b) Appliances with hob burners:

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

Each hob 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. detectors for combustible gases, leakage detection fluids) is then used to search for gas leaks from the joints of the assembly which could be ignited.

It is allowed to remove components other than those of the burner, provided that this does not alter the test conditions.

The requirements of 6.1.4.2.1 shall be satisfied.

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 7.1.3.2.3), then under the following conditions:

a) Hob 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 instructions for installation 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 %.

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.

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 the requirements of 6.1.4.3 shall be verified under the following conditions:

a) Hob burners:

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

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

3) The pressure is then reduced progressively to 70 % of the normal test pressure.

b) Oven burners:

1) 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;

2) 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;

3) The pressure is then reduced progressively to 70 % of the normal test pressure.

c) Grill burners:

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

2) 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;

3) The pressure is then reduced progressively to 70 % of the normal test pressure.

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 shall 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 hob**, 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 14) indicated in the instructions for installation. 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 instructions for installation. 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 X_2 in Figure 14) indicated in the instructions for installation.

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 in the instructions for installation it is indicated that as an alternative to the specified gaps, insulating material is 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.

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

7.3.1.5.1.3 Class 2, subclass 2 and class 3

a) **For all appliances**, it is allowed to replace the back wall of the building-in unit 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 hob**, a horizontal panel is placed above the appliance at the minimum distance indicated in the instructions for installation. 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 hob**, an additional panel is placed vertically at the side of the appliance, which produces the greatest heating effect with respect to the surfaces mentioned in 6.1.5 at the minimum distance indicated in the instructions for installation. 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).

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 hobs**, if specified in the instructions for installation, 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 instructions for installation.

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

   If the instructions for installation do not require this horizontal panel to be installed, test no. 1a in 7.3.1.5.2.3 is carried out with and without this panel.

f) **For built-in hobs**, thermocouples are fitted into the work top as described in 7.3.1.5.1.1.

7.3.1.5.2 Test methods

7.3.1.5.2.1 General

The appliance is supplied according to its category with the reference gas indicated in 7.1.1.1 giving the highest heat input at normal test pressure.

It is fitted and adjusted as prescribed in 7.1.3.2.1.

Where appropriate, it is supplied with electrical energy at nominal voltage.

7.3.1.5.2.2 General operating conditions of the different parts of the appliance

The tests are started from cold and, unless otherwise stated in 7.3.1.5.2.3, the measurements are carried out in accordance with 7.3.1.5.3 under the following conditions.

a) Hob cooking elements

Pans are placed simultaneously on the burners, and on the electric cooking plates, if they exist, in accordance with 7.1.4.2.

At the start of the test, the burners and any electric cooking plates are put into operation, their control being at their highest setting. As soon as the water boils, the controls are adjusted so that they maintain light boiling (simmering) and the controls left at this setting until the end of the test.

During the test, the pan is covered by its lid and hot water is added to ensure a sufficient water level in order to maintain the boiling.

When a burner is designed to operate covered or uncovered, the test is carried out using the arrangement corresponding to the highest thermal output.

b) Hob griddles

Gas or electric hob griddles are put into operation 30 min after the start of the test.

Griddles provided with means of reducing the power are put into operation with the control mechanism set so as to limit the temperature at the centre of the griddle plate to a value as close as possible to 275 °C but no lower than 245 °C, unless this condition cannot be obtained, in which case the control mechanism is set to its highest position.

If a burner is designed to operate either under a pan or under a griddle, the test is carried out using the arrangement giving the highest thermal input.

c) Ovens

At the start of the test, gas or electric ovens are put in operation without accessories, the thermostat, or the control knob if there is no thermostat, being set to the position permitting the maintenance of an average temperature at the centre of the oven of (200 ± 4) °C, or to the position corresponding to the nearest possible temperature above 200 °C.

If an appliance has two ovens, they are put in operation simultaneously with their knobs being placed in the positions permitting the maintenance of an average temperature of 200 ±) °C at the centre of each oven, or the positions corresponding to the nearest possible temperature above 200 °C.

d) Grills

Grills are operated when this is specified in the tests given in 7.3.1.5.2.3.

Unless otherwise specified they are operated as described below.

The grill is put into operation 30 min after the start of the test with its control mechanism set to the highest position. After 15 min of operation, the control mechanism is adjusted to obtain half the nominal heat input or half the nominal electric power.

