IEC 60335-2-12

Edition 6.0 2024-08
COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

Household and similar electrical appliances – Safety –
Part 2-12: Particular requirements for warming plates and similar appliances

IEC 60335-2-12:2024-08 CMV(en)

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Household and similar electrical appliances – Safety – Part 2-12: Particular requirements for warming plates and similar appliances

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-12: Particular requirements for warming plates and similar appliances

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This commented version (CMV) of the official standard IEC 60335-2-12:2024 edition 6.0 allows the user to identify the changes made to the previous IEC 60335-2-12:2002+AMD1:2008+AMD2:2017 CSV edition 5.2. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60335-2-12 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This sixth edition cancels and replaces the fifth 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) alignment with IEC 60335-1:2020;
b) conversion of some notes to normative text (Clause 1, 5.2, 7.12, 15.2, 15.101, 24.1.5);
c) application of test probe 19 (8.1.1, 20.2, B.22.3, B.22.4);
d) clarification of applicability of requirements for remote operation (22.40, 22.49, 22.51).

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

Draft	Report on voting
61/7265/FDIS	61/7283/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.

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/publications.

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

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 warming plates and similar appliances.

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 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, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can 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.

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 and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

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~~ can 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 and generic standards~~ 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. ~~For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards~~ **1**

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 of 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. **2**

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-12: Particular requirements for warming plates and similar appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric warming plates, warming trays and similar appliances intended to keep food or vessels warm, for household and similar purposes, their **rated voltage** being not more than 250 V including direct current (DC) supplied appliances and **battery-operated appliances**. 3

Appliances intended for normal household and similar use and that ~~may~~ can also be used by ~~laymen~~ laypersons in shops, in light industry and on farms are within the scope of this standard. However, if the appliance is intended to be used professionally to keep vessels warm or to process food for commercial consumption, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

– persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledge

  prevents them from using the appliance safely without supervision or instruction;
– children playing with the appliance.

~~NOTE 101~~ Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or in 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 and similar authorities.

~~NOTE 102~~ This standard does not apply to

– appliances made of flexible material, such as textile material;
– appliances intended exclusively to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
– appliances intended exclusively for commercial catering ~~or industrial purposes~~ (IEC 60335-2-49, IEC 60335-2-50);
– appliances intended exclusively industrial purposes;
– warming cabinets.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60320-1:2021, *Appliance couplers for household and similar purposes – Part 1: General requirements*

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

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 ~~*Replacement*~~ *Modification:*
normal operation

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

The appliance is operated with a shallow pan, 150 mm in diameter and filled with water to a height of at least 25 mm, placed on the heated surface. If vessels are supplied with the appliance, or specified in the instructions, these are used instead.

The appliance is operated without a pan if this condition is more unfavourable.

3.6 Definitions relating to parts of appliances

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

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.

5.2 *Addition:*

~~NOTE 101~~ If the test of 15.101 has to be carried out, three additional samples are required.

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances intended to be partially immersed in water for cleaning shall be marked with the maximum level of immersion and with the substance of the following:

Do not immerse beyond this level.

When the provisions of footnote b to Table 101 apply, the appliance shall be marked with:

– the substance of "CAUTION: Hot surface", or
– symbol IEC 60417-5041 (2002-10).

7.6 *Addition:*

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

7.12 *Addition:*

The instructions shall include the substance of the following:

This appliance is intended to be used in household and similar applications such as:

– staff kitchen areas in shops, offices and other working environments;
– farm houses;
– by clients in hotels, motels and other residential type environments;
– bed and breakfast type environments.

~~NOTE 101~~ If the manufacturer wants to limit the use of the appliance to less than the above, this ~~has to~~ shall be clearly stated in the instructions.

The instructions for appliances incorporating an appliance inlet and intended to be partially or completely immersed in water for cleaning, shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

The instructions for appliances intended to be used with a connector incorporating a **thermostat** shall state that only the appropriate connector must be used.

The instructions for appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts** shall include the substance of the following:

WARNING: Do not use the appliance if the surface is cracked.

The instructions for appliances that have to be used with particular vessels that are not supplied shall specify the vessels to be used.

If symbol IEC 60417-5041 (2002-10) is marked on appliances, its meaning shall be explained and the location of areas where the limits are exceeded shall be stated or shown by a drawing.

7.14 *Addition:*

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

Compliance is checked by measurement.

