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REDLINE VERSION

INTERNATIONAL STANDARD

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Household and similar electrical appliances – Safety –
Part 2-47: Particular requirements for commercial electric boiling pans

IEC 60335-2-47:2021-11 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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Household and similar electrical appliances – Safety – Part 2-47: Particular requirements for commercial electric boiling pans

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-47: Particular requirements for commercial electric boiling pans

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-47:2002+AMD1:2008+AMD2:2017 CSV. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60335-2-47 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2002, Amendment 1:2008 and Amendment 2:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the text has been aligned with IEC 60335-1:2020;
b) some notes have been converted to normative text, modified or deleted (Clause 1, 7.15, 11.7, 9.101, 10.1, 11.4, 11.7, 19.101, 20.1, 22.101, 22.113, 23.3, 27.2);
c) clarifications to some test specifications have been made (15.1.1, 15.2, 20.1, 22.101, 22.102);
d) exclusion of battery-operated appliances and appliances used in areas open to the public (Clause 1);
e) relocation of cleaning instructions from 7.12.1 to 7.12;
f) introduction of 22.120;
g) conciliation of the text of IEC 60335-2-47 with the other standards under IEC/TC61/MT32.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
61/6363/FDIS	61/6413/RVD

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

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60335 series, published under the general title *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This Part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for commercial electric boiling pans.

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

NOTE 2 The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

– unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

NOTE 3 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 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

– 6.1: Class 01 appliances are allowed (Japan).

– 13.2: Leakage current limits are different (Japan).

– 16.2: Leakage current limits are different (Japan).

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website:

https://www.iec.ch/tc61/supportingdocuments

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IEC 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the Part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

– IEC standards published by TC 59 concerning methods for measuring performance;
– CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
– CISPR 14-2 concerning electromagnetic immunity;
– IEC standards published by TC 111 concerning environmental matters.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-47: Particular requirements for commercial electric boiling pans

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrically operated commercial **boiling pans** ~~not intended for household and similar 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 101~~ These appliances are not intended for household and similar purposes. They are used for commercial processing of food in areas not open to the public, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries~~,~~ and butcheries~~, etc~~.

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

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

~~NOTE 102~~ Attention is drawn to the fact that:

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can 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.

~~NOTE 103~~ 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);

– appliances for continuous mass production of food;

– **battery-operated appliances**.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread*

ISO 3506-1, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs with specified grade and property classes*

ISO 3506-2, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 2: Nuts with specified grade and property classes*

ISO 3506-3, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 3: Set screws and similar fasteners not under tensile stress*

ISO 3506-4, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 4: Tapping screws*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.4 *Addition:*

Note 101 to entry: The **rated power input** is the sum of the power inputs of all the individual elements in the appliance that 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**.

3.1.9 *Replacement:*

~~**normal operation**~~
operation of the appliance under the following conditions

The appliance is filled with water at 15 °C ± 5 °C to the **indicated level**.

Appliances with more than one programme are operated with the most severe programme. In addition, any control intended to be operated by the user is set at maximum until the water boils or the operating temperature is reached. The control is then adjusted to the lowest setting that maintains boiling or the operating temperature. Lids and covers are in position and closed.

Motors and **detachable electrical parts** incorporated in the appliance are operated ~~in the intended manner~~ under the most ~~severe~~ unfavourable conditions that can be expected in normal use taking into account the manufacturer's instructions.

3.1.101
rated pressure
maximum working pressure assigned by the manufacturer to the pressurized parts of the appliance

3.5 Definitions relating to types of appliances

3.5.101
boiling pan
appliance in which liquids contained in a vessel are heated to boiling point as part of a cooking process

Note 1 to entry: The pressure within the vessel can exceed atmospheric pressure.

Note 2 to entry: The vessel may be fixed or tilting.

3.5.102
atmospheric boiling pan
boiling pan in which the pressure within the vessel does not differ significantly from atmospheric pressure

3.5.103
jacketed boiling pan
appliance having a double-walled vessel, the space between the inner and outer walls containing a heat transfer medium that is heated by heating elements

3.5.104
dual purpose boiling pan
appliance incorporating two vessels, the inner one being removable

Note 1 to entry: The appliance may be used with or without the removable vessel.

3.5.105
unjacketed boiling pan
appliance in which heating of the contents of the vessel is achieved by means other than via a heat transfer jacket

~~**3.106**~~
~~**rated pressure**~~
~~the maximum working pressure assigned by the manufacturer to the pressurized parts of the appliance~~

~~**3.107**~~
~~**indicated level**~~
~~a mark on the appliance to indicate the maximum liquid level for correct operation~~

~~**3.108**~~
~~**installation wall**~~
~~a special fixed construction containing supply facilities for appliances installed in conjunction with it~~

3.6 Definitions relating to parts of an appliance

3.~~109~~6.101
functional surface
surface that is intentionally heated by an internal heat source and has to be hot to carry out the function for which the appliance is intended

Note 1 to entry: An example is the heated sheath of a tubular heating element.

3.~~110~~6.102
adjacent surface
surface that is adjacent to a **functional surface** and which can become hot through conduction

3.8 Definitions relating to miscellaneous matters

3.8.101
indicated level
mark on the appliance to indicate the maximum liquid level for correct operation

3.8.102
installation wall
special fixed construction containing supply facilities for appliances installed in conjunction with it

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.5 *Addition:*

Tests are carried out with the vessel in the position of normal use for cooking.

5.10 *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 ~~101~~ Appropriate enclosures or additional appliances ~~may~~ can be needed for test purposes.

5.101 ~~*Appliances are tested as **heating appliances**, even if they incorporate a **motor**.*~~ *Appliances are tested as **heating appliances** when during a mode of operation electrical heaters are energized. If no electrical heaters are energized, the appliances are tested as **motor-operated appliances**.*

5.102 *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.*

5.103 *Tests on **dual purpose boiling pans** are carried out with or without the inner vessel, whichever imposes the more severe condition, taking into account the manufacturer's instructions.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

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

Compliance is checked by inspection and by the relevant tests.

6.2 *Addition:*

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances shall be marked with the **rated pressure**, in kilopascals (kPa), on pressurized parts of the appliance.

If appliances have external **accessible surfaces**, for which temperature rise limits are specified in Table 101 and for which the provisions of footnote b to Table 101 apply, then the appliance shall be marked with symbol IEC 60417-5041 (2002-10), or with the substance of the following:

Caution: Hot surfaces.

7.6 *Addition:*

[symbol IEC 60417-5041 (2002-10)] caution, hot surface

7.10 *Addition:*

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

7.12 *Addition:*

The instructions of **boiling pans** except **atmospheric boiling pans** shall include the substance of the following warning.

WARNING: Do not open drain cocks or other emptying devices until the pressure has been reduced to approximately atmospheric pressure.

The instructions shall include the substance of the following warning.

WARNING: Opening the drain cock will lead to the outflow of the hot contents of the boiling pan.

Instructions for **user maintenance**, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet or a steam cleaner.

Unless the appliance or part is intended to be partially or completely immersed in water for cleaning, the instructions for appliances with **detachable electrical parts** and appliances, other than **stationary appliances**, shall state that the appliance or part shall not be immersed.

If any of symbols IEC 60417-5021 (2002-10) ~~and~~ or IEC 60417-5041 (2002-10) ~~are~~ is marked on the appliance, ~~their~~ its meaning shall be explained.

The instructions shall include the substance of the following:

These appliances are intended to be used for commercial applications, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries, butcheries, etc., but not for continuous mass production of food.

If the manufacturer wants to limit the use of the appliance to less than the above, this has to be clearly stated in the instructions.

Modification:

The instruction~~s~~ concerning persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge and children playing with the appliance ~~are~~ is not applicable.

7.12.1 ~~*Replacement*~~ *Addition:*

The appliance shall be accompanied by instructions 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. They shall include a statement that the appliance is not to be cleaned with a water jet or a steam cleaner.~~

For appliances that are permanently connected to fixed wiring and for which leakage currents ~~may~~ can exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instructions shall give recommendations regarding the rating of **protective devices**, such as ~~earth leakage relays~~ residual current devices (RCD), to be installed.

If a **stationary appliance** is intended to be moved for cleaning, this shall be stated.

For **stationary appliances** equipped with rollers or castors or intended to be moved for cleaning, the instructions shall state the substance of the following.

> This appliance is to be connected with flexible connections for equipotential bonding and connection to services such as electricity supply, water supply, gas supply and steam supply such that the appliance can be moved in the direction required for cleaning a distance not less than the dimension of the appliance in the direction of movement plus 500 mm without the flexible connections becoming taut or being subject to strain.

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.

7.12.9 Not applicable.

7.14 *Addition:*

The height of the triangle ~~used with~~ in symbol IEC 60417-5041 (2002-10) shall be at least 15 mm.

7.15 *Addition:*

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

Modification:

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

~~NOTE 101 An example of such a **fixed appliance** is a **built-in appliance**.~~

7.101 Equipotential bonding terminals shall be marked with symbol ~~5021 of IEC 60417-1~~ IEC 60417-5021 (2002-10).

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

Compliance is checked by inspection.

