

INTERNATIONAL STANDARD

IEC
60335-2-37

Fourth edition
2000-02

Safety of household and similar electrical appliances –

Part 2-37: Particular requirements for commercial electric deep fat fryers

Sécurité des appareils électrodomestiques et analogues –

*Partie 2-37:
Règles particulières pour les friteuses électriques
à usage collectif*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –**Part 2-37: Particular requirements for commercial electric
deep fat fryers**

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 60335-2-37 has been prepared by subcommittee 61E: Safety of electrical commercial catering equipment, of IEC technical committee 61: Safety of household and similar electrical appliances.

If forms the fourth edition of IEC 60335-2-37 and cancels 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/348/FDIS	61E/362/RVD

Full information on the voting for the approval of this part 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 deep fatfryers.

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.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

Part 2-37: Particular requirements for commercial electric deep fat fryers

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of electrically operated commercial **deep fat fryers** including pressurized types 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;
- in many countries, additional requirements are specified for pressure appliances.

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.

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:

The appliance is filled with oil to the minimum **indicated level**.

The thermal control is set at the maximum setting. Lids, if provided, are left in the open position or removed unless the manufacturer's instructions indicate that the appliance is designed for operation with the lid closed.

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

deep fat fryer

an appliance provided with one or more containers in which the food to be cooked is immersed in the frying medium. The container(s) may be fixed, removable, lifting, tilting, etc. The pressure within the container can exceed atmospheric pressure.

2.2.102

indicated level

a mark on the appliance to indicate either the minimum or the maximum liquid level for correct operation

2.2.103

installation wall

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

2.2.104

rated pressure

the maximum working pressure assigned by the manufacturer to the pressurized part of the appliance

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.

4.5 Addition:

Unless otherwise stated, the tests are carried out with the container in the position of normal use for frying.

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 Appliances are initially filled with unused vegetable oil. The series of relevant tests are carried out with this oil, unused oil being added as necessary to maintain a constant level.

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,
- the **rated pressure**, in kilopascals (kPa), on pressurized parts of the appliance.

7.6 Addition:

Add the following symbol:



..... equipotentiality (IEC 60417-5021-a)*

* 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*

7.10 Addition:

Devices controlling the tilting process of appliances with tilting parts shall be clearly marked to show the direction of movement.

7.12 Addition:

The instruction sheet shall include a warning that danger of fire exists if the oil level is below the minimum **indicated level**.

The instruction sheet shall include the maximum batch load in kilogrammes.

The instruction sheet shall also include a warning regarding the danger of using old oil, emphasizing that this will have a reduced flash-point and be more prone to surge boiling.

Attention shall also be drawn to the effect on surge boiling of over-wet food and too large a charge.

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.

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 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.

7.102 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.

7.103 Appliances shall be marked with the minimum and maximum oil levels.

Compliance is checked by inspection.

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.

11.3 Addition:

The temperature of the oil is measured 25 mm below the oil surface in the centre of the oil container.

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.*

NOTE See also 11.7.

11.7 Replacement:

Appliances are operated until steady conditions are established.

NOTE The duration of the test may consist of more than one cycle of operation.

Tilting motors are operated immediately after the appliance has reached steady conditions, for one full cycle of operation (one cycle being from the fully up position, to the fully down position and back to the fully up position).

Lifting motors are similarly operated, but for three such cycles.

11.8 Addition:

The maximum temperature of the oil shall not exceed 200 °C. During the test, the pressure relief device shall not operate.

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).

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, IPX0, 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 $15\text{ cm} \pm 5\text{ cm}$ 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.

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**, the supply voltage being such that the power input of the appliance is 1,15 times the **rated power input** until steady conditions are established.

The connector is then withdrawn or the supply otherwise switched off and the sample is immediately emptied and then 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 as above 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 emptied and 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.

16.2 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:

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.

17 Overload protection of transformers and associated circuits

This clause of part 1 is applicable.

18 Endurance

This clause of part 1 is not applicable.

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.

Appliances provided with a control limiting the pressure during the test of clause 11 are also subjected to the tests of 19.4 with this control rendered inoperative.

NOTE 101 Continuous blowing-off of the pressure relief device is in itself disregarded.

19.2 Addition:

The test is carried out in two parts as follows:

- a) With a quantity of oil less than the minimum such that the highest oil temperature is obtained, the test being started from cold with the thermal control at its highest setting and with the lid(s) open, removed or closed whichever is the most unfavourable condition, unless the appliance is constructed so that it cannot be operated unless the lid(s) is(are) closed.
- b) When the appliance has returned to room temperature it is refilled and then drained for 1 h but not dried off. The test is then started with the thermal control at its highest setting and with the lid(s) open, removed or closed whichever is the most unfavourable condition, unless the appliance is constructed so that it cannot be operated unless the lid(s) is(are) closed. During this test no oil, other than the oil on the elements, shall ignite and no flames shall be propagated to other parts of the appliance.

19.3 Addition:

Any adjustable temperature or pressure control within the appliance which is preset for correct operation but is not locked in position is adjusted to its most unfavourable position.

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:

During the first part of the test of 19.2 and 19.3 the temperature of the oil shall not exceed 230 °C measured at any point not closer than 5 mm from any surface.

