The marking specified for external **accessible surfaces** shall be visible when the appliance is operated as in normal use, including when actuating any switch, adjusting any control or opening a lid or door. It shall not be placed on a **functional surface** or **adjacent surface**.

Modification:

For **fixed appliances**, the marking of the name or trademark or identification mark of the manufacturer or responsible vendor and the model or type reference shall be marked on the appliance and, if not visible when the appliance is installed as in normal use, shall be included in the instructions or on an additional label that can be fixed near the appliance after installation.

NOTE 101 An example of such an appliance is a **built-in hob.**

7.101 If, during the test of Clause 11, the temperature rise of the side and rear walls of the test corner above the level of the hob surface exceeds 65 K or during the test of Clause 19 the temperature rise of the walls above and below the hob surface exceeds 125 K, the installation instructions provided by the manufacturer shall include the substance of the following that shall also be included on a non-permanent label, for example a tie-on type, attached to the appliance:

> Where this appliance is to be positioned in close proximity to a wall, partitions, kitchen furniture, decorative finishes, etc., it is recommended that they be made of non-combustible material, or if not, that they shall be clad with a suitable non-combustible heat-insulating material.

Compliance is checked by inspection.

7.102 The **cooking zones** of **hob surfaces** of glass-ceramic or similar material shall be clearly identified by appropriate marking, unless they are obvious.

Compliance is checked by inspection.

7.103 Equipotential bonding terminals shall be marked with symbol 60417-5021 (2002-10).

These markings shall not be placed on screws, removable washers or other parts that can be removed when conductors are being connected.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 *Addition:*

Appliances intended to accommodate detachable **hob elements** shall be constructed so that there is adequate protection against accidental contact with **live parts** during insertion or removal of these elements.

8.101 Heating elements that are liable to be touched accidentally by a fork or similar pointed object in normal use shall be so protected that it is not possible to touch their **live parts** with such an object.

Compliance is checked by inserting test probe 12 of IEC 61032 at all points where the probe can enter in the vicinity of live parts. The probe is applied with a force not exceeding 1 N.

9 Starting of motor-operated appliances

This clause of Part 1 is applicable except as follows.

9.101 Fan motors providing a cooling effect in order to comply with the requirements of Clause 11 shall start under all voltage conditions that may occur in use.

Compliance is checked by the following tests using a supply source such that its drop in voltage does not exceed 1 % during the tests. The appliance being returned to the ambient temperature specified in 5.7 after each test.

The appliance is started under the conditions occurring at the beginning of ***normal operation*** *or, for automatic appliances, at the beginning of the normal cycle of operation,–a voltage equal to 0,85 times* ***rated voltage*** *being applied to the input terminals of the appliance.*

For appliances provided with motors having other than centrifugal starting switches, this test is repeated at a voltage equal to 1,06 times ***rated voltage*** *being applied to the input terminals of the appliance.*

The tests are carried out three times.

In all cases, the motor shall start and it shall function in such a way that safety is not affected and overload ***protection devices*** *of the motor shall not operate.*

10 Power input and current

This clause of Part 1 is applicable except as follows.

10.1 *Modification:*

The power input of appliances without induction heating sources, at rated voltage and at normal operating temperature, shall not deviate from the rated power input by more than the deviation shown in Table 1.

The power input of appliances having only induction heating sources, at rated voltage and at normal operating temperature, shall not exceed from the rated power input by more than 10 %.

The measurement is made before the controls are adjusted to the reduced setting.

For appliances incorporating induction and non-induction heating sources the following applies.

The power input of the induction heating sources and the non-induction heating sources is measured separately, in each case using a combination of heating units that can be on at the same time to give the highest power input. For the induction heating sources, the measurement is made before the controls are adjusted to the reduced setting.

The power inputs so measured shall in the case of the induction heating sources not deviate from the power input marked by the manufacturer (see 7.1) by more than 10 %, and in the case of the non-induction heating sources not deviate from the power input marked by the manufacturer (see 7.1) by more than that given in Table 1 for heating appliances.

The power input of the appliance when the induction and non-induction heating sources are operated simultaneously shall not deviate from the rated power input by more than 10 %.

*For appliances having more than one **heating unit**, the total power input may be determined by measuring the power input of each **heating unit** separately (see also 3.1.4).*

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Addition:*

Appliances intended to be fixed to the floor and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means are installed in accordance with the manufacturer's instructions. If no instructions are given, these appliances are considered as **appliances** *normally placed on the floor.*

11.3 *Addition:*

*If the magnetic field of an **induction heating source** unduly influences the results, the temperature rises can be determined using platinum resistances with twisted connecting wires or any equivalent means.*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

11.4 *Replacement:*

The non-induction heating units of the appliance are operated under normal operation at 1,15 times the power input marked (see 7.1).