7.102 Vessels 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

This clause of Part 1 is applicable except as follows.

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

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

*The ~~motor~~ appliance 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~~ a voltage equal to 0,85 times **rated voltage** being applied to the input terminals of the appliance.*

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

The tests are carried out three times.

*In all cases, the motor shall start and it shall function in such a way that safety is not affected, and 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 3.1.4).*

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Addition:*

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

11.3 *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of ~~Figure 103~~ Figure 101 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

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

11.4 *Replacement:*

*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 that limits the total power input, the test is made with whichever combination of heating units as may be selected by the control imposes the most ~~severe~~ unfavourable 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**~~ rise of the components for which the temperature rise limits were exceeded are measured.*

~~NOTE 101 See also 11.7.~~

11.7 *Replacement:*

Appliances are operated until steady conditions are established.

~~NOTE 101 The duration of the test may consist of more than one cycle of operation.~~

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

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

Agitator motors are operated continuously unless provided with a timer, in which case they are operated for the maximum time allowed by the timer, or until steady conditions are established, whichever is ~~shorter~~ the shortest.

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*~~ *Modification:*

~~*During the test the pressure relief device shall not operate.*~~

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

Addition:

During the test, the pressure relief device shall not operate.

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

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

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

[b] *The temperature rise on external accessible surfaces up to a distance of 100 mm from* ***adjacent surfaces*** *of the appliance (see Figure 102) may exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text.*

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

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

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

12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is not applicable.

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

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

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

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

In addition, ~~IPX0, IPX1, IPX2, IPX3 and IPX4~~ appliances, except those marked IPX5 and IPX6 are subjected for 5 min to the following splash test.

The apparatus shown in ~~Figure 101~~ Figure 103 is used. The appliance is placed in normal position of use and adjustable feet shall be set in accordance with the instructions for use to the most unfavourable height.

For appliances normally used on the floor, the bowl is placed on the floor and is moved around in such a way as to splash the appliance from all directions. 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~~ not positioned underneath the appliance.

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~~ the bowl is placed on the same plane where the appliance is placed and is moved around in such a way as to splash the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 100 mm above the bottom of the bowl. The bowl is not positioned underneath the appliance.

Care is taken that the appliance is not hit by the direct jet.

15.1.2 *Modification:*

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

15.2 *~~Replacement~~ Modification:*

~~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 using a spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent.*~~

~~*Any commercially available non-ionic rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:*~~

~~– *viscosity, 17 mPa·s;*~~

~~– *pH, 2,2 (1 % in water)*~~

~~*and its composition shall be*~~

~~***Substance***~~	~~***Parts by mass %***~~
~~*Plurafac ® LF 221*[1]~~	~~*15,0*~~
~~*Cumene sulfonate (40 % solution)*~~	~~*11,5*~~
~~*Citric acid (anhydrous)*~~	~~*3,0*~~
~~*Deionized water*~~	~~*70,5*~~

~~*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 26.6, and other appliances are tested as delivered.*~~

~~***Detachable parts** are removed.*~~

The vessels of appliances intended to be filled by hand are completely filled with the spillage solution and a further quantity equal to 15 % of the capacity of the vessel but not more than 10 l is poured in steadily over a period of 1 min.

Appliances with vessels 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.

*In addition, **jacketed boiling pans** are subjected to the following test.*

The filling hole for the heat transfer medium is closed and 2 l of the spillage solution is poured steadily over the filling hole for a period of 1 min.

~~*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 that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*~~

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

Compliance is checked by the following test.

~~[1] Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product.~~

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 position. Swivelling outlets of water taps are so positioned as to direct water on to those parts that will give the most unfavourable result. Immediately following this treatment, the appliance shall withstand an electric strength test as specified in 16.3.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.2 *Modification:*

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

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

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

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

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Addition:*

Compliance is also checked by the test of 19.101.

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

~~*Appliances provided with a control limiting the pressure during the tests 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 appliance is operated without water in the vessel and the controls are set at maximum.

***Jacketed boiling pans** fitted with pressure relief devices are operated until the pressure in the jacket is stabilized.*

19.34 *Addition:*

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

*If it is possible for the heat transfer medium of **jacketed boiling pans** to leak out or escape by evaporation or be drained off, the test is also made with the vessel filled with water to the **indicated level** and the jacket empty.*

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

During the test the pressure relief device is allowed to operate.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 *Addition:*

Covers, lids and accessories are placed in the most unfavourable positions.

~~NOTE 101 Any spillage of liquid is ignored.~~

Modification:

The test with the angle of inclination increased to 15° is not carried out.

20.2 ~~*Modification:*~~

~~Add the following after the first requirement paragraph.~~

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

Addition:

Add the following after the first paragraph in the requirement.

This applies also to parts necessary to perform the tilting movement, i.e. handles or handwheels.

20.101 **Boiling pans** with moving parts intended for mixing, stirring, etc., having a kinetic energy of more than 200 J, shall be provided with an interlock to stop the moving parts when the lid or guard has been opened by more than 50 mm.

It shall not be possible to release the interlock by means of test probe B of IEC 61032 with a force of 5 N.

Alternatively, if the peripheral speed of the stirring device does not exceed 1 m/s, the appliance may be provided with an interlock or similar device that can be easily actuated by the user without the use of his hands. The interlock or device shall be **non-self-resetting** and shall provide **all-pole disconnection** from the supply.

Compliance is checked by inspection and by actuating the safety devices.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.7 *Replacement:*

Boiling pans and **jacketed boiling pans** in which the vessel or jacket operates at a pressure in excess of atmospheric pressure (overpressure) shall incorporate a suitable pressure relief device that 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 %.*

~~**22.13** *Addition:*~~

~~Lids and their grips shall be constructed so that, when opening and closing them, scalding by steam is obviated.~~

~~*Compliance is checked by inspection.*~~

22.101 For ~~3~~ multi-phase appliances, **thermal cut-outs** protecting circuits with heating elements and those for motors of which the unexpected starting ~~may~~ can cause a hazard, shall be of the non-self-resetting, trip-free type and shall provide **all-pole disconnection** from related supply circuits.

For single-phase appliances and for single-phase heating elements and/or motors connected between one phase and neutral or between phase and phase, thermal cut-out protecting circuits with heating elements, and those for motors of which the unexpected starting ~~may~~ can cause a hazard, shall be of the non-self-resetting trip-free type and shall provide at least one-pole disconnection.

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 ~~1 **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.~~ Trip-free is an automatic action that is independent of manipulation or position of the actuating member.

Thermal cut-outs of the bulb and capillary type that 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 in such a way that the rupture does not seal the tube.

~~NOTE 2 Care must be taken to ensure that the rupture does not seal the capillary tube.~~

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

Compliance is checked by inspection.

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

Compliance is checked during the test of Clause 11.

22.104 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 or set to a higher relief pressure without the aid of a special **tool**.

Compliance is checked by inspection.

22.105 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.

22.106 Appliances shall be provided with a means whereby exhausted steam is condensed automatically before it is released to the drain.

Compliance is checked by inspection.

22.107 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.

22.108 **Jacketed boiling pans** shall incorporate a vacuum release valve to prevent a partial vacuum forming within the jacket unless it is designed for vacuum operation.

Compliance is checked by inspection.

22.109 Hinged lids shall be protected against accidental ~~falling~~ closing.

Compliance is checked by inspection and by manual test.

22.110 Appliances with tilting containers shall be provided with a mechanism that prevents accidental tilting from any position. It shall not be possible to adversely influence the tilting action other than by the intended means.

Control devices used to operate the mechanism shall be located and protected in such a way that they cannot be operated accidentally.

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

22.111 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.

22.112 The rim of tilting **boiling pans** shall be constructed so that the liquid is poured out in an even stream.

Compliance is checked by manual test.

22.113 Drain cocks and other emptying devices for hot liquids shall be constructed so that they cannot be opened inadvertently.

This requirement is met if the emptying device handle is such that

– when released, it returns the emptying device automatically to the closed position;
– it is of the wheel type; or
– it is placed in a recess such that it cannot be placed in the open position by means of test probe B of IEC 61032 using a single action with a force of 10 N.

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.~~

22.114 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.

22.115 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.

22.116 **Portable appliances** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 6 mm. However, if the appliance is fitted with legs, this distance is increased to 10 mm if the appliance is intended to stand on the table and to 20 mm if it is intended to stand on the floor.*

22.117 The level to which manually filled ~~vessels~~ containers have to be filled shall be so located as to be readily visible when filling.

Compliance is checked by inspection.

22.118 Baskets, lifting or tilting devices shall be constructed so as to keep them safely in any position and a safe handling is possible. The drive mechanism shall automatically disengage or stop at its end positions.

Compliance is checked by inspection and manual test.

22.119 Lids and their grips shall be constructed so that, when opening and closing them, scalding by steam is avoided.

Compliance is checked by inspection.

