

INTERNATIONAL STANDARD

IEC
60335-2-50

Third edition
2000-03

**Safety of household and
similar electrical appliances –**

**Part 2-50:
Particular requirements for
commercial electric bains-marie**

Sécurité des appareils électrodomestiques et analogues –

*Partie 2-50:
Règles particulières pour les bains-marie électriques
à usage collectif*



Reference number
IEC 60335-2-50:2000(E)

Numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series.

Consolidated publications

Consolidated versions of some IEC publications including amendments are available. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Validity of this publication

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology.

Information relating to the date of the reconfirmation of the publication is available in the IEC catalogue.

Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is to be found at the following IEC sources:

- **IEC web site***
- **Catalogue of IEC publications**
Published yearly with regular updates
(On-line catalogue)*
- **IEC Bulletin**
Available both at the IEC web site* and as a printed periodical

Terminology, graphical and letter symbols

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams*.

* See web site address on title page.

INTERNATIONAL STANDARD

IEC 60335-2-50

Third edition
2000-03

Safety of household and similar electrical appliances –

Part 2-50: Particular requirements for commercial electric bains-marie

Sécurité des appareils électrodomestiques et analogues –

*Partie 2-50:
Règles particulières pour les bains-marie électriques
à usage collectif*

© IEC 2000 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembe Geneva, Switzerland
e-mail: inmail@iec.ch

IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

R

For price, see current catalogue

CONTENTS

	Page
FOREWORD	3
Clause	
1 Scope	5
2 Definitions	5
3 General requirement	6
4 General conditions for the tests	7
5 Void	7
6 Classification	7
7 Marking and instructions	7
8 Protection against access to live parts	9
9 Starting of motor-operated appliances	9
10 Power input and current	10
11 Heating	10
12 Void	10
13 Leakage current and electric strength at operating temperature	10
14 Void	11
15 Moisture resistance	11
16 Leakage current and electric strength	13
17 Overload protection of transformers and associated circuits	14
18 Endurance	14
19 Abnormal operation	14
20 Stability and mechanical hazards	14
21 Mechanical strength	14
22 Construction	15
23 Internal wiring	16
24 Components	17
25 Supply connection and external flexible cords	17
26 Terminals for external conductors	17
27 Provision for earthing	18
28 Screws and connections	18
29 Creepage distances, clearances and distances through insulation	18
30 Resistance to heat, fire and tracking	18
31 Resistance to rusting	18
32 Radiation, toxicity and similar hazards	18
Annexes	20
Figure 101 – Splash apparatus	19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –**Part 2-50: Particular requirements for commercial electric bains-marie**

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.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60335-2-50 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 third edition of IEC 60335-2-50 and replaces the second edition, published in 1995, its amendment 1 (1996) and amendment 2 (1998).

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

FDIS	Report on voting
61E/351/FDIS	61E/364/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 bains-marie.

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.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-50:2000

Withdawn

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

Part 2-50: Particular requirements for commercial electric bains-marie

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of electrically operated **bains-marie** 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 restaurants, canteens, hospitals and similar commercial enterprises.

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;
- for appliances intended to be used outdoors, additional requirements may be necessary.

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:

Open-well and **wet-heat-type bains-marie** are filled with water to the **indicated level** and topped up during the test in accordance with the manufacturer's instructions. The appliance is operated with any control intended to be operated by the user set at maximum. If the water boils, the control is then adjusted to the lowest setting that maintains simmering. No covers or containers are fitted.

Dry-heat-type bains-marie are operated with any controls set at the maximum. Empty food containers are placed in the well but with the container covers removed.

Combined-type appliances are operated under the most unfavourable conditions.

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 bain-marie

an appliance with a well which is used for the storage of hot food in containers prior to serving. The containers are indirectly heated by hot air, steam or water in the well

2.2.102 open-well-type bain-marie

an appliance where the food containers rest in water in a heated well

2.2.103 wet-heat-type bain-marie

an appliance where the fitted food containers are heated by steam generated within the appliance. The pressure in the well or steam generator does not differ significantly from atmospheric pressure

2.2.104 dry-heat-type bain-marie

an appliance where the fitted food containers are heated by warm air generated within the appliance

2.2.105 indicated level

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

2.2.106 installation wall

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

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.

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)*

7.12.1 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 partially or completely 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**.

* 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*.

7.101 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 intended to be filled by hand or a manually operated tap shall be marked with an **indicated level**.

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 the overload **protective devices** of the motor shall not operate.*

NOTE The supply source is 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.

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 regulated so 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 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 which are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.

15.2 Replacement:

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

Compliance is checked by the following test:

Appliances with **type X attachment**, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cable or cord of the smallest cross-sectional area specified in 26.2 and other appliances are tested as delivered.

Appliances provided with an appliance inlet are tested with or without an appropriate connector in position, whichever is the more unfavourable.

Detachable parts are removed.

The water-well and steam generator of appliances intended to be filled by hand are completely filled with water containing approximately 1 % NaCl and a further quantity equal to 15 % of their capacity but not more than 10 l is poured in steadily over a period of 1 min.

The food containers of **dry-heat-type bains-marie** are filled with water and placed in the appliance. A further quantity of 1 l is then added to each container.

Appliances intended to be filled by a manually operated tap or automatically are connected to a water supply having the maximum supply pressure indicated by the manufacturer. The means for controlling the incoming water is held fully open and the filling continued for 1 min after the first evidence of overflow, or until a further protective system operates to stop the inflow.

The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation which could result in a reduction of **creepage distances** and **clearances** below the values specified in 29.1.

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, if relevant, 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 down 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.

19.2 Addition:

Appliances are tested without water and those intended to be automatically filled are tested with the water supply turned off.

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.

20 Stability and mechanical hazards

This clause of part 1 is applicable except as follows.

20.1 Addition:

Movable parts, including lids, are placed in the most unfavourable position.

NOTE 101 Any spillage of liquid is ignored.

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.

22.15 Addition:

Appliances intended to transport food or other loads shall be provided with a suitable means to protect the **supply cord** from damage during transportation.

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 fitted with wheels or similar means shall be provided with an efficient means of locking while the appliance is stationary.

Compliance is checked by inspection and by the following test:

The appliance is fully loaded in accordance with the manufacturer's instructions. If no instructions are provided, the containers delivered with the appliance are completely filled with water. If no containers are supplied, suitable containers are used for the test.

The appliance, fully loaded in accordance with the manufacturer's instructions, is placed on a plane inclined at 10° to the horizontal, with the locking mechanism applied. The appliance shall not move by more than 100 mm.

22.105 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 placed in a recess.

22.106 Means provided to allow drainage of water from **bain-marie** wells or steam generators shall discharge the water in such a manner that electrical insulation is not affected.

Compliance is checked by inspection and by manual test.

22.107 The level to which manually filled appliances have to be filled shall be so located as to be readily visible when filling.

Compliance is checked by inspection.

22.108 Portable appliances shall be constructed to prevent a hazard resulting from objects placed on the table or floor penetrating the bottom surface.

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

NOTE Appliances without legs are considered as complying 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.

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 shall be subjected to 1 000 flexings at a rate not exceeding 30 per minute.*

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 being subjected to extra-severe duty conditions.

In addition, other parts of insulating materials are also considered as being 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.

31 Resistance to rusting

This clause of part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of part 1 is applicable.