If the design of the control mechanism is such that it is not possible to reduce the full input or the electric power by half, but only to a value greater than half, then the control mechanism is adjusted to give the lowest input or electric power obtainable.

However, if the oven has a rotating spit, the duration of operation of the grill is 60 min with the control mechanism set to give the most unfavourable conditions specified in the instructions for use and maintenance.

e) Warming drawers and cupboards

Gas or electric warming drawers and cupboards are put into operation for 30 min after the starting of the test with their control mechanisms set to the highest position.

7.3.1.5.2.3 Test conditions

a) Test no. 1a:

The duration of test is 1 h.

The appliance is installed under the condition of 7.3.1.5.1 with the following exceptions:

1) in the case of class 1 appliances, the side test panels are removed;

2) in the case of class 2, subclass 1 appliances, the side test panels are removed unless the instructions for installation state that the appliance cannot be used freestanding.

The appliance is operated in accordance with 7.3.1.5.2.2 with the exception that the grill(s) is (are) not operated.

b) Test no. 1b:

The duration of test is 1 h.

The appliance is installed under the condition of 7.3.1.5.1 with the following exceptions:

1) in the case of class 1 appliances, the side test panels are removed;

2) in the case of class 2, subclass 1 appliances, the side test panels are removed unless the instructions state that the appliance cannot be used freestanding.

The appliance is operated in accordance with 7.3.1.5.2.2.

If the appliance has a grill, it is only operated if:

3) the grill is situated in an oven compartment and

4) the instructions for use and maintenance state that the grill, gas or electric, is designed to be used with the oven door closed.

The grill is operated as described in 7.3.1.5.2.2, taking into consideration the following operation mode:

5) electrical grills and gas ovens are operated simultaneously if this is possible;

6) gas grills and gas ovens are operated separately

c) Test no. 2:

The duration of the test is 15 min.

The appliance is operated in accordance with 7.3.1.5.2.2 with the following exceptions:

1) the control of the hob cooking elements shall remain in the fully open position throughout the test, with a pan, in accordance with 7.1.4.1, being placed on each of the burners;

2) the griddle operates with the control at its maximum position throughout the test;

3) the grill operates throughout the test with the tap at its maximum position. Each compartment door is open or closed, according to the instructions for use and maintenance, and each grid in the highest possible position under the grill. A plate made of insulating material covers the surface of the grid;

4) no oven or warming drawer shall be operated in this test.

d) Test no. 3:

The duration of the test is 1 h.

The appliance is operated in accordance with 7.3.1.5.2.2 with the following exceptions:

1) each oven is ignited at the start of the test and operates in accordance with 7.1.5;

2) if a grill in a separate cavity is designed to be operated simultaneously with the oven (i.e. double cavity ovens, cooking ranges) it is operated for the last 15 min of the test, with its control in the maximum position and with its grill door open or closed in accordance with the instructions for use and maintenance;

3) the grill pan is placed in the normal position indicated in the instructions for use and maintenance as soon as the grill is operated.

If an electrical grill is situated in an oven and is designed to be operated simultaneously with a gas burner in the same oven, the test is carried out without the grill in operation and then repeated under the following conditions:

4) if the appliance has a control with a specific setting enabling the oven burner and electrical grill to operate simultaneously, these are put into operation at the setting enabling the grill to operate for the longest duration with its maximum setting, any separate oven thermostat being set in accordance with 7.1.5;

5) if the appliance has separate controls for the oven burner and the electrical grill, the oven and grill are put into operation in accordance with 7.1.5.

If a gas or electrical grill is situated in an oven, but cannot be operated simultaneously with the gas burner for the oven, the test is carried out without the grill in operation and then repeated with the grill in operation instead of the oven burner. The grill is operated in accordance with 7.1.5.

e) Test no. 4:

Only the ovens are operated for 1 h at the maximum control setting.

If an electrical grill is situated in an oven and is designed to be operated simultaneously with a gas burner in the same oven, the test is carried out without the grill in operation and then repeated under the following conditions:

1) if the appliance has a control with a specific setting enabling the oven burner and electrical grill to operate simultaneously, these are put into operation at the setting enabling the grill to operate for the longest duration with its maximum setting, any separate oven thermostat being set to its maximum setting;

2) if the appliance has separate controls for the oven burner and the electrical grill, the oven and the grill are put into operation at their maximum control settings.