7.15 *Addition:*

The marking specified for hot surfaces shall be clearly 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 ~~hot~~ **functional surface** or on surfaces that are exempted from the limits of Table 101.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **4**

8.1.3 *Addition:*

Test probe 19 is not applied.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 ~~*Modification*~~ *Addition:*

Portable appliances *are placed away from the walls of the test corner.*

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.

11.7 ~~*Replacement*~~ *Modification:*

Replace the first paragraph with the following:

Appliances are operated until steady conditions are established.

11.8 ~~*Addition*~~ *Modification:*

Replace the first paragraph with the following:

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

Addition:

When an appliance connector incorporates a ***thermostat****, the temperature rise limit for the pins of the inlet does not apply.*

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

Surface	***Temperature rise of external accessible surfaces*** [a] ***K***	
	Appliances and parts situated not more than 850 mm above the floor after installation b	***Appliances and parts situated more than 850 mm above the floor after installation*** [b]
Bare metal	*38*	*42*
Coated metal [c]	*42*	*49*
Glass and ceramic	*51*	*56*
Plastic and plastic coating > 0,4 mm [d], [e]	*58*	*62*

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3. **5**

[a] *The following surfaces or elements shall not be taken into consideration:*

- ~~*hot*~~ ***functional surfaces***;
- *handles or control knobs including keypads, keyboards and the like: part of the equipment that a user needs to touch to operate or adjust the equipment. The equipment has to be installed according to the manufacturer's instructions;*
- *surfaces within 5 mm of touch controls regardless of their shape;*
- *surfaces within 25 mm of the outline of the ~~hot~~ functional surfaces;*
- *underside surfaces that are not accessible to a 75 mm diameter probe having a hemispherical end;*
- *lids and covers.*

[b] *When the required values are not met, the maximum temperature rise shall not be higher than two times the values indicated.*

[c] *Metal is considered coated when a coating having a minimum thickness of 90 μm made of enamel, powder 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 the coated metal or of glass and ceramic material apply.*

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

This clause of Part 1 is applicable. 6

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 ~~*Modification*~~ *Addition:*

For appliances that are intended to be used with particular metallic vessels, the vessels are placed on the heated surface and connected to ***accessible metal parts****. The metal foil is not in contact with the heated surface.*

For other appliances, vessels are not placed on the heated surface, the metal foil being in contact with ***accessible surfaces*** *of insulating material.*

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 *Addition:*

Appliances without containers, other than appliances intended to be used for warming crockery only, are tested with 0,01 l of ~~saline~~ the spillage solution for each 100 cm^2 of the heated surface. The solution is poured steadily over the surface over a period of 1 min.

~~NOTE 101 Appliances that can only be used for warming crockery are not subjected to this test.~~

15.101 Appliances intended to be partially or completely immersed in water for cleaning shall have adequate protection against the effects of immersion.

Compliance is checked by the following tests, which are carried out on three additional appliances.

The appliances are operated under ***normal operation*** *at 1,15 times* ***rated power input****, until the* ***thermostat*** *operates for the first time. Appliances without a* ***thermostat*** *are operated until steady conditions are established. The appliances are disconnected from the supply, any appliance connector being withdrawn. They are then completely immersed in water containing approximately 1 % NaCl and having a temperature between 10 °C and 25 °C, unless they are marked with the maximum level of immersion, in which case they are immersed 50 mm deeper than this level.*

After 1 h, the appliances are removed from the saline solution~~, dried and subjected to the leakage current test of 16.2~~. They are then dried, taking care that all moisture is removed from the insulation around the pins of the appliance inlets, and are then subjected to the leakage current test of 16.2.

~~NOTE Care is to be taken to ensure that all moisture is removed from the insulation around the pins of appliance inlets.~~

This test is carried out four more times, after which the appliances shall withstand the electric strength test of 16.3, the voltage being as specified in Table 4.

*The appliance having the highest leakage current after the fifth immersion is dismantled and inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

*The remaining two appliances are operated under **normal operation** at 1,15 times **rated power input** for 240 h. After this period, the appliances are disconnected from the supply and immersed again for 1 h. They are then dried and subjected to the electric strength test of 16.3, the voltage being as specified in Table 4.*

*Inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Modification:*

Instead of being subjected to the tests of 19.2 and 19.3, appliances are subjected to the test of 19.101.