22.120 Thermal controls shall not be incorporated in connectors.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 *Addition:*

~~*When*~~ *If 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.~~

The rate of flexing may be reduced if it is not possible to move the movable part of the appliance at the given rate, due to the mass of the movable part.

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 in such a way that the rupture does not seal 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.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 *Modification:*

Appliances shall not be provided with an appliance inlet.

25.3 *Addition:*

Appliances with a mass greater than 40 kg, intended for permanent connection to fixed wiring and not provided with rollers, castors or similar means shall be constructed so that the connection can be done after the appliance has been installed in accordance with the manufacturer's instructions.

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

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 instructions 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.*~~

If the appliance uses a **type X attachment** the instructions shall state the size and type of the **supply cord** to be used.

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, except small fixed exposed metal parts such as name-plates and similar parts;

– allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm^2 ; and

– 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 except as follows.

28.1 *Addition:*

Screws made of carbon steel and alloy steel shall be made in accordance with ISO 898-1.

Screws made of corrosion-resistant stainless-steel shall be made in accordance with ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4.

28.4 *Addition:*

Screws that make mechanical connections and electrical connections shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts during operational stress and contact corrosion.

Screws that make mechanical connections and provide earthing continuity shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts due to operational stress and contact corrosion. They shall be designed so that a minimum contact pressure remains.

Compliance is checked by inspection and by measuring the assembling torques for screwed connections providing earthing continuity by applying a torque as specified in Table 102 to turn the screw in the fastening direction. The screw shall not turn.

The screw shall not have been unfastened prior to performing this test.

Table 102 – Assembling torques for screwed connections providing earthing continuity

Outer thread diameter of the screw *mm*	***Assembling torque*** *Nm*	
	Screwed connections for the mechanical strength of the screws A2-70 according to ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4 and 5.8 according to ISO 898-1	***Screwed connections for the mechanical strength of the screws > 8.8 according to ISO 898-1***
> 2,8 and ≤ 3,6	*0,8*	*1,3*
> 3,6 and ≤ 4,2	*1,9*	*3,0*
> 4,2 and ≤ 5,3	*3,7*	*6,0*
> 5,3 and ≤ 6,3	*6,5*	*10,0*
M 8	*15,0*	*25,0*
M 10	*31,0*	*50,0*

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 *Addition:*

The microenvironment is pollution degree 3 and the insulation shall have a comparative tracking index (CTI) not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.1 *Modification:*

The glow-wire test is carried out at 650 °C. The glow-wire flammability index (GWFI) according to IEC 60695-2-12 shall be at least 650 °C.

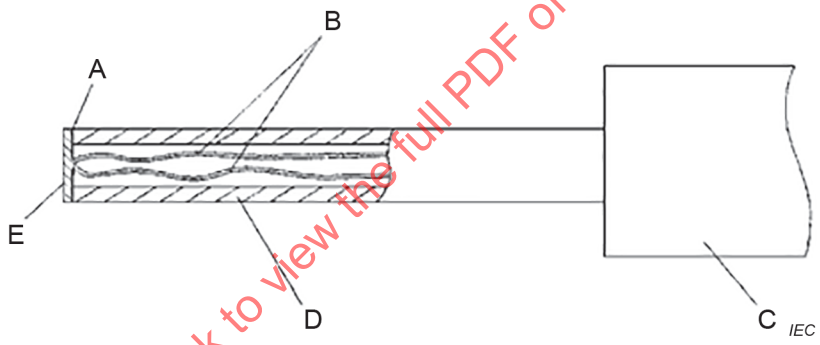
30.2.2 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K ~~(chrome alumel)~~

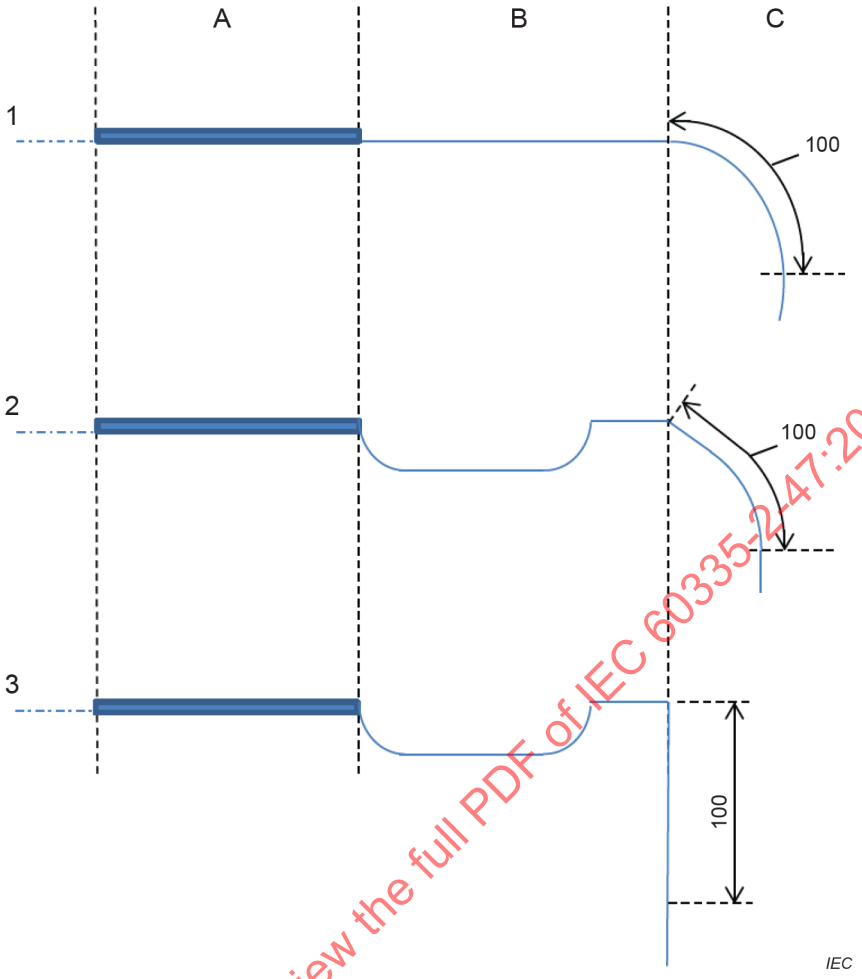
C handle arrangement permitting a contact force of 4 N ± 1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with flat contact face