If, under these conditions of test the temperature at the centre of the oven is likely to exceed 350 °C, the temperature at the centre of the oven is monitored during the test and after the burners have been turned off. If, at any time the temperature of the oven exceeds 350 °C then it shall be verified that the requirements of 5.2.9.1.5 are met and that the means provided prevents access to the interior of the oven while the temperature at the centre of the oven exceeds 350 °C.

f) Test no. 5:

The appliance is installed without side panels, and operates under the conditions of test no. 3 in 7.3.1.5.2.3.

7.3.1.5.3 Measurements

7.3.1.5.3.1 General

During the heating tests, the ambient temperature in the room shall be between 20 °C and 25 °C.

The ambient temperature is measured with an appropriate instrument under the following conditions:

— at a height of (900 ± 50) mm from the floor;

— at a distance of between 1 m and 1,5 m from the appliance;

— using an instrument which is accurate to within ± 0,5 °C;

— the instrument shall be protected against radiation from the appliance.

At the end of each test, it is checked that the appropriate requirements of 6.1.5 are satisfied.

7.3.1.5.3.2 Front and sides of the appliance

Temperatures are measured by means of an appropriate probe, such as the one specified in D.1 which is validated as specified in D.2.

The probe is applied to the surface with a force of (4 ± 1) N so as to ensure the best possible contact between the probe and the surface.

The probe is applied for a sufficient period of time for the temperature of the sensing element to be stabilized.

Any measuring instrument giving the same results as the probe shown in D.1 may be used.

Special care is required when the surfaces under testing are not flat.

7.3.1.5.3.3 Other parts of the appliance, support and adjacent panels and housing unit

Suitable thermocouples are used with thermoelectric junctions which are accurate to ± 2 K.

In order to measure the temperature of the push-on hose connector, thermocouples are inserted between the cylindrical part of the push-on hose connector and the flexible tube.

However, if the auxiliary equipment is itself likely to cause a rise in temperature (e.g. electromagnetic valves), the temperature of auxiliary equipment is not measured. In this case, thermocouples are placed so as to measure the air temperature close to the device.

The temperature measurements of the auxiliary equipment are deemed to be satisfactory if:

$$t_{\mathrm{m}} \leq t_{\mathrm{max}} + t_{\mathrm{a}} - 25 \qquad (11)$$

where

t_{m} is the temperature measured, in degrees Celsius;

t_{max} is the maximum temperature of the component, in degrees Celsius;

t_{a} is the ambient temperature in degrees Celsius.

7.3.1.6 Overheating of the LPG cylinder and its compartment

In order to produce conditions more severe than in practice, the compliance with the requirements of 6.1.6 is verified with the following tests:

— the oven burner and the hob burners are supplied with G30 gas by a cylinder outside the appliance;

— the controls for the hob burners and the electric cooking plates are in the full-on position, pans being placed according to 7.1.4.2. It is allowed to add water to the pans during the test, to allow boiling to continue for the time necessary for the test;

— the oven operates with its control in the maximum position;

— if the grill is in a separate grill compartment, and it can operate simultaneously with the oven, it is supplied under the same conditions and put into operation during the last 15 min of oven operation, its control being in the maximum position;

— the cylinder placed in the appliance compartment is the largest of those recommended in the instructions for use and maintenance; it is filled to 4/5 of its volumetric water capacity with

commercial butane and supplies an external burner, not part of the appliance, at a heat input equal to the nominal heat input of the gas oven. If the appliance does not have a gas oven, the incorporated cylinder is not turned on during this test;

— the temperatures of the push-on hose connector and of the walls of the compartment are checked with thermocouples. The increase of pressure is measured with a manometer as shown in Figure 7.

The existence of any means of guiding the flexible tube, of the appropriate instructions and of the warning notice shall be considered when the test is carried out. The measurement is carried out after 1 h of operation and during the first 30 min which follow complete extinction.

However, in the case of an electric pyrolytic oven, the oven is put into operation at its cleaning setting for the maximum period specified by the instructions for use and maintenance. During the last hour of oven operation, the hob elements which are designed to operate are operated with the burners supplied at half rate.

In the case of an electric oven or grill, the test is repeated without the hob burners in operation.

