INTERNATIONAL STANDARD

IEC 60335-2-38

Fourth edition
2000-02

Safety of household and similar electrical appliances –

Part 2-38: Particular requirements for commercial electric griddles and griddle grills

Sécurité des appareils électrodomestiques et analogues –

Partie 2-38: Règles particulières pour les plaques à griller électriques à usage collectif

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

Part 2-38: Particular requirements for commercial electric griddles and griddle grills

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60335-2-38 has been prepared by subcommittee 61E: Safety of electrical commercial catering equipment, of IEC technical committee 61: Safety of household and similar electrical appliances.

It forms the fourth edition of IEC 60335-2-38 and replaces the third edition, published in 1994, its amendment 1 (1996) and amendment 2 (1998).

The text of this standard is based on the third edition, amendments 1 and 2, and the following documents:

FDIS	Report on voting
61E/352/FDIS	61E/365/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the third edition (1991) of that standard.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert it into the IEC standard: Safety requirements for commercial electric griddles and griddle grills.

Where a particular subclause of part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where this standard states "addition", "modification" or "replacement", the relevant text in part 1 is to be adapted accordingly.

NOTE 1 The following print types are used:

– requirements: in roman type;
– *test specifications: in italic type;*
– notes: in small roman type;

Words in **bold** in the text are defined in clause 2.

NOTE 2 Subclauses, figures and notes which are additional to those in part 1 are numbered starting from 101.

A bilingual version of this standard may be issued at a later date.

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

Part 2-38: Particular requirements for commercial electric griddles and griddle grills

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of electrically operated commercial **griddles** and **griddle grills** not intended for household use, their **rated voltage** being not more than 250 V for single-phase appliances connected between one phase and neutral and 480 V for other appliances.

NOTE 1 These appliances are used for example in kitchens such as in restaurants, canteens, hospitals and commercial enterprises such as bakeries, butcheries, etc.

The electrical part of appliances making use of other forms of energy is also within the scope of this standard.

So far as is practicable, this standard deals with the common hazards presented by these types of appliances.

NOTE 2 Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;

– for appliances intended to be used in tropical countries, special requirements may be necessary;

– in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

This standard does not apply to

– appliances designed exclusively for industrial purposes;

– appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

– continuous process appliances for the mass production of food;

– grillers and toasters (IEC 60335-2-48);

– appliances incorporating induction heating sources.

2 Definitions

This clause of part 1 is applicable except as follows.

2.2.4 *Addition:*

NOTE The **rated power input** is the sum of the power inputs of all the individual elements in the appliance which can be on at one time; where there are several such combinations possible, that giving the highest power input is used in determining the **rated power input**.

2.2.9 *Replacement:*

normal operation: Operation of the appliance under the following conditions:

Appliances are operated in accordance with the manufacturer's instructions with no load and with the controls set to give the temperatures as set out below, the temperature being measured at the hottest point of each controlled cooking surface.

Stepped controls are set to the first position which gives a temperature equal to or greater than 275 °C. Cycling controls are set so that the mean value of the temperature over the cycle is 275 °C ± 5 °C. If this temperature cannot be reached, the control is set at the maximum.

Griddle grills are operated open or closed whichever is the more unfavourable. When in the closed position, the plates are separated by a heat-resistant low-conductivity spacer panel 10 mm thick and having an area equal to the smaller of the cooking areas of the two heating plates.

For **griddle grills** where both plates are not separately controlled, the control is adjusted so that the conditions set out above are achieved on the directly controlled plate. Where both plates are separately controlled, the conditions set out apply to both plates.

Motors incorporated in the appliance are operated in the intended manner under the most severe conditions which can be expected in normal use taking into account the manufacturer's instructions.

2.2.101
griddle
an appliance intended to cook by direct contact between one side of the food and a heated surface

2.2.102
griddle grill
an appliance intended to cook by direct simultaneous contact of both sides of the food with two heated surfaces

2.2.103
installation wall
a special fixed construction containing supply facilities for appliances installed in conjunction with it

2.2.104
heating unit
any part of the appliance which fulfils an independent cooking or heating function

3 General requirement

This clause of part 1 is applicable except as follows.