Figure ~~103~~ 101 – Probe for measuring surface temperatures

Dimensions in millimetres



Key

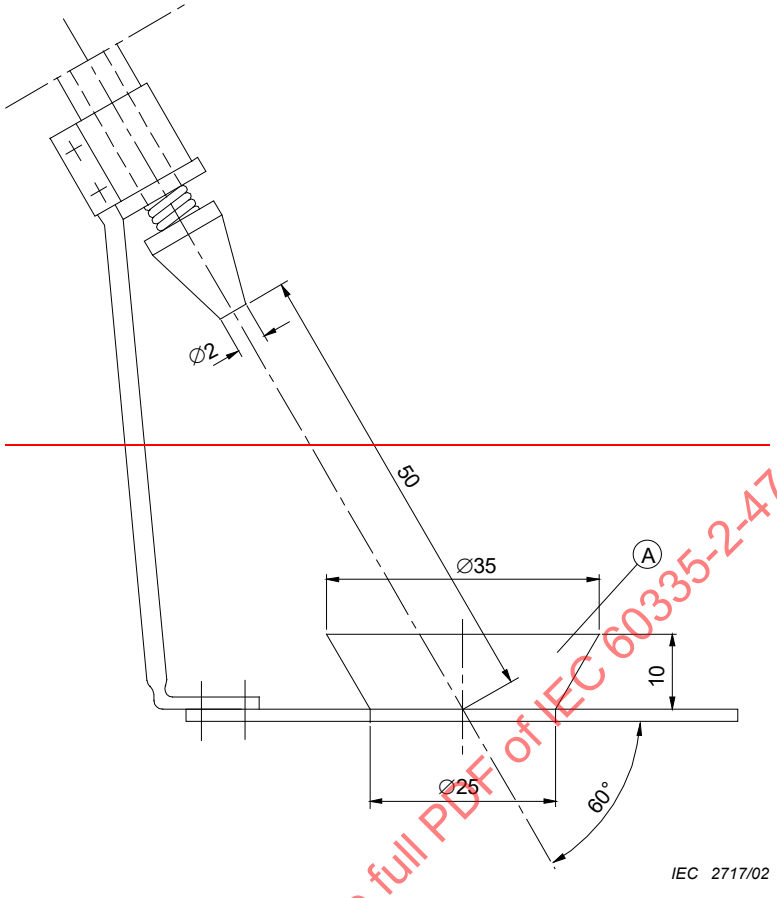
A functional surface

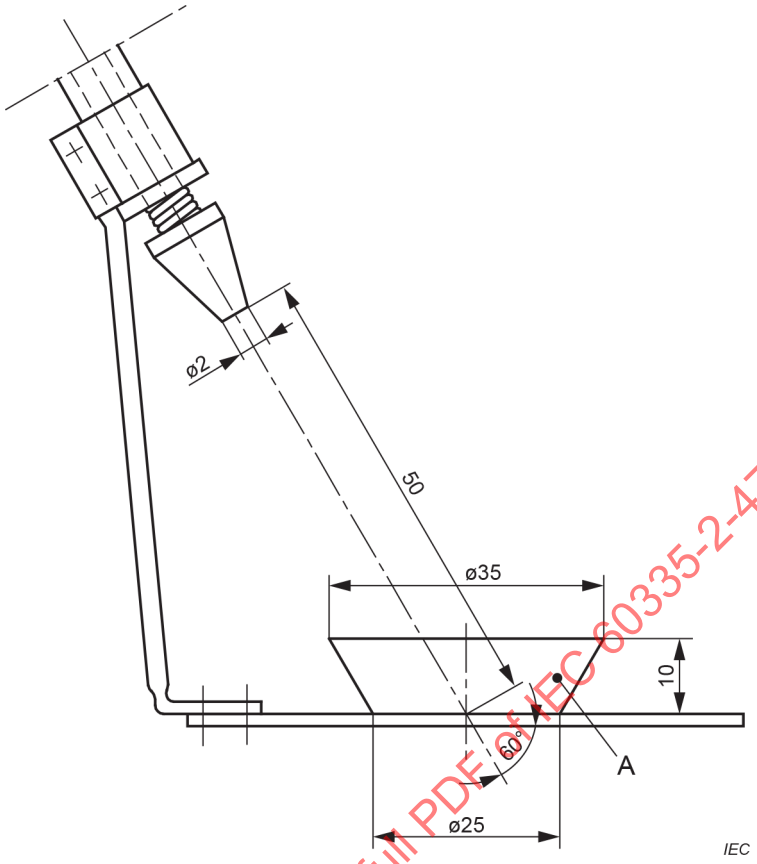
B adjacent surface

C external accessible surface

Figure 102 – Identification of surfaces for temperature measurement

Dimensions in millimetres





Key

A Bowl

Figure ~~101~~ 103 – Splash apparatus

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is not applicable.

~~**Annex N**~~
~~(normative)~~

~~**Proof tracking test**~~

~~***6.3 Addition:***~~

~~*Add 250 V to the list of specified voltages.*~~

Annex P
(informative)

Guidance for the application of this standard to appliances used in tropical climates

Annex P of Part 1 is applicable except as follows.

13 Leakage current and electric strength at operating temperature

13.2 *Modification:*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher;*
– *for other appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher.*

16 Leakage current and electric strength

16.2 *Modification:*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher;*
– *for other appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher.*

Bibliography

The bibliography of Part 1 is applicable.

IEC 60335-2-47

Edition 5.0 2021-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Household and similar electrical appliances – Safety – Part 2-47: Particular requirements for commercial electric boiling pans

Appareils électrodomestiques et analogues – Sécurité – Partie 2-47: Exigences particulières pour les marmites électriques à usage commercial

IEC 60335-2-47:2021-11(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-47: Particular requirements for commercial electric boiling pans

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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IEC 60335-2-47 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2002, Amendment 1:2008 and Amendment 2:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the text has been aligned with IEC 60335-1:2020;
b) some notes have been converted to normative text, modified or deleted (Clause 1, 7.15, 11.7, 9.101, 10.1, 11.4, 11.7, 19.101, 20.1, 22.101, 22.113, 23.3, 27.2);
c) clarifications to some test specifications have been made (15.1.1, 15.2, 20.1, 22.101, 22.102);
d) exclusion of battery-operated appliances and appliances used in areas open to the public (Clause 1);

e) relocation of cleaning instructions from 7.12.1 to 7.12;

f) introduction of 22.120;

g) conciliation of the text of IEC 60335-2-47 with the other standards under IEC/TC61/MT32.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
61/6363/FDIS	61/6413/RVD

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

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60335 series, published under the general title *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This Part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for commercial electric boiling pans.

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

NOTE 2 The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

– unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

NOTE 3 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 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

– 6.1: Class 01 appliances are allowed (Japan).
– 13.2: Leakage current limits are different (Japan).
– 16.2: Leakage current limits are different (Japan).

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website:

https://www.iec.ch/tc61/supportingdocuments

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IEC 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the Part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

– IEC standards published by TC 59 concerning methods for measuring performance;
– CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
– CISPR 14-2 concerning electromagnetic immunity;
– IEC standards published by TC 111 concerning environmental matters.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-47: Particular requirements for commercial electric boiling pans

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrically operated commercial **boiling pans**, 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.

These appliances are not intended for household and similar purposes. They are used for commercial processing of food in areas not open to the public, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries and butcheries.

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

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

Attention is drawn to the fact that:

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can 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);
– appliances for continuous mass production of food;
– **battery-operated appliances**.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread*

ISO 3506-1, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs with specified grade and property classes*

ISO 3506-2, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 2: Nuts with specified grade and property classes*

ISO 3506-3, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 3: Set screws and similar fasteners not under tensile stress*

ISO 3506-4, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 4: Tapping screws*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.4 *Addition:*

Note 101 to entry: The **rated power input** is the sum of the power inputs of all the individual elements in the appliance that 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**.

3.1.9 *Replacement:*

operation of the appliance under the following conditions

The appliance is filled with water at 15 °C ± 5 °C to the **indicated level**.

Appliances with more than one programme are operated with the most severe programme. In addition, any control intended to be operated by the user is set at maximum until the water boils or the operating temperature is reached. The control is then adjusted to the lowest setting that maintains boiling or the operating temperature. Lids and covers are in position and closed.

Motors and **detachable electrical parts** incorporated in the appliance are operated under the most unfavourable conditions that can be expected in normal use taking into account the manufacturer's instructions.

3.1.101
rated pressure
maximum working pressure assigned by the manufacturer to the pressurized parts of the appliance

3.5 Definitions relating to types of appliances

3.5.101
boiling pan
appliance in which liquids contained in a vessel are heated to boiling point as part of a cooking process

Note 1 to entry: The pressure within the vessel can exceed atmospheric pressure.

Note 2 to entry: The vessel may be fixed or tilting.

3.5.102
atmospheric boiling pan
boiling pan in which the pressure within the vessel does not differ significantly from atmospheric pressure

3.5.103
jacketed boiling pan
appliance having a double-walled vessel, the space between the inner and outer walls containing a heat transfer medium that is heated by heating elements

3.5.104
dual purpose boiling pan
appliance incorporating two vessels, the inner one being removable

Note 1 to entry: The appliance may be used with or without the removable vessel.

3.5.105
unjacketed boiling pan
appliance in which heating of the contents of the vessel is achieved by means other than via a heat transfer jacket

3.6 Definitions relating to parts of an appliance

3.6.101
functional surface
surface that is intentionally heated by an internal heat source and has to be hot to carry out the function for which the appliance is intended

Note 1 to entry: An example is the heated sheath of a tubular heating element.

3.6.102
adjacent surface
surface that is adjacent to a **functional surface** and which can become hot through conduction

3.8 Definitions relating to miscellaneous matters

3.8.101
indicated level
mark on the appliance to indicate the maximum liquid level for correct operation

3.8.102
installation wall
special fixed construction containing supply facilities for appliances installed in conjunction with it

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.5 *Addition:*

Tests are carried out with the vessel in the position of normal use for cooking.

5.10 *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 can be needed for test purposes.

5.101 *Appliances are tested as* ***heating appliances*** *when during a mode of operation electrical heaters are energized. If no electrical heaters are energized, the appliances are tested as* ***motor-operated appliances****.*

5.102 *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.*

5.103 *Tests on* ***dual purpose boiling pans*** *are carried out with or without the inner vessel, whichever imposes the more severe condition, taking into account the manufacturer's instructions.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

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

Compliance is checked by inspection and by the relevant tests.

6.2 *Addition:*

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances shall be marked with the **rated pressure**, in kilopascals (kPa), on pressurized parts of the appliance.

If appliances have external **accessible surfaces**, for which temperature rise limits are specified in Table 101 and for which the provisions of footnote b to Table 101 apply, then the appliance shall be marked with symbol IEC 60417-5041 (2002-10), or with the substance of the following:

Caution: Hot surfaces.

7.6 *Addition:*

[symbol IEC 60417-5041 (2002-10)] caution, hot surface

7.10 *Addition:*

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

7.12 *Addition:*

The instructions of **boiling pans** except **atmospheric boiling pans** shall include the substance of the following warning.

WARNING: Do not open drain cocks or other emptying devices until the pressure has been reduced to approximately atmospheric pressure.

The instructions shall include the substance of the following warning.

WARNING: Opening the drain cock will lead to the outflow of the hot contents of the boiling pan.

Instructions for **user maintenance**, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet or a steam cleaner.

Unless the appliance or part is intended to be partially or completely immersed in water for cleaning, the instructions for appliances with **detachable electrical parts** and appliances, other than **stationary appliances**, shall state that the appliance or part shall not be immersed.