During the test of 19.4 the temperature of the oil measured in accordance with 11.3 shall not exceed 230 °C.

20 Stability and mechanical hazards

This clause of part 1 is applicable except as follows.

20.1 Addition:

Detachable parts and loose items such as baskets and lids are placed in their most unfavourable positions.

20.2 Add the following after the first requirement paragraph:

This applies also to parts necessary to effect the tilting operation, i.e. handles or wheels.

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).

22 Construction

This clause of part 1 is applicable except as follows.

22.7 Replacement:

Appliances which operate at a pressure in excess of atmospheric pressure (over-pressure) shall incorporate a suitable pressure relief device which prevents excessive pressure.

*Compliance is checked by operating the appliance at **rated power input** with the pressure controls rendered inoperative.*

*The pressure relief device shall operate during this test so as to prevent the internal pressure exceeding the **rated pressure** by more than 20 %.*

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 Appliances shall be constructed so that spillage or splashing of hot oil on parts which in normal use have a temperature exceeding 300 °C is adequately prevented.

Compliance is checked by inspection after the test of 15.2.

22.105 A means shall be provided for emptying the oil from appliances with fixed containers without tilting the appliance, if the total mass of the appliance, with its container filled with oil to the maximum **indicated level**, exceeds 10 kg, or if the quantity of oil exceeds 5 l.

For appliances with removable containers, if the total mass of the container filled with oil to the maximum **indicated level** exceeds 10 kg, or if the quantity of oil exceeds 5 l, such a means shall also be provided.

NOTE Means to empty the oil are for example taps, drain valves, tilting devices, etc.

If oil-collecting containers are provided by the manufacturer, they shall be suitable and have sufficient capacity to allow the complete drainage of the oil in the appliance in one operation.

Containers in which oil is intended to be carried shall be provided with suitable means for handling.

Compliance is checked by inspection and measurement.

22.106 Appliances intended to be emptied by mechanically tilting the oil container shall be constructed so that this will not result in a hazard, for example the spilling or splashing of hot oil.

Compliance is checked by inspection.

22.107 Appliances with tilting containers shall be provided with a mechanism which prevents accidental tilting from any position.

If the container is tilted by means of an electric motor, it shall only be possible for this motor to function if the pressure is maintained on the control buttons or switches. The buttons or switches shall be located and protected in such a way that they cannot be operated accidentally.

If the container is tilted manually, it shall not be possible to adversely influence the tilting action other than by the intended means.

Compliance is checked by inspection and by applying a force of 340 N at any point to the container.

22.108 Appliances fitted with lifting devices shall be constructed so that the drive mechanism automatically disengages or stops at its fully up or fully down position.

Compliance is checked by inspection.

22.109 Appliances shall be constructed so that the heating element is switched off from the supply when

- it is removed from the appliance; or
- it has reached 80 % of the distance between its normal operating position and its parked position if it is of the type which swings up.

Compliance is checked by inspection.

22.110 Appliances shall have adequate surge allowance above the maximum indicated oil level such that the total surge volume of the pan, including any container designed to collect surging oil, shall have a ratio in litres to the recommended batch load in kilogrammes (see 7.12), of not less than 4.

Compliance is checked by measurement.

22.111 Drain cocks and other emptying devices for hot liquids shall be constructed so that they cannot be opened inadvertently. Moreover, it shall not be possible to withdraw drain plugs inadvertently.

Compliance is checked by inspection and by manual test.

NOTE For example, this requirement is met when the valve handle is such that, when released, it returns automatically to the closed position or is of the wheel type or is placed in a recess.

22.112 Fryer baskets and swinging, tilting or lifting heating elements shall be constructed so as to keep them safely in the raised position.

Compliance is checked by inspection and by manual test.

22.113 Means provided to allow drainage of liquid from appliances shall discharge the liquid in such a manner that electrical insulation is not affected.

Compliance is checked by inspection and by manual test.

22.114 Hinged lids shall be protected against accidental falling.

Compliance is checked by inspection and by manual test.

22.115 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.

22.116 The operating pressure of pressurized parts of the appliance shall not exceed the **rated pressure**.

Compliance is checked during the test of clause 11.

22.117 The pressure relief device shall be positioned or constructed so that its operation does not cause injury to persons or damage to surroundings. Its construction shall be such that it cannot be made inoperative.

Compliance is checked by inspection.

22.118 It shall not be possible to open the lid or cover of a pressurized appliance until the pressure has been reduced to approximately atmospheric pressure.

Compliance is checked by inspection and by manual test.

22.119 Pressurized appliances shall incorporate a vacuum release valve to prevent a partial vacuum forming unless it is designed for vacuum operation.

Compliance is checked by inspection.

22.120 Pressurized parts of appliances shall be capable of withstanding the **rated pressure**.

*Compliance is checked by subjecting the pressurized parts for 30 min to a hydrostatic pressure equal to 1,5 times the **rated pressure**. All outlets are sealed and any pressure relief devices rendered inoperative. Means other than water may be used to create the hydrostatic pressure.*

During the test the pressurized parts shall show no signs of leaks or permanent deformation, nor shall they burst.

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.

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

Addition:

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**.

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 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.

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Withdrawing