Addition:

NOTE 101 The d.c. component in the appliance neutral is limited (Australia).

4 General conditions for the tests

This clause of part 1 is applicable except as follows.

4.10 *Addition:*

*Appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall** are enclosed to obtain protection against electric shock and harmful ingress of water equivalent to that obtained when installed in accordance with the instructions provided with the appliance.*

NOTE Appropriate enclosures or additional appliances may be needed for test purposes.

4.101 *Appliances are tested as **heating appliances**, even if they incorporate a motor.*

4.102 *Appliances, when assembled in combination with or incorporating other appliances, are tested in accordance with the requirements of this standard. The other appliances are operated simultaneously in accordance with the requirements of the relevant standards.*

If a part of the appliance or the whole appliance is intended to be used for different functions covered by different standards, the relevant standard is applied to each function separately, so far as is reasonable.

4.103 *Unless otherwise specified, the test conditions and requirements apply to both heated surfaces of **griddle grills.***

5 Void

6 Classification

This clause of part 1 is applicable except as follows.

6.1 *Replacement:*

Appliances shall be of **class I** with respect to protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

NOTE **Class 0I appliances** are allowed (Japan).

6.2 *Addition:*

NOTE 101 For appliances intended to be installed in a kitchen, an appropriate degree of protection against harmful ingress of water is required according to their height of installation (France).

7 Marking and instructions

This clause of part 1 is applicable except as follows.

7.1 *Addition:*

In addition, appliances shall be marked with:

– the water pressure or range of pressures, in kilopascals (kPa), for appliances intended to be connected to a water supply, unless this is indicated in the instruction sheet.

7.6 *Addition:*

Add the following symbol:

equipotentiality (IEC 60417-5021-a)*

7.12 *Addition:*

If the appliance incorporates a surface of glass-ceramic or similar material which provides the enclosure of **live parts**, the instructions shall include the substance of the following warning:

WARNING – If the surface is cracked, immediately disconnect the appliance or appropriate part of the appliance from the supply.

The instructions for appliances with cooking surfaces of glass-ceramic or similar material shall state that aluminium foil and plastic vessels are not to be placed on the hot surfaces. They shall also state that these surfaces are not to be used for storage.

The instructions for appliances incorporating halogen lamps shall warn the user to avoid looking directly at the lamps when on.

7.12.1 *Replacement:*

The appliance shall be accompanied by an instruction sheet detailing any special precautions necessary for installation. For appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall,** details of how to ensure appropriate protection against electric shock and harmful ingress of water shall be supplied. If the controls of more than one appliance are combined in a separate enclosure, detailed installation instructions shall be supplied. Instructions for **user maintenance**, for example cleaning, shall also be given.

Appliances which are provided with an appliance inlet, and are intended to be immersed in water for cleaning shall be accompanied by an instruction sheet stating that the connector shall be removed before the appliance is cleaned and that the appliance inlet shall be dried before the appliance is used again.

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* See IEC 60417-1:1998, *Graphical symbols for use on equipment – Part 1: Overview and application,* and IEC 60417-2:1998, *Graphical symbols for use on equipment – Part 2: Symbol originals.*

The instruction sheet of appliances other than **stationary** and appliances with **detachable electrical parts**, which are not intended to be partially or completely immersed in water for cleaning, shall state that the appliance or part must not be immersed.

For appliances which are permanently connected to fixed wiring and for which leakage currents may exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instruction sheet shall give recommendations regarding the rating of **protective devices** i.e. earth leakage relays to be installed.

If the appliance is constructed so that it is not protected against water jets, clear and detailed instructions for the user shall be delivered together with the appliance. It shall be stated in the instructions that this appliance shall not be cleaned with a water jet.

Compliance is checked by inspection.

7.12.4 *Addition:*

The instructions for **built-in appliances** having a separate control panel for several appliances shall state that the control panel is only to be connected to the specified appliances in order to avoid a possible hazard.

7.15 *Addition:*

When it is not practical to place the marking of **fixed appliances** so that it is visible after the appliance has been installed, the relevant information shall also be included in the instructions for use or on an additional label which can be fixed near the appliance after installation.