If any of symbols IEC 60417-5021 (2002-10) or IEC 60417-5041 (2002-10) is marked on the appliance, its meaning shall be explained.

The instructions shall include the substance of the following:

These appliances are intended to be used for commercial applications, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries, butcheries, etc., but not for continuous mass production of food.

If the manufacturer wants to limit the use of the appliance to less than the above, this has to be clearly stated in the instructions.

Modification:

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge and children playing with the appliance is not applicable.

7.12.1 *Addition:*

The appliance shall be accompanied by instructions 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.

For appliances that are permanently connected to fixed wiring and for which leakage currents can exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instructions shall give recommendations regarding the rating of **protective devices**, such as residual current devices (RCD), to be installed.

If a **stationary appliance** is intended to be moved for cleaning, this shall be stated.

For **stationary appliances** equipped with rollers or castors or intended to be moved for cleaning, the instructions shall state the substance of the following.

> This appliance is to be connected with flexible connections for equipotential bonding and connection to services such as electricity supply, water supply, gas supply and steam supply such that the appliance can be moved in the direction required for cleaning a distance not less than the dimension of the appliance in the direction of movement plus 500 mm without the flexible connections becoming taut or being subject to strain.

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.

7.12.9 Not applicable.

7.14 *Addition:*

The height of the triangle in symbol IEC 60417-5041 (2002-10) shall be at least 15 mm.

7.15 *Addition:*

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

Modification:

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

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

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

Compliance is checked by inspection.

7.102 Vessels 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

This clause of Part 1 is applicable except as follows.

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

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

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

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

The tests are carried out three times.

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

10 Power input and current

This clause of Part 1 is applicable except as follows.

10.1 *Addition:*

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

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Addition:*

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

11.3 *Addition:*

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

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

11.4 *Replacement:*

*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 that limits the total power input, the test is made with whichever combination of heating units as may be selected by the control imposes the most unfavourable 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 rise of the components for which the temperature rise limits were exceeded are measured.*

11.7 *Replacement:*

Appliances are operated until steady conditions are established.

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

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

Agitator motors are operated continuously unless provided with a timer, in which case they are operated for the maximum time allowed by the timer, or until steady conditions are established, whichever is the shortest.

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 *Modification:*

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

Addition:

During the test, the pressure relief device shall not operate.

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

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

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

[b] *The temperature rise on external accessible surfaces up to a distance of 100 mm from* ***adjacent surfaces*** *of the appliance (see Figure 102) may exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text.*

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

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

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

12 Charging of metal-ion batteries

This clause of Part 1 is not applicable.

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* — *0,75 mA or 1 mA per kW* ***rated power input*** *of the appliance with a maximum of 10 mA, whichever is higher;*
- *for other appliances* — *0,75 mA or 1 mA per kW* ***rated power input*** *of the appliance with no maximum, whichever is higher.*

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

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

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

In addition, appliances, except those marked IPX5 and IPX6 are subjected for 5 min to the following splash test.

The apparatus shown in Figure 103 is used. The appliance is placed in normal position of use and adjustable feet shall be set in accordance with the instructions for use to the most unfavourable height.

For appliances normally used on the floor, the bowl is placed on the floor and is moved around in such a way as to splash the appliance from all directions. 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 not positioned underneath the appliance.

For all other appliances, the bowl is placed on the same plane where the appliance is placed and is moved around in such a way as to splash the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 100 mm above the bottom of the bowl. The bowl is not positioned underneath the appliance.

Care is taken that the appliance is not hit by the direct jet.

15.1.2 *Modification:*

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

15.2 *Modification:*

The vessels of appliances intended to be filled by hand are completely filled with the spillage solution and a further quantity equal to 15 % of the capacity of the vessel but not more than 10 l is poured in steadily over a period of 1 min.

Appliances with vessels 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.

*In addition, **jacketed boiling pans** are subjected to the following test.*

The filling hole for the heat transfer medium is closed and 2 l of the spillage solution is poured steadily over the filling hole for a period of 1 min.

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

Compliance is checked by the following test.

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

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.2 *Modification:*

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

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

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

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

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Addition:*

Compliance is also checked by the test of 19.101.

A control or switching device that is intended for different settings corresponding to different functions of the same part of the appliance is in addition set in the most unfavourable setting irrespective of the manufacturer's instructions.

19.2 *Addition:*

The appliance is operated without water in the vessel and the controls are set at maximum.

Jacketed boiling pans *fitted with pressure relief devices are operated until the pressure in the jacket is stabilized.*

19.4 *Addition:*

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

If it is possible for the heat transfer medium of ***jacketed boiling pans*** *to leak out or escape by evaporation or be drained off, the test is also made with the vessel filled with water to the* ***indicated level*** *and the jacket empty.*

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

During the test the pressure relief device is allowed to operate.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 *Addition:*

Covers, lids and accessories are placed in the most unfavourable positions.

Modification:

The test with the angle of inclination increased to 15° is not carried out.

20.2 *Addition:*

Add the following after the first paragraph in the requirement.

This applies also to parts necessary to perform the tilting movement, i.e. handles or handwheels.

20.101 **Boiling pans** with moving parts intended for mixing, stirring, etc., having a kinetic energy of more than 200 J, shall be provided with an interlock to stop the moving parts when the lid or guard has been opened by more than 50 mm.

It shall not be possible to release the interlock by means of test probe B of IEC 61032 with a force of 5 N.

Alternatively, if the peripheral speed of the stirring device does not exceed 1 m/s, the appliance may be provided with an interlock or similar device that can be easily actuated by the user without the use of his hands. The interlock or device shall be **non-self-resetting** and shall provide **all-pole disconnection** from the supply.

Compliance is checked by inspection and by actuating the safety devices.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.7 *Replacement:*

Boiling pans and **jacketed boiling pans** in which the vessel or jacket operates at a pressure in excess of atmospheric pressure (overpressure) shall incorporate a suitable pressure relief device that 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 For multi-phase appliances, **thermal cut-outs** protecting circuits with heating elements and those for motors of which the unexpected starting can cause a hazard, shall be of the non-self-resetting, trip-free type and shall provide **all-pole disconnection** from related supply circuits.

For single-phase appliances and for single-phase heating elements and/or motors connected between one phase and neutral or between phase and phase, thermal cut-out protecting circuits with heating elements, and those for motors of which the unexpected starting can cause a hazard, shall be of the non-self-resetting trip-free type and shall provide at least one-pole disconnection.

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 Trip-free is an automatic action that is independent of manipulation or position of the actuating member.

Thermal cut-outs of the bulb and capillary type that 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 in such a way that the rupture does not seal the tube.

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

Compliance is checked by inspection.

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

Compliance is checked during the test of Clause 11.

22.104 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 or set to a higher relief pressure without the aid of a special **tool**.

Compliance is checked by inspection.

22.105 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.

22.106 Appliances shall be provided with a means whereby exhausted steam is condensed automatically before it is released to the drain.

Compliance is checked by inspection.

22.107 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.

22.108 **Jacketed boiling pans** shall incorporate a vacuum release valve to prevent a partial vacuum forming within the jacket unless it is designed for vacuum operation.

Compliance is checked by inspection.

22.109 Hinged lids shall be protected against accidental closing.

Compliance is checked by inspection and by manual test.

22.110 Appliances with tilting containers shall be provided with a mechanism that prevents accidental tilting from any position. It shall not be possible to adversely influence the tilting action other than by the intended means.

Control devices used to operate the mechanism shall be located and protected in such a way that they cannot be operated accidentally.

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

22.111 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.

22.112 The rim of tilting **boiling pans** shall be constructed so that the liquid is poured out in an even stream.

Compliance is checked by manual test.

22.113 Drain cocks and other emptying devices for hot liquids shall be constructed so that they cannot be opened inadvertently.

This requirement is met if the emptying device handle is such that

– when released, it returns the emptying device automatically to the closed position;
– it is of the wheel type; or
– it is placed in a recess such that it cannot be placed in the open position by means of test probe B of IEC 61032 using a single action with a force of 10 N.

Moreover, it shall not be possible to withdraw drain plugs inadvertently.

Compliance is checked by inspection and by manual test.

22.114 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.

22.115 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.

22.116 **Portable appliances** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 6 mm. However, if the appliance is fitted with legs, this distance is increased to 10 mm if the appliance is intended to stand on the table and to 20 mm if it is intended to stand on the floor.*

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

Compliance is checked by inspection.

22.118 Baskets, lifting or tilting devices shall be constructed so as to keep them safely in any position and a safe handling is possible. The drive mechanism shall automatically disengage or stop at its end positions.

Compliance is checked by inspection and manual test.

22.119 Lids and their grips shall be constructed so that, when opening and closing them, scalding by steam is avoided.

Compliance is checked by inspection.

22.120 Thermal controls shall not be incorporated in connectors.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 *Addition:*

*If 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.*

The rate of flexing may be reduced if it is not possible to move the movable part of the appliance at the given rate, due to the mass of the movable part.

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 in such a way that the rupture does not seal the capillary tube.

