontal panel described in c) and its width is such that it extends at least to the additional side panel described in a).

e) **Insulating material**: however, if the instructions specify that as an alternative to the specified gaps, insulating material may be used with the appliance installed with a reduced gap, the test shall be repeated under these particular conditions.

f) **Floor-standing appliances or appliances resting on a support** shall be placed on a horizontal panel representing the floor or the support and extending at least 100 mm beyond the corresponding dimensions of the appliance. All the vertical panels rest on the horizontal panel.

〚AC〉 The floor or the support shall be slightly raised in order to allow natural circulation of air under the panel. 〈AC〛

7.3.1.5.1.3 Class 2, subclass 2 and class 3

a) **For all appliances**, the back wall of the building-in unit may be replaced by a panel which shall be at least as wide as the unit wall and shall be high enough to reach the horizontal panel described in b), or, if the panel is not required, to reach the top of the building-in unit, but, in all cases, has a height of not less than 1,80 m.

b) **For all appliances with a hotplate**, a horizontal panel is placed above the appliance at the minimum distance indicated in the technical instructions. The panel shall be of a depth sufficient to extend from the back panel described in a) to at least 50 mm beyond the front of the building-in unit and shall be of a width sufficient to extend from the additional side panel described in c) to at least 50 mm beyond the opposite side of the building-in unit.

c) **For all appliances with a hotplate**, an additional panel is placed vertically at the side of the appliance, which produces the greatest heating effect at the minimum distance indicated in the technical instructions. This panel shall be of a depth sufficient to extend from the back panel described in a) to at least 50 mm beyond the front of the building-in unit and of a height sufficient to extend from the work top to the top of the back panel described in a).

In order to ensure that the greater heating effect has been determined with respect to the surfaces mentioned in 6.1.5, it may be necessary to repeat the test with the above mentioned panel on the other side of the appliance.

d) **Appliances intended to stand on the floor** shall be placed on a test floor. This shall be of depth sufficient to extend from the back panel to at least 50 mm beyond the front of the unit and of a width sufficient to extend at least 50 mm beyond the corresponding dimensions of the building-in unit. The floor shall be slightly raised to allow natural circulation of air under the panel.

e) **For built-in hotplates**, if specified in the instructions, an additional horizontal panel made of 15 mm thick timber is placed below the appliance at the minimum distance from the work top recommended by the technical instructions.

This panel shall correspond to the critical dimensions which shall be stated in the technical instructions.