NOTE An example of such a **fixed appliance** is a **built-in appliance**.

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 cooking surface exceeds 65 K, and/or during the test of clause 19 the temperature rise of the walls above and below the cooking surface level or of the floor or ceiling exceeds 125 K, the installation instructions provided by the manufacturer shall include the substance of the following which 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; if not, they shall be clad with a suitable non-combustible heat-insulating material, and that the closest attention be paid to fire prevention regulations.

Compliance is checked by inspection.

7.102 Equipotential bonding terminals shall be indicated by the equipotentiality symbol (see 7.6).

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

Compliance is checked by inspection.

7.103 Appliances or the **detachable electrical parts** of appliances intended to be partially immersed in water for cleaning shall be marked with a line which clearly indicates the maximum depth of immersion, together with the substance of the following warning:

Do not immerse beyond this line.

If there is any seam or seal that causes the appliance or part not to withstand the treatment specified in 15.102, the line indicating the maximum depth of immersion shall be at least 50 mm below any such seam or seal when the appliance or the part is in the position in which it is to be cleaned.

Compliance is checked by inspection and measurement.

8 Protection against access to live parts

This clause of part 1 is applicable.

9 Starting of motor-operated appliances

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

*Compliance is checked by starting the motor three times at a voltage equal to 0,85 times **rated voltage**, the motor being at room temperature at the beginning of the test.*

*The motor is started each time under the conditions occurring at the beginning of **normal operation** or, for automatic appliances, at the beginning of the normal cycle of operation, the motor being allowed to come to rest between successive starts. 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**.*

*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.*

NOTE The supply source must be such that during the test the drop in voltage does not exceed 1 %.

10 Power input and current

This clause of part 1 is applicable except as follows.

10.1 *Addition:*

NOTE 101 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 2.2.4).

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.*

11.4 *Replacement:*

*Appliances are operated under **normal operation** such that the total power input of the appliance is 1,15 times **rated power input**. If it is not possible to switch on all heating elements 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 which limits the total power input, the test is made with whichever combination of heating units, as may be selected by the control, imposes the most severe condition.

*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 or electronic circuits are measured.*

11.7 *Replace the test specification paragraph by the following:*

Appliances are operated until steady conditions are established.

11.8 *Addition:*

The limit of 65 K temperature rise for the rear and side test walls, including the part of the test corner which projects in front of the appliance, only applies below the level of the cooking surface. If this temperature rise limit is exceeded above this level then the requirements of 7.101 apply.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of part 1 is applicable except as follows.

13.2 *Modification:*

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

– *for cord and plug connected appliances*	*1 mA per kW **rated power input** of the appliance with a maximum of 10 mA*
– *for other appliances*	*1 mA per kW **rated power input** of the appliance with no maximum.*

NOTE 101 Leakage current limits are different (Japan).

*For **heating units** with surfaces of glass-ceramic or similar material, a flat metal plate, 200 mm by 100 mm and 2 mm thick is used in place of the metal foil. The concavity of the major dimension of the plate shall not exceed 0,1 mm.*

The plate is put in any position on the surface for a period of 1 min before the leakage current is measured.

13.3 *Addition:*

*If there is earthed metal between **live parts** and the surface of glass-ceramic or similar material, the flat metal plate is connected to earthed metal.*

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

*If there is no earthed metal between **live parts** and the surface of glass-ceramic or similar material, the metal plate is not connected to earthed metal.*

*A test voltage of 3 750 V is then applied between **live parts** and the metal plate.*

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

14 Void

15 Moisture resistance

This clause of part 1 is applicable except as follows:

15.1 *Addition:*

*Appliances or any **detachable electrical parts** intended to be partially or completely immersed in water for cleaning are also subjected to the tests of 15.102.*

NOTE Appliances other than **stationary** or any **detachable electrical parts** not marked with a line indicating the maximum depth of immersion, or for which there is no warning against partial or complete immersion in the instruction sheet, are considered to be appliances intended to be completely immersed in water for cleaning.