24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 *Modification:*

Appliances shall not be provided with an appliance inlet.

25.3 *Addition:*

Appliances with a mass greater than 40 kg, intended for permanent connection to fixed wiring and not provided with rollers, castors or similar means shall be constructed so that the connection can be done after the appliance has been installed in accordance with the manufacturer's instructions.

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

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 uses a **type X attachment** the instructions shall state the size and type of the **supply cord** to be used.

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, except small fixed exposed metal parts such as name-plates and similar parts;
– allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm^2; and
– be located in a position convenient for the connection of the bonding conductor after installation of the appliance.

28 Screws and connections

This clause of Part 1 is applicable except as follows.

28.1 *Addition:*

Screws made of carbon steel and alloy steel shall be made in accordance with ISO 898-1.

Screws made of corrosion-resistant stainless-steel shall be made in accordance with ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4.

28.4 *Addition:*

Screws that make mechanical connections and electrical connections shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts during operational stress and contact corrosion.

Screws that make mechanical connections and provide earthing continuity shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts due to operational stress and contact corrosion. They shall be designed so that a minimum contact pressure remains.

Compliance is checked by inspection and by measuring the assembling torques for screwed connections providing earthing continuity by applying a torque as specified in Table 102 to turn the screw in the fastening direction. The screw shall not turn.

The screw shall not have been unfastened prior to performing this test.

Table 102 – Assembling torques for screwed connections providing earthing continuity

Outer thread diameter of the screw *mm*	***Assembling torque*** *Nm*	
	Screwed connections for the mechanical strength of the screws A2-70 according to ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4 and 5.8 according to ISO 898-1	***Screwed connections for the mechanical strength of the screws > 8.8 according to ISO 898-1***
> 2,8 and ≤ 3,6	*0,8*	*1,3*
> 3,6 and ≤ 4,2	*1,9*	*3,0*
> 4,2 and ≤ 5,3	*3,7*	*6,0*
> 5,3 and ≤ 6,3	*6,5*	*10,0*
M 8	*15,0*	*25,0*
M 10	*31,0*	*50,0*

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 *Addition:*

The microenvironment is pollution degree 3 and the insulation shall have a comparative tracking index (CTI) not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.1 *Modification:*

The glow-wire test is carried out at 650 °C. The glow-wire flammability index (GWFI) according to IEC 60695-2-12 shall be at least 650 °C.

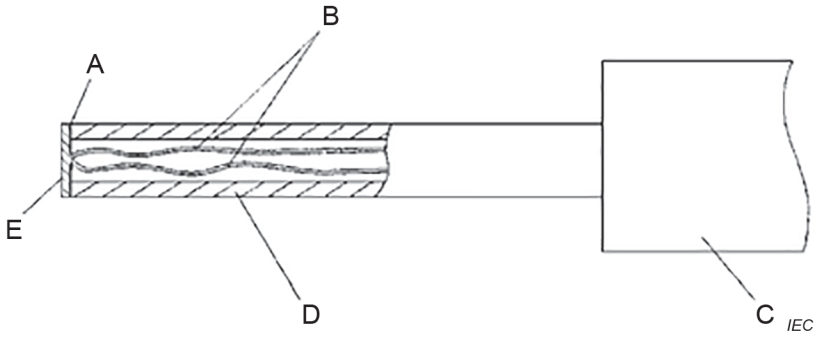
30.2.2 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K

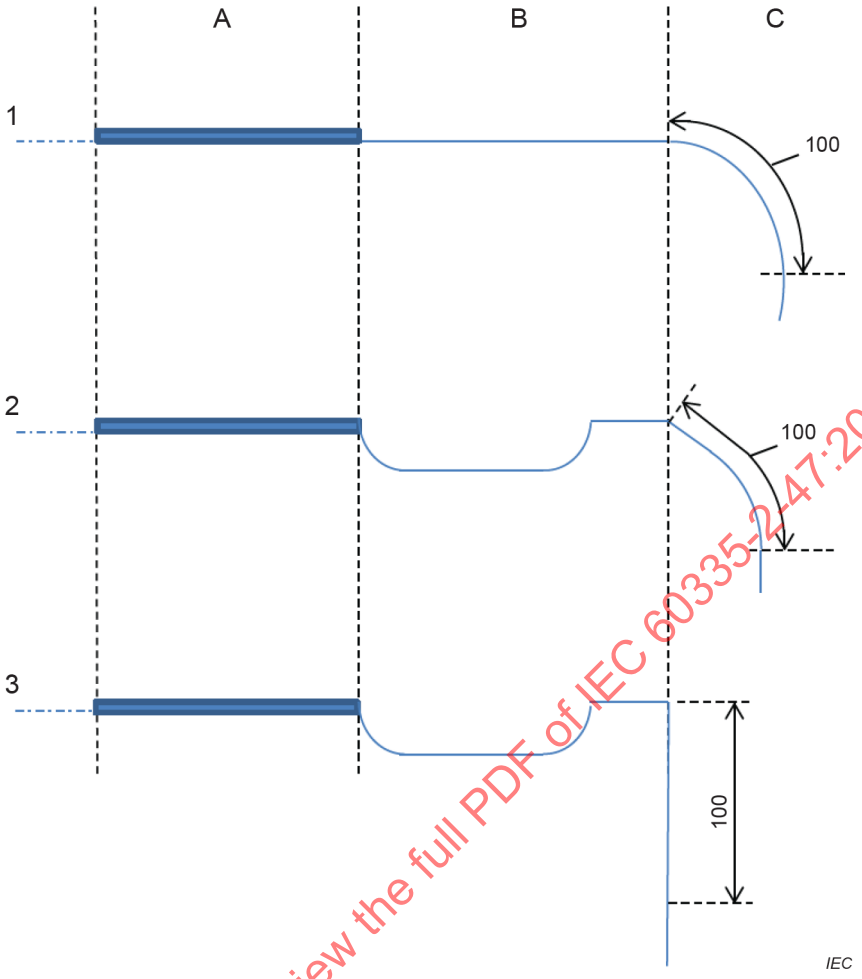
C handle arrangement permitting a contact force of 4 N ± 1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with flat contact face

Figure 101 – Probe for measuring surface temperatures

Dimensions in millimetres



Key

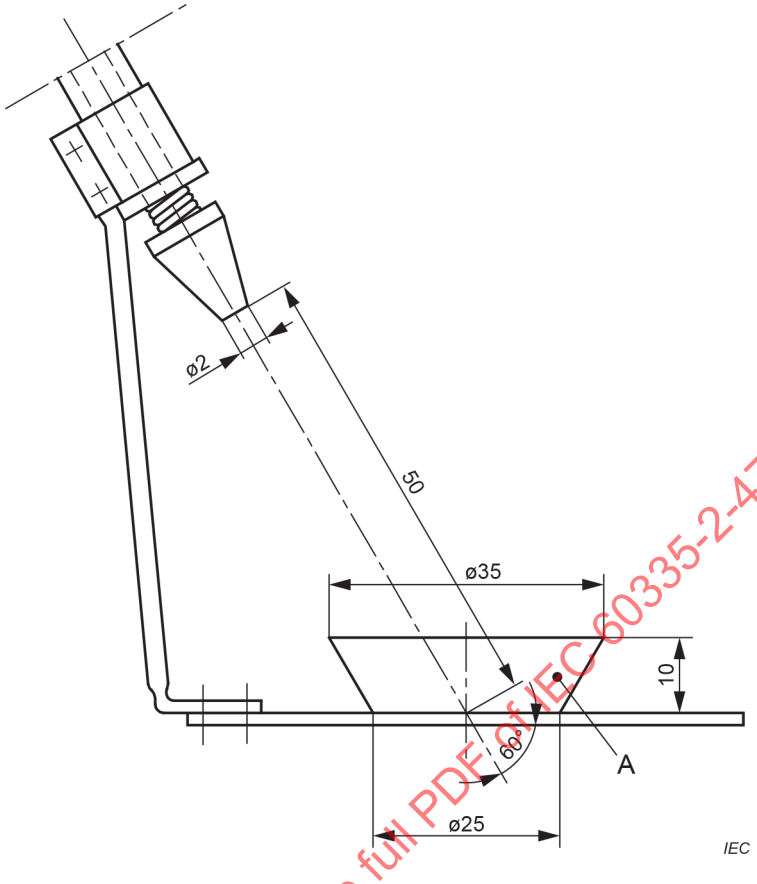
A functional surface

B adjacent surface

C external accessible surface

Figure 102 – Identification of surfaces for temperature measurement

Dimensions in millimetres



Key

A bowl

Figure 103 – Splash apparatus

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is not applicable.

Annex P
(informative)

Guidance for the application of this standard to appliances used in tropical climates

Annex P of Part 1 is applicable except as follows.

13 Leakage current and electric strength at operating temperature

13.2 *Modification:*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher;*
– *for other appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher.*

16 Leakage current and electric strength

16.2 *Modification:*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher;*
– *for other appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.*

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

– *for cord and plug connected appliances*	*0,5 mA or 0,5 mA per kW **rated power input** of the appliance with a maximum of 5 mA, whichever is higher.*

Bibliography

The bibliography of Part 1 is applicable.