If the temperature rise limits of motors, transformers or electronic circuits are exceeded, the test is repeated with the appliance supplied at 1,06 times rated voltage. In this case, only the temperature rises of motors, transformers and electronic circuits are measured.

Induction heating units are operated simultaneously and supplied separately at the most unfavourable voltage between 0,94 times minimum rated voltage and 1,06 times maximum rated voltage.

If it is not possible to switch on all heating elements or induction heating sources at the same time, the test is made with each of the combinations that the switch arrangement will allow, the highest load possible with each switching arrangement being in circuit.

If the appliance is provided with a control that limits the total power input, the test is made with whichever combination of heating units, as may be selected by the control, imposes the severest condition.

In addition, appliances incorporating induction heating sources are also operated as above, but with the smallest size of pan as recommended by the manufacturer placed in the most onerous position consistent with being able to energize the coil, but within the cooking zone.

NOTE 101 The additional operating condition described above is not applied when reference to Clause 11 is made in other tests.

11.7 *Replacement:*

Appliances are operated until steady conditions are established.

Steady conditions are considered to exist 60 min after reaching the temperatures defined for normal operation.

When an appliance is assembled in combination with, equipped with or incorporating accessories or other appliances the interaction shall be covered if they are provided to operate simultaneously as stated by the manufacturer or by a common control.

11.8 *Addition:*

The limit of 65 K temperature rise for the rear and side test walls, including the part of the test corner that projects in front of the appliance, only applies below the level of the hob surface. If this temperature rise limit is exceeded above the hob surface then the instructions in 7.101 shall be provided.

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface [a]	***Temperature rise of external accessible surfaces*** [b] *K*
Bare metal	*48*
Coated metal [c]	*59*
Glass and ceramic	*65*
Plastic and plastic coating > 0,4 mm [d, e]	*74*

[a] *Temperature rises are not measured on:*
- *the underside of appliances intended to be used on a working surface or floor;*
- *the rear surface of appliances;*
- *surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end*
- *the area up to 60 mm around a heated cavity door opening;*
- *functional surfaces and adjacent surfaces.*

[b] *The temperature rise on external accessible surfaces up to a distance of 100 mm from adjacent surfaces of the appliance, (see Figure 101) may exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text.*

[c] *Metal is considered coated when a coating having a minimum thickness of 90 μm made by enamel or non-substantially plastic coating is used.*

[d] *The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.*

[e] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.1 *Modification:*

The appliance is operated under the conditions specified in Clause 11 until the leakage current has reached a steady value or for the duration specified in 11.7, whichever is the shorter period.

If more than one pan is placed on a single cooking zone, they are electrically connected together.

13.2 *Modification:*

Instead of the permissible leakage current for stationary class I appliances, the following applies:

– *for cord and plug connected appliances*	*0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher.*
– *for other appliances*	*0,75 mA or 1 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.*

For portable class I appliances, instead of the permissible leakage current, the following applies:

– *for cord and plug connected appliances*	*0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher.*

13.3 *Addition:*

If there is earthed metal between live parts and the surface of glass-ceramic or similar material, all the pans on the hob surface are electrically connected together and to earthed metal.

A test voltage of 1 000 V is then applied between live parts and the pans.

If there is no earthed metal between live parts and the surface of glass-ceramic or similar material, all the pans on the hob surface are electrically connected together, but not connected to earthed metal.

A test voltage of 3 000 V is then applied between live parts and the pans.

NOTE 101 Care is taken to ensure that the voltage applied does not overstress the other insulations.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

In addition, IPX0, IPX1, IPX2, IPX3 and IPX4 appliances are subjected for 5 min to the following splash test.

The apparatus shown in Figure 103 is used. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl. The bowl is placed on the floor for appliances normally used on the floor. For all other appliances on a horizontal support 50 mm below the lowest edge of the appliance, the bowl is moved around

in such a way as to splash the appliance from all directions. Care is taken that the appliance is not hit by the direct jet.

15.1.2 *Modification:*

Appliances normally used on a table are placed on a support having dimensions that are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.

Addition:

If detailed instructions regarding the cleaning of movable but non-detachable (for example hinged) hob elements are given in the instruction sheet, tests on these hob elements are carried out with the elements in the horizontal position of normal use.

15.2 *Addition:*

Appliances are positioned so that the hob surface is horizontal and if the hob elements are adjustable separately, their surfaces are also horizontal.