15.1.1 *Addition:*

In addition, IPX8, IPX1, IPX2, IPX3 and IPX4 appliances are subjected for 5 min to the following splash test:

The apparatus shown in figure 101 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 and, for all other appliances, on a horizontal support 50 mm below the lowest edge of the appliance; the bowl is so moved around 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 which are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.

15.2 *Replace the requirement paragraph by the following:*

Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation.

Instead of the test specification paragraph referring to the liquid container the following applies:

A litre of cold water containing approximately 1 % NaCl is poured steadily over a period of 1 min on to the centre of the surface of the griddle plate.

15.3 *Addition:*

NOTE 101 If it is not possible to place the whole appliance in the humidity cabinet, parts containing electrical components are tested separately, taking into account the conditions which occur in the appliance.

15.101 Appliances which 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 so positioned as to direct water on to those parts which will give the most unfavourable result. Immediately following this treatment the appliance shall withstand an electric strength test as specified in 16.3.

15.102 Appliances or **detachable electrical parts** intended to be partially or completely immersed in water for cleaning shall have adequate protection against the effects of immersion.

Compliance is checked by the following tests:

*The sample is operated under **normal operation**, except that cycling controls, if any, are adjusted to the highest setting, the supply voltage being such that the power input of the appliance is 1,15 times the **rated power input**.*

When steady conditions are established or when the cycling control operates for the first time, the connector is withdrawn or the supply switched off and the sample is immediately immersed completely in water having a temperature between 10 °C and 25 °C, unless it is marked with a line indicating the maximum depth of immersion, in which case it is immersed to the depth indicated.

After 1 h of immersion, the sample is removed from the water and dried, care being taken to ensure that all moisture is removed from the insulation in the vicinity of the pins of appliance inlets. The leakage current is then measured on the assembled appliance, as described in 16.2.

The leakage current shall not exceed the value specified in 16.2.

After the treatment described above and the measurement of the leakage current, the sample shall withstand an electric strength test as specified in 16.3, the test voltage being, however, reduced to 1 000 V.

*The sample is then operated under **normal operation**, the supply voltage being such that the power input of the appliance is 1,15 times the **rated power input** for 10 days (240 h). During this period, the sample is allowed to cool to approximately room temperature five times at regular intervals.*

After this period, the connector of the sample is withdrawn or the supply otherwise switched off and the sample immediately immersed once more in water for 1 h as described above. It is then dried and the leakage current is measured again as described in 16.2.

The leakage current shall not exceed the value specified in 16.2.

The sample shall then withstand an electric strength test as specified before, and inspection shall show that water has not entered the appliance to any appreciable extent.

NOTE When inspecting the appliance for the presence of water, special attention is paid to parts of the appliance in which electrical components are situated.

16 Leakage current and electric strength

This clause of part 1 is applicable except as follows.

16.1 *Addition:*

*For **heating units** with surfaces of glass-ceramic or similar material, the tests of 16.2 and 16.3 are made with the flat metal plate as described in 13.2.*

16.2 *Modification:*

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

– *for cord and plug connected appliances*	*2 mA per kW **rated power input** of the appliance with a maximum of 10 mA*
– *for other appliances*	*2 mA per kW **rated power input** of the appliance with no maximum*

NOTE 101 Leakage current limits are different (Japan).

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 **heating units** in turn, with the flat metal plate connected to earthed metal.*

*The leakage current shall not exceed 2 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 each pole of the supply and the flat metal plate for each of the **heating units** in turn, the metal plate not being connected to earthed metal.*

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

NOTE 102 For appliances intended to be used with a connector and intended to be partially or completely immersed in water for cleaning, the appliance inlet may be dried, for example by means of blotting paper, before applying the test voltage, if the appliance would not otherwise withstand this test.

16.3 *Addition:*

*If there is earthed metal between **live parts** and the surface of glass-ceramic or similar material, the flat metal plate is connected to earthed metal.*

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

*If there is no earthed metal between **live parts** and the surface of glass-ceramic or similar material, the metal plate is not connected to earthed metal.*

*A test voltage of 3 750 V is then applied between **live parts** and the metal plate.*

17 Overload protection of transformers and associated circuits

This clause of part 1 is applicable.