7.3.1.7 Total input rate of the appliance

Each burner is supplied with reference gas (see 7.1.1.1) at normal test pressure (see 7.1.2) and with the corresponding injector. If the appliance category includes several reference gases, the test is carried out only with the one having the lowest Wobbe index.

Each burner is operated at the nominal heat input. The gas rate is measured for each burner in turn, as specified in 7.3.1.2 and then the total rate is measured with all the taps open simultaneously.

If the requirements of 6.1.7 are not satisfied by the rates measured with gas, the test has to be carried out by using air and the requirements of 6.1.7 shall be satisfied. The flame supervision device shall be overruled so that air reaches the injectors (e.g. by separate heating of the sensing element).

7.3.1.8 Regulator performance

For these tests, measurements are taken when the burner(s) are at thermal equilibrium.

With the appliance initially at ambient temperature, two tests are carried out using the reference gas(es). Each test starts with adjusting the gas rate in the following way at normal supply pressure using the appliance tap(s).

a) Test no. 1:

For an appliance with several burners, the gas rate corresponds to 2/3 of the sum of the nominal heat inputs of all the burners which are intended to function simultaneously. For an appliance with only one burner, the gas rate corresponds to the nominal heat input.

b) Test no. 2:

The appliance gas rate is adjusted to 0,08 m^3/h for first family gases, to 0,05 m^3/h for second family gases and to 0,02 m^3/h for third family gases.

For each test, the appliance inlet pressure is varied between the minimum and maximum values in Table 5 and 6 of EN 437:2021 and it is checked that the requirements of 6.1.8 are satisfied.

7.3.2 Specific tests for hobs

7.3.2.1 Ignition, cross-ignition, flame stability

7.3.2.1.1 General

The appliance is installed according to 7.1.3.3 in a suitably ventilated room.

Each burner is adjusted under the conditions described in 7.1.3.2.1 with each reference gas belonging to the appliance category.

The burner is lit in accordance with the instructions for use and maintenance by means of the ignition system, is there is one, or with a match if the burner does not have an ignition system.

When the ignition system only delivers one spark at a time, for the purposes of the test it is operated at most three times at intervals of about 1 s. The first ignition attempt is made when the gas arrives at the burner ports.

In order to know the time of arrival of the gas at the burner ports, an auxiliary ignition flame is placed near to the burner ports. The time which elapses between the moment when the tap is placed in the full-on position and the moment when the burner ignites is measured.

Where the use of a pan is required on a burner in the following tests, a pan in accordance with 7.1.4 is used, preferably one made of glass so that the flame is observed.

In the case of temporary griddles and temporary covered burners, the burner is tested firstly with the plate or griddle in place, then as an uncovered burner.

Where uncovered burners do not have an ignition system and covered burners are tested individually, the tests are carried out without a pan. The tests in which they operate simultaneously with other burners of the hob are carried out with the pans recommended in 7.1.4.2.

In the case of uncovered burners with an ignition system, the requirements regarding the use of pans are specified for each test.

In all cases, hob burners are tested successively in the following order: back right burner, back left burner, front left burner, front right burner, where the hob has four burners. If the hob has a different number of burners, the order of ignition is based on the order given for four burners.

In tests requiring the operation of ovens and grills placed beneath the hob, all these ovens and grills operate simultaneously if this is possible.

If simultaneous operation is not possible because there is an oven and grill in the same compartment, the tests are carried out once with the oven in operation and once with the grill in operation. If there is a second oven or grill beneath the hob, it operates in both cases.

The requirements for ignition, cross-ignition and flame stability in 6.2.1 are verified during the following tests. However, for independent hobs, the tests in 7.3.2.1.2 second group, requiring the use of reference gases and those in 7.3.2.1.3 first group, do not apply.

7.3.2.1.2 Cold tests

With the appliance at ambient temperature, the correct ignition and flame stability of each of the hob burners is checked with them operating individually.

Two groups of tests are carried out under the following conditions.

a) First test group:

The appliance is cold at the start of the test.

Uncovered burners which have an ignition system are tested with and without a pan.

Correct ignition and cross-lighting of each burner are checked individually with the appliance supplied successively with each of the reference gases at the normal test pressure.

After 5 s operation, the tap is turned to the reduced rate position at normal speed and it is verified that the burner is not extinguished.

The tap is turned to the maximum flow position and flame stability is verified.