A vessel having a diameter equal to or not more than 25 mm smaller than the largest inscribed circle on the hob element or cooking zone is completely filled with the solution and placed in the most unfavourable position, not overlapping the hob element or the cooking zone.

A further quantity of the solution equal to approximately 2 l is poured steadily into the vessel over a period of 1 min.

The test is made on each hob element separately, the tray or other receptacle being emptied each time.

For appliances incorporating ovens or grills, the spillage test is made by pouring steadily over a period of 1 min approximately 1 l of the solution over the bottom surface of the oven or grilling compartment.

For appliances incorporating griddle plates, approximately 1 l of the solution is poured steadily over a period of 1 min onto the centre of the surface of the griddle plate.

If controls are mounted in the hob surface of the appliance1 l of the solution is poured.

15.101 Appliances that are provided with a tap intended for filling or cleaning, shall be constructed so that the water from the tap cannot come into contact with **live parts**.

Compliance is checked by the following test.

The tap is fully opened for 1 min with the appliance connected to a water supply having the maximum water pressure indicated by the manufacturer. Tiltable and movable parts, including lids, are tilted or placed in the most unfavourable positions. Swivelling outlets of water taps are positioned so as to direct water onto those parts that will give the most unfavourable result. Immediately following this treatment the appliance shall withstand an electric strength test as specified in 16.3.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.1 *Addition:*

For appliances provided with hob surfaces of glass-ceramic or similar material, the tests of 16.2 and 16.3 are made with a pan or pans as described in 3.1.9.

If more than one pan is placed on a single cooking zone, they are electrically connected together.

16.2 *Modification:*

Instead of the permissible leakage current for stationary class I appliances, the following applies:

– *for cord and plug connected appliances*	*0,75 mA or 1 mA per kW* ***rated power input*** *of the appliance with a maximum of 10 mA, whichever is higher.*
– *for other appliances*	*0,75 mA or 1 mA per kW* ***rated power input*** *of the appliance with no maximum, whichever is higher.*

For portable class I appliances, instead of the permissible leakage current, the following applies:

– *for cord and plug connected appliances*	*0,75 mA or 1 mA per kW* ***rated power input*** *of the appliance with a maximum of 10 mA, whichever is higher.*

Addition:

If there is earthed metal between live parts and the surface of glass-ceramic or similar material, the leakage current is measured for each of the cooking zones in turn, only the pan(s) concerned being connected to earthed metal.

The leakage current shall not exceed 1 mA per kW of the power input of the heating unit being tested.

If there is no earthed metal between live parts and the surface of glass-ceramic or similar material, the leakage current is measured between live parts and the pan(s) for each of the cooking zones in turn, the pan(s) concerned not being connected to earthed metal.

In addition, the leakage current is measured between live parts and a probe consisting of a flat metal disc 50 mm in diameter. The probe is placed in all positions on the hob surface outside the cooking zones, the pans remaining in position.

For each measurement, the leakage current shall not exceed 0,25 mA.

16.3 *Addition:*

If there is earthed metal between live parts and the surface of glass-ceramic or similar material, all the pans on the hob surface are electrically connected together and to the earthed metal.

A test voltage of 1 250 V is then applied between live parts and the pans.

If there is no earthed metal between live parts and the surface of glass-ceramic or similar material, all the pans on the hob surface are electrically connected together, but not connected to earthed metal.

A test voltage of 3 000 V is then applied between live parts and the pans.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is applicable except as follows.

18.101 Appliances incorporating **induction heating sources** shall be constructed so that, in normal use, there is no failure that impairs compliance with this standard. The insulation shall not be damaged and connections shall not work loose.

Compliance is checked by energizing each induction heating source 100 000 times by moving the smallest pan recommended by the manufacturer (or an equivalent metallic object) on and off the hob element at a rate of six times per minute (5 s for each movement). The test is made at the least favourable voltage as determined in Clause 11.

18.102 Appliances incorporating surfaces of glass-ceramic or similar material shall withstand thermal stresses liable to occur in normal use.

Compliance is checked by the following test:

The appliance is operated with all heating sources beneath the glass-ceramic or similar material energized at the same time. Non-induction heating sources are operated with a pan filled with water according to 3.1.9 but placed in the most unfavourable position on the cooking zone. Induction heating sources are operated with an empty pan.

The controls are set at maximum and the appliance is operated for 500 cycles, each cycle comprising 10 min on and 20 min off, the supply being 1,1 times rated voltage. The operation of thermostats or temperature limiters during the test is ignored.

Immediately after the last energized period the pan(s) is (are) removed and the ***hob surface*** *is subjected to a spillage test using* $2\,^{+0,1}_{0}$ *l of cold water between 10 °C and 15 °C, poured steadily over the surface for 1 min.*

Fifteen minutes later, all excess water is removed from the surface.