18 Endurance

18.1 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. **Griddle grills** are operated in the open position.*

*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 cooking surface is subjected to a spillage test using $1\,^{+0,1}_{0}$ litre of cold water between 10 °C and 15 °C, poured steadily over the surface for 1 min.

15 min 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 *Addition:*

A control or switching device which is intended for different settings corresponding to different functions of the same part of the appliance and which are covered by different standards is in addition set in the most severe setting irrespective of the manufacturer's instructions.

19.2 *Addition:*

Controls are set at maximum.

19.4 *Addition:*

NOTE 101 The main contacts of the contactor intended for switching on and off the heating element(s) in normal use are locked in the "ON" position. However, if two contactors operate independently of each other or if one contactor operates two independent sets of main contacts, these contacts are locked in the "ON" position in turn.

19.13 *Addition:*

If the temperature rise of the walls above and below the cooking surface level or of the floor or ceiling exceeds 125 K, the requirements of 7.101 apply.

20 Stability and mechanical hazards

This clause of part 1 is applicable.

21 Mechanical strength

This clause of part 1 is applicable except as follows.

Addition:

NOTE 101 For appliances intended to be installed in a kitchen, different values of impact energy are applicable according to the height of the impact point (France).

21.101 Cooking surfaces of glass-ceramic or similar material shall withstand the stresses liable to occur in normal use.

Compliance is checked by the following test:

Heating sources beneath a surface of glass-ceramic or similar material are operated in accordance with the conditions of clause 11 until steady conditions are established. After switching off, the cooking surface is immediately subjected to the following test:

A vessel having a bottom of copper or aluminium which is flat over a diameter of 220 mm ± 10 mm with edges rounded with a radius of at least 10 mm is uniformly filled with sand or shot so that the total mass is 4 kg. The vessel is dropped flat from a height of 150 mm on to the surface.

The test is carried out 10 times on any part of the cooking surface but not within 20 mm of control knobs.

The heating sources are then again operated in accordance with the conditions of clause 11 until steady conditions are established.

Immediately after switching off, a quantity of $1^{+0,1}_{0}$ litre of cold water at 15 °C ± 5 °C is then poured steadily over a period of 1 min over the surface; 15 min later all excess water is removed. The appliance is then allowed to cool to approximately ambient temperature. An additional quantity of $1^{+0,1}_{0}$ litre of cold water is then again poured steadily over a period of 1 min over the surface.

15 min later all excess water is removed and the surface wiped dry.

After the tests the surface shall not be cracked or broken and the appliance shall withstand the test of 16.3.

22 Construction

This clause of part 1 is applicable except as follows.

22.101 Appliances shall be protected in such a manner that moisture and grease will not collect in such a way as to affect **creepage distance** and **clearance** values.

Compliance is checked by inspection.

22.102 **Thermal cut-outs** protecting circuits with heating elements and those for motors of which the unexpected starting may cause a hazard shall be of the **non-self-resetting** trip-free type and shall provide **all-pole disconnection** from the supply.

If the **non-self-resetting thermal cut-out** is only accessible after removing parts with the aid of a **tool**, the trip-free type is not required.

NOTE **Thermal cut-outs** of the trip-free type have an automatic action, with a reset actuating member, so constructed that the automatic action is independent of manipulation or position of the reset mechanism.

Thermal cut-outs of the bulb and capillary type which operate during the tests of clause 19 shall be such that rupture of the capillary tube shall not impair compliance with the requirements of 19.13.

Compliance is checked by inspection and by manual test and by rupturing the capillary tube.

NOTE Care must be taken to ensure that the rupture does not seal the capillary tube.

22.103 Lights, switches or push-buttons shall only be coloured red for the indication of danger, alarm or similar situations.

Compliance is checked by inspection.

22.104 **Portable appliances** shall be constructed to prevent a hazard resulting from objects penetrating the bottom surface.

Compliance is checked by inspection and by measurement, if necessary.

NOTE Appliances without legs are considered to comply with this requirement if **live parts** are at least 6 mm from the supporting surface measured through any opening. If the appliance is fitted with legs, this distance is increased to 10 mm for appliances intended to be placed on a table and to 20 mm for appliances intended to be placed on the floor.