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SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-47: Exigences particulières pour les marmites électriques à usage commercial

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-47 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2002, l'Amendement 1:2008 et l'Amendement 2:2017. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) alignement du texte sur l'IEC 60335-1:2020;
b) conversion en texte normatif, modification ou suppression de certaines notes (Article 1, 7.15, 11.7, 9.101, 10.1, 11.4, 11.7, 19.101, 20.1, 22.101, 22.113, 23.3, 27.2);

c) clarification de certaines modalités d'essais (15.1.1, 15.2, 20.1, 22.101, 22.102);

d) exclusion des appareils alimentés par batteries et des appareils utilisés dans des lieux ouverts au public (Article 1);

e) déplacement des instructions pour le nettoyage du 7.12.1 au 7.12;

f) introduction du 22.120;

g) alignement du texte de l'IEC 60335-2-47 sur les autres normes sous l'IEC/TC61/MT32.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
61/6363/FDIS	61/6413/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

La présente Partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements, sauf si cette édition l'exclut. Dans ce cas, la dernière édition qui n'exclut pas la présente Partie 2 est utilisée. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente Partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les marmites électriques à usage commercial.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

– les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;

– à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;

– les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

– exigences: caractères romains;

– *modalités d'essais: caractères italiques;*

– notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit entériné au niveau national au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Les différences suivantes existent dans les pays indiqués ci-après.

– 6.1: les appareils de la classe 01 sont admis (Japon).
– 13.2: les limites de courant de fuite sont différentes (Japon).
– 16.2: les limites de courant de fuite sont différentes (Japon).

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de ce document indique qu'il contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer ce document en utilisant une imprimante couleur.

INTRODUCTION

Il a été considéré en établissant cette Norme internationale que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être consultés dans les documents de support du CE 61, accessibles sur le site web de l'IEC à l'adresse:

https://www.iec.ch/tc61/supportingdocuments

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et n'a pas pour objet de remplacer le texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils, lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique.

Cette norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre Partie 2 de l'IEC 60335, la Partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

Lorsqu'une Partie 2 ne comporte pas d'exigences complémentaires pour couvrir les risques traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les Parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

Cette norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un risque ne sont pas applicables parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de cette norme peut être examiné et essayé en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la norme.

NOTE 3 Les normes traitant des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

– les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure d'aptitude à la fonction;
– les normes CISPR 11 et CISPR 14-1, ainsi que les normes applicables de la série IEC 61000-3 concernant les émissions électromagnétiques;
– la norme CISPR 14-2 concernant l'immunité électromagnétique;
– les normes IEC publiées par le comité d'études 111 concernant l'environnement.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-47: Exigences particulières pour les marmites électriques à usage commercial

1 Domaine d'application

L'article de la Partie 1 est remplacé par l'article ci-après.

La présente partie de l'IEC 60335 traite de la sécurité des **marmites** électriques à usage commercial, dont la **tension assignée** est inférieure ou égale à 250 V pour les appareils monophasés raccordés entre un conducteur de phase et le conducteur de neutre, et à 480 V pour les autres appareils.

Ces appareils ne sont pas destinés à un usage domestique ou analogue. Ils sont destinés à un usage commercial pour le traitement des aliments dans des lieux non ouverts au public, par exemple dans les cuisines de restaurants, les cantines, les hôpitaux et les entreprises commerciales, telles que les boulangeries et les boucheries.

La partie électrique des appareils qui utilisent d'autres formes d'énergie est également comprise dans le domaine d'application de la présente norme.

Dans la mesure du possible, la présente norme traite des dangers courants que présentent ces types d'appareils.

L'attention est attirée sur le fait que:

– pour les appareils destinés à être utilisés dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires;
– dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs, par les organismes nationaux responsables de l'alimentation en eau et par des organismes similaires;
– dans de nombreux pays, des exigences supplémentaires sont spécifiées pour les appareils sous pression.

La présente norme ne s'applique pas:

– aux appareils prévus exclusivement pour des usages industriels;
– aux appareils destinés à être utilisés dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz);
– aux appareils conçus pour la production continue en masse d'aliments;
– aux **appareils alimentés par batteries**.

2 Références normatives

L'article de la Partie 1 est applicable, avec l'exception suivante.

Addition:

IEC 60584-1, *Couples thermoélectriques – Partie 1: Spécifications et tolérances en matière de FEM*

ISO 898-1, *Caractéristiques mécaniques des éléments de fixation en acier au carbone et en acier allié – Partie 1: Vis, goujons et tiges filetées de classes de qualité spécifiées – Filetages à pas gros et filetages à pas fin*

ISO 3506-1, *Fixations – Caractéristiques mécaniques des fixations en acier inoxydable résistant à la corrosion – Partie 1: Vis, goujons et tiges filetées de grades et classes de qualité spécifiés*

ISO 3506-2, *Fixations – Caractéristiques mécaniques des fixations en acier inoxydable résistant à la corrosion – Partie 2: Ecrous de grades et classes de qualité spécifiés*

ISO 3506-3, *Caractéristiques mécaniques des éléments de fixation en acier inoxydable résistant à la corrosion – Partie 3: Vis sans tête et éléments de fixation similaires non soumis à des contraintes de traction*

ISO 3506-4, *Caractéristiques mécaniques des éléments de fixation en acier inoxydable résistant à la corrosion – Partie 4: Vis à tôle*

3 Termes et définitions

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.4 *Addition:*

Note 101 à l'article: La **puissance assignée** est la somme des puissances de tous les éléments individuels de l'appareil qui peuvent être alimentés simultanément; si plusieurs combinaisons d'éléments sont possibles, celle qui donne la puissance la plus élevée sert à déterminer la **puissance assignée**.

3.1.9 *Remplacement:*

fonctionnement de l'appareil dans les conditions suivantes

L'appareil est rempli d'eau à 15 °C ± 5 °C jusqu'au **niveau indiqué**.

Les appareils qui comportent plus d'un programme sont mis en fonctionnement avec le programme le plus défavorable. De plus, tout dispositif de commande destiné à être manœuvré par l'usager est placé sur son réglage maximal jusqu'à l'ébullition de l'eau ou jusqu'à ce que la température de régime soit atteinte. Le dispositif de commande est ensuite placé sur son réglage minimal qui maintient l'ébullition ou la température de régime. Les couvercles sont mis en place et fermés.

Les moteurs et les **parties électriques amovibles** incorporés dans l'appareil sont mis en fonctionnement dans les conditions les plus défavorables qui peuvent se produire en usage normal, en tenant compte des instructions du fabricant.

3.1.101
pression assignée
pression de service maximale attribuée par le fabricant aux parties sous pression de l'appareil

3.5 Définitions relatives aux types d'appareils

3.5.101
marmite
appareil dans lequel des liquides contenus dans une cuve sont chauffés jusqu'au point d'ébullition pour assurer la cuisson

Note 1 à l'article: La pression à l'intérieur de la cuve peut dépasser la pression atmosphérique.

Note 2 à l'article: La cuve peut être fixe ou basculante.

3.5.102
marmite atmosphérique
marmite dans laquelle la pression à l'intérieur de la cuve ne diffère pas sensiblement de la pression atmosphérique

3.5.103
marmite à chauffage indirect (bain-marie)
marmite qui comporte une cuve à double paroi, dans laquelle l'espace situé entre les parois intérieure et extérieure contient un fluide caloporteur qui est chauffé par des éléments chauffants

3.5.104
marmite à double usage
appareil qui comporte deux cuves l'une dans l'autre, la cuve intérieure étant amovible

Note 1 à l'article: L'appareil peut être utilisé avec ou sans la cuve amovible.

3.5.105
marmite à chauffage direct
appareil dans lequel le chauffage du contenu de la cuve est assuré par des moyens autres que par un fluide caloporteur contenu dans une double paroi

3.6 Définitions relatives aux parties d'un appareil

3.6.101
surface fonctionnelle
surface qui est volontairement chauffée par une source de chaleur interne et qui doit être chaude pour assurer la fonction prévue de l'appareil

Note 1 à l'article: La gaine chauffée d'un élément chauffant tubulaire constitue un exemple.

3.6.102
surface adjacente
surface qui est adjacente à une **surface fonctionnelle** et qui peut devenir chaude par conduction

3.8 Définitions relatives à des sujets divers

3.8.101
niveau indiqué
marque sur l'appareil qui indique le niveau maximal de liquide pour assurer un fonctionnement correct

3.8.102
mur d'installation
construction fixe spéciale qui comporte les dispositifs d'alimentation des appareils qui y sont raccordés

4 Exigences générales

L'article de la Partie 1 est applicable.

5 Conditions générales d'essais

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

5.5 *Addition:*

Les essais sont effectués avec la cuve en position normale d'emploi pour la cuisson.