After the test, the surface shall not be cracked or broken and the appliance shall withstand the test in 16.3.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Modification:*

Instead of the first paragraph of the test specification, the following applies.

All appliances are subjected to the tests of 19.2 and 19.3.

In addition, appliances provided with a control limiting the temperature during the tests of Clause 11 are subjected to the test of 19.4 and, where applicable, to the test of 19.5. However, for these tests, hob elements with induction heating sources are not energized and appliances incorporating only induction heating sources are not tested.

Appliances incorporating PTC heating elements are also subjected to the test of 19.6.

19.2 *Addition:*

Induction heating sources beneath a flat surface of glass-ceramic or similar material are operated with a 6 mm thick disc made of grey cast iron Class 250 in accordance with ISO 185. The diameter of the disc shall be in accordance with the pans specified in 3.1.9. For other than flat surfaces (for example a wok) the supplied pan or a pan recommended by the manufacturer shall be used. The disc is placed on the centre of the cooking zone. The induction heating sources are supplied with a voltage of 0,94 times the rated voltage. The maximum concavity of the base of the disc is $0 < c < d/100$ (see Figure 104). The base of the disc shall not be convex.

Non-induction heating sources beneath a surface of glass-ceramic or similar material are operated without a pan or with an empty pan, whichever is the least favourable condition.

For all heating units, the controls are adjusted to the highest setting.

Pan detectors are rendered inoperative.

19.3 *Modification:*

Induction heating sources are supplied with a voltage of 1,06 times the rated voltage.

If more than one hob element with a non-induction heating source is incorporated in an appliance, the supply voltage is that required to provide a power input of 1,15 times the rated power input under normal operation.

19.11.2 *Addition:*

During simulation of the fault conditions, it shall be possible to switch off any energized hob element.

The fault conditions are also simulated with all hob elements switched off, the appliance being supplied at rated voltage. If a pan detector is incorporated, a suitable vessel is placed on the cooking zone.

The hob elements shall not become energized.

19.12 *Addition:*

The test is also repeated if, for any of the fault conditions specified in 19.101, the safety of the appliance depends on the operation of a miniature fuse-link complying with IEC 60127.

19.13 *Addition:*

If the temperature rise of the walls above and below the hob surface exceeds 125 K, the requirements of 7.101 apply.

The temperature of the windings of induction coils shall not exceed the values shown in Table 8 of 19.7.

The electric strength test of induction heating sources is carried out immediately after switching off the appliance.

19.101 Appliances incorporating **induction heating sources** shall be constructed so that the risk of fire, mechanical hazard or electric shock is obviated as far as is practicable in the event of incorrect operation or the development of defects in control devices or circuit components.

Compliance is checked by applying any form of operation or any defect in the relevant circuits that may be expected in normal use while the appliance is operated under conditions of normal operation at rated voltage or at the upper limit of the rated voltage range. Only one fault condition is reproduced at a time, the tests being made consecutively.

NOTE Examples of fault conditions are:

– drop-out of contactors and of electromagnetic components;

– failure of motors to start;

– drop in voltage supply, re-appearance of the voltage, voltage interruptions of up to 0,5 s;

– fault conditions specified in 19.11 as applicable.

Examination of the appliance and its circuit diagrams will generally show the fault conditions to be simulated.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.101 Appliances other than appliances intended to be fixed to the floor shall have adequate stability when the doors are open and subjected to a load.

Compliance is checked by the following tests.

Doors having a horizontal hinge at their lower edge are opened and a weight is gently placed on the surface of the door so that its centre of gravity is vertically over the geometric centre of the door. The contact area of the weight is such as will cause no damage to the door, and its mass is

– *for appliances normally used on a floor:*
  - *for oven doors: 23 kg or such higher value as, according to the manufacturer's cooking instructions, can be placed in the oven;*
  - *for other doors: 7 kg;*
– *for appliances normally used on a table or similar support and provided with doors having a horizontal hinge at their lower edge and a projection of at least 225 mm from the hinge to the opening edge:*
  - *7 kg or such higher value as, according to the manufacturer's cooking instructions, can be placed in the oven.*

Doors, except those where the lower level of the oven is above a hob, having a vertical hinge are opened through an angle of 90°, and a downward force of 140 N is then applied gently to the top of the door at the extremity furthest from the hinge.

This test is repeated with the door opened as far as possible, but not through an angle of more than 180°.

During these tests, the appliance shall not tilt.

For the weight, a sandbag may be used.

For appliances provided with more than one door, the tests are made on each door separately.