22.105 Hinged cooking surfaces of **griddle grills** shall be protected against accidental dropping.

Compliance is checked by applying a force of 20 N in the most unfavourable position and direction to the raised cooking surface. The cooking surface shall not fall back to its operating position.

NOTE Hinged cooking surfaces which can be opened through an angle of at least 100°, even if placed against a wall, are not subjected to this test.

23 Internal wiring

This clause of part 1 is applicable except as follows.

23.3 *Addition:*

*When the capillary tube of the **thermostat** is liable to flexing in normal use the following applies:*

– *Where the capillary tube is fitted as part of the internal wiring, part 1 applies.*
– *Where the capillary tube is separate, it is subjected to 1 000 flexings at a rate not exceeding 30 per min.*

NOTE 101 If, in any of the above cases, it is not possible to move the movable part of the appliance at the given rate, due for example to the mass of the part, the rate of flexing may be reduced.

After the test, the capillary tube shall show no sign of damage within the meaning of this standard and no damage impairing its further use.

– *However, if a rupture of the capillary tube renders the appliance inoperative (fail-safe), separate capillary tubes are not tested, and those fitted as part of the internal wiring are not inspected for compliance with the requirements.*

Compliance in this instance is checked by rupturing the capillary tube.

NOTE 102 Care must be taken to ensure that the rupture does not seal the capillary tube.

24 Components

This clause of part 1 is applicable except as follows.

24.101 Connectors fitted to appliances shall not incorporate a **thermostat**.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of part 1 is applicable except as follows.

25.3 *Addition:*

Fixed appliances and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means shall be constructed so that the **supply cord** can be connected after the appliance has been installed in accordance with the manufacturer's instructions.

Terminals for permanent connection of cables to fixed wiring may also be suitable for the **type X attachment** of a **supply cord**. In this case, a cord anchorage complying with 25.16 shall be fitted to the appliance.

If the appliance is provided with a set of terminals allowing the connection of a flexible cord, they shall be suitable for the **type X attachment** of the cord.

In both cases the instruction sheets shall give full particulars of the power **supply cord**.

The connection to the supply wires of **built-in appliances** may be made before the appliance is installed.

Compliance is checked by inspection.

25.7 *Modification:*

Instead of the types of **supply cords** specified, the following applies:

Supply cords shall be oil-resistant, sheathed flexible cable not lighter than ordinary polychloroprene or other equivalent synthetic elastomer-sheathed cord (code designation 60245-IEC-57).

26 Terminals for external conductors

This clause of part 1 is applicable.

27 Provision for earthing

This clause of part 1 is applicable except as follows.

27.2 *Addition:*

Stationary appliances shall be provided with a terminal for the connection of an external equipotential conductor. This terminal shall be in effective electrical contact with all fixed exposed metal parts of the appliance, and shall allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm². It shall be located in a position convenient for the connection of the bonding conductor after installation of the appliance.

NOTE 101 Small fixed exposed metal parts, for example nameplates and the like, are not required to be in electrical contact with the terminal.

28 Screws and connections

This clause of part 1 is applicable.

29 Creepage distances, clearances and distances through insulation

This clause of part 1 is applicable.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows.

30.2.1 *Modification:*

The glow-wire test of annex K is made at a temperature of 650 °C.

30.2.2 *Modification:*

Not applicable.

30.3 *Addition:*

NOTE 101 Switching devices with moving contacts, other than those manually operated and those intended to operate only during abnormal operation, are considered as subjected to extra-severe duty conditions.

In addition, other parts of insulating materials are also considered as subjected to extra-severe duty conditions, unless they are so enclosed or located that pollution by condensation is unlikely to occur; in such a case, the requirements for severe duty conditions apply.

30.101 *Filters, if any, of non-metallic materials intended for the absorption of grease are subjected to the burning test specified in annex J, except that the thickness of the specimen is the same as that in the appliance.*

NOTE It may be necessary to support the specimen.

31 Resistance to rusting

This clause of part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of part 1 is applicable.