5.10 *Addition:*

Les appareils destinés à être installés en batterie avec d'autres appareils et les appareils destinés à être fixés à un ***mur d'installation*** *sont sous une enveloppe de manière à assurer une protection contre les chocs électriques et les effets nuisibles de la pénétration de l'eau équivalente à celle procurée lorsqu'ils sont installés conformément aux instructions fournies avec l'appareil.*

NOTE Des enveloppes adaptées ou des appareils supplémentaires peuvent être nécessaires pour les essais.

5.101 *Les appareils sont soumis à l'essai comme des* ***appareils chauffants*** *lorsque les appareils de chauffage électriques sont sous tension au cours d'un mode de fonctionnement. Si aucun appareil de chauffage électrique n'est sous tension, les appareils sont soumis à l'essai comme des* ***appareils à moteur****.*

5.102 *Les appareils, lorsqu'ils sont montés en combinaison avec d'autres appareils ou lorsqu'ils incorporent d'autres appareils, sont soumis à l'essai conformément aux exigences de la présente norme. Les autres appareils sont mis en fonctionnement simultanément conformément aux exigences des normes correspondantes.*

5.103 *Les* ***marmites à double usage*** *sont soumises à l'essai avec ou sans la cuve intérieure, selon la condition la plus défavorable, conformément aux instructions du fabricant.*

6 Classification

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

6.1 *Remplacement:*

Les appareils doivent être de la **classe I** en ce qui concerne la protection contre les chocs électriques.

La vérification est effectuée par examen et par les essais applicables.

6.2 *Addition:*

Les appareils normalement utilisés sur une table doivent être au moins IPX3. Les autres appareils doivent être au moins IPX4.

7 Marquage et instructions

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

7.1 *Addition:*

Les appareils doivent porter un marquage de la **pression assignée**, en kilopascals (kPa), sur les parties sous pression de l'appareil.

Si un appareil possède des **surfaces accessibles** extérieures, pour lesquelles des limites d'échauffement sont spécifiées dans le Tableau 101 et pour lesquelles les dispositions de la note de bas de tableau b du Tableau 101 s'appliquent, l'appareil doit porter un marquage sur lequel est apposé le symbole IEC 60417-5041 (2002-10), ou qui comporte en substance l'indication suivante:

Attention: Surfaces chaudes.

7.6 *Addition:*

[symbole IEC 60417-5041 (2002-10)] Attention: surface chaude

7.10 *Addition:*

Les dispositifs qui commandent le mouvement de basculement des appareils qui comportent des parties basculantes doivent porter une indication claire de la direction du mouvement.

7.12 *Addition:*

Les instructions pour les **marmites** à l'exception des **marmites atmosphériques** doivent comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Ne pas ouvrir les robinets de purge ou autres dispositifs de vidange tant que la pression n'est pas redescendue approximativement à la pression atmosphérique.

Les instructions doivent comporter, en substance, la mise en garde suivante:

MISE EN GARDE: L'ouverture du robinet de purge entraîne l'écoulement du contenu chaud de la marmite électrique.

Des instructions doivent également être fournies concernant l'**entretien par l'usager**, par exemple pour le nettoyage. Elles doivent inclure une indication qui précise que l'appareil ne doit pas être nettoyé au moyen d'un jet d'eau ou d'un appareil de nettoyage à vapeur.

A moins que l'appareil ou la partie ne soit destiné(e) à être partiellement ou complètement immergé(e) dans l'eau pour le nettoyage, les instructions des appareils qui comportent des **parties électriques amovibles** et des appareils autres que les **appareils fixes** doivent indiquer que l'appareil ou la partie ne doit pas être immergé(e).

Si l'un des symboles IEC 60417-5021 (2002-10) ou IEC 60417-5041 (2002-10) est marqué sur l'appareil, sa signification doit être expliquée.

Les instructions doivent comporter, en substance, les indications suivantes:

> Ces appareils sont destinés à un usage commercial, par exemple dans les cuisines de restaurants, les cantines, les hôpitaux et les entreprises commerciales, telles que les boulangeries, les boucheries, etc., mais pas pour la production continue en masse d'aliments.

Si le fabricant souhaite limiter l'utilisation de l'appareil à un domaine plus restreint que celui décrit ci-dessus, cette restriction doit être clairement indiquée dans les instructions.

Modification:

L'instruction concernant les personnes (y compris les enfants) dont les capacités physiques, sensorielles ou mentales sont réduites, les personnes dénuées d'expérience ou de connaissance, et l'utilisation de l'appareil comme jouet par des enfants n'est pas applicable.

7.12.1 *Addition:*

L'appareil doit être accompagné d'instructions qui précisent les précautions spéciales nécessaires à l'installation. Pour les appareils destinés à être installés dans une batterie d'autres appareils, et pour les appareils destinés à être fixés à un **mur d'installation**, des précisions doivent être fournies sur la façon d'assurer une protection appropriée contre les chocs électriques et les effets nuisibles de la pénétration d'eau. Si les dispositifs de commande de plusieurs appareils sont combinés dans un boîtier séparé, des instructions d'installation détaillées doivent être fournies.

Pour les appareils raccordés de façon permanente à un câblage fixe et dont le courant de fuite peut être supérieur à 10 mA, en particulier s'ils sont déconnectés ou qu'ils ne sont pas utilisés pendant de longues périodes, ou lors de la première installation, les instructions doivent contenir des recommandations concernant les caractéristiques assignées des **dispositifs de protection** à installer, tels que les dispositifs à courant différentiel résiduel (DDR).

Si un **appareil fixe** est destiné à être déplacé pour le nettoyage, cela doit être indiqué.

Pour les **appareils fixes** équipés de rouleaux ou roulettes, ou qui sont destinés à être déplacés pour le nettoyage, les instructions doivent comporter, en substance, l'indication suivante.

> Cet appareil doit être raccordé au moyen de connexions souples pour la liaison équipotentielle et le raccordement aux services tels que l'alimentation en électricité, en eau, en gaz et en vapeur afin de pouvoir déplacer l'appareil dans la direction exigée pour le nettoyage à une distance supérieure ou égale à la dimension de l'appareil dans le sens du déplacement plus 500 mm, sans tendre ni solliciter les connexions souples.

La vérification est effectuée par examen.

7.12.4 *Addition:*

Lorsque les **appareils à encastrer** comportent un tableau de commande distinct pour plusieurs appareils, les instructions doivent indiquer que le tableau de commande ne doit être connecté qu'aux appareils spécifiés, afin d'éviter tout danger éventuel.

7.12.9 Non applicable.

7.14 *Addition:*

La hauteur du triangle dans le symbole IEC 60417-5041 (2002-10) doit être d'au moins 15 mm.

7.15 *Addition:*

Le marquage spécifié pour les **surfaces accessibles** extérieures doit être visible lorsque l'appareil est mis en fonctionnement comme en usage normal, y compris lors de l'actionnement d'un interrupteur, du réglage d'un dispositif de commande ou de l'ouverture d'un couvercle ou d'une porte. Il ne doit pas être apposé sur une **surface fonctionnelle** ou une **surface adjacente**.

Modification:

Pour les **appareils installés à poste fixe**, le nom, la marque déposée ou la marque d'identification du fabricant ou de son mandataire, ainsi que la référence du modèle ou du type, doivent être apposés par marquage sur l'appareil et, si le marquage n'est pas visible lorsque l'appareil est installé comme en usage normal, ces informations doivent être indiquées dans les instructions ou sur une étiquette supplémentaire qui peut être fixée à proximité de l'appareil après l'installation.

7.101 Les bornes de liaison équipotentielle doivent être marquées du symbole IEC 60417-5021 (2002-10).

Ces marquages ne doivent pas être placés sur des vis, des rondelles amovibles ou d'autres éléments qui peuvent être enlevés lors du raccordement des conducteurs.

La vérification est effectuée par examen.

7.102 Les cuves doivent porter un marquage du **niveau indiqué**.

La vérification est effectuée par examen.

8 Protection contre l'accès aux parties actives

L'article de la Partie 1 est applicable.

9 Démarrage des appareils à moteur

L'article de la Partie 1 est applicable, avec l'exception suivante.

9.101 Les moteurs des ventilateurs qui assurent une fonction de refroidissement afin de satisfaire aux exigences de l'Article 11 doivent démarrer dans toutes les conditions de tension qui peuvent être rencontrées en cours d'utilisation.

*La vérification est effectuée par les essais suivants en utilisant une source d'alimentation telle qu'il ne se produit pas de chute de tension supérieure à 1 % au cours des essais. L'appareil revient à la **température de la pièce** après chaque essai.*

*L'appareil est démarré dans les conditions qui se produisent au début du **fonctionnement normal** ou, pour les appareils automatiques, au début du cycle normal de fonctionnement, en appliquant aux bornes d'entrée de l'appareil une tension égale à 0,85 fois la **tension assignée**.*

*Pour les appareils qui comportent des moteurs équipés d'interrupteurs de démarrage autres que centrifuges, cet essai est répété en appliquant aux bornes de l'appareil une tension égale à 1,06 fois la **tension assignée**.*

Les essais sont effectués trois fois.