19.101 *The appliance is operated at **rated power input** with the heated surface completely covered with felt strips for 7 h.*

The felt strips have a width of 100 mm and are lined with a single layer of textile material. The felt has a specific mass of 4 kg/m^2 ± 0,4 kg/m^2 and a thickness of approximately 25 mm. The textile material consists of pre-washed double-hemmed cotton sheet having a mass between 140 g/m^2 and 175 g/m^2 in the dry condition.

*If a **thermostat** operates, the test is repeated with the one-third of the heated surface furthest from the temperature-sensing element covered.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **7**

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 *Addition:*

*For appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts**, three blows having an impact energy of 0,70 J are also applied to parts of such surfaces that are not exposed to impacts during the test of 21.101.*

21.101 Appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts**, shall withstand the stresses liable to occur in normal use.

Compliance is checked by the following test.

A vessel with its base horizontal is dropped from a height of 150 mm onto the surface. The vessel has a copper or aluminium base that is flat over a diameter of 120 mm ± 10 mm, its edges being rounded with a radius of at least 10 mm. It is uniformly filled with at least 1,3 kg of sand or shot so that the total mass is 1,80 kg ± 0,01 kg. The vessel is dropped 10 times.

*The appliance is then supplied at **rated voltage** and operated until steady conditions are established. A wet pad having dimensions approximately 100 mm × 100 mm is then applied to the most unfavourable part of the surface. The pad is formed from a cotton sheet of 400 mm × 400 mm having a mass between 140 g/m^2 and 175 g/m^2 in the dry condition. The sheet is folded four times to form the pad, which is then soaked with water containing approximately 1 % NaCl.*

The surface shall not be broken and the appliance shall withstand the leakage current test of 16.2.

22 Construction

This clause of Part 1 is applicable except as follows.

22.40 *Addition*:

Warming plates and similar appliances are not considered to be appliances that could give rise to a hazard when operated continuously, automatically, or remotely.

22.49 Not applicable.

22.51 Not applicable. **8**

22.101 **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.

22.102 Thermal controls shall not be incorporated in connectors complying with the standard sheets of IEC 60320-3.

Compliance is checked by inspection. **9**

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.5 *Addition:*

For appliance couplers incorporating thermostats, thermal cut-outs or fuses in the connector, IEC 60320-1:2021 is applicable except that

- *the earthing contact of the connector is allowed to be accessible, provided that this contact is not likely to be gripped during insertion or withdrawal of the connector;*
- *the temperature required for the test of Clause 18 is that measured on the pins of the appliance inlet during the heating test of Clause 11 of this standard;*
- *the breaking-capacity test of Clause 19 is carried out using the inlet of the appliance;*
- *the temperature rise of current-carrying parts specified in Clause 21 is not determined.*

~~NOTE 101 Thermal controls are not allowed in connectors complying with the standard sheets of IEC 60320-1.~~

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

~~**25.1** *Addition:*~~

~~Appliances incorporating an appliance inlet that does not comply with the standard sheets of IEC 60320-1 shall be supplied with a cord set.~~ **10**

25.7 *Addition:*

Light polyvinyl chloride sheathed cord (code designation 60227 IEC 52) is allowed, irrespective of the mass of the appliance.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

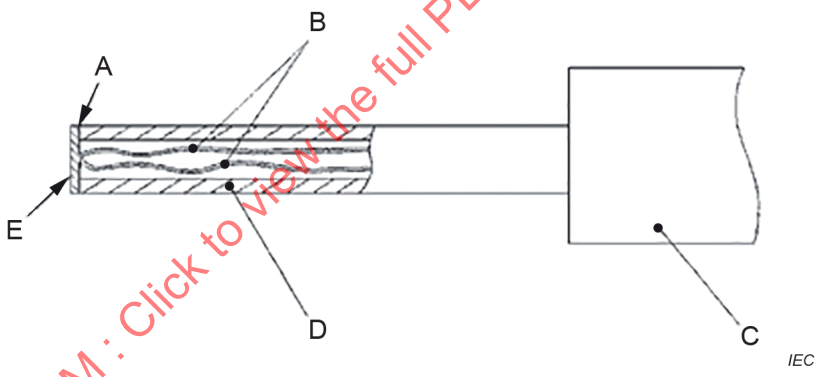
30.2.2 Not applicable.

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 according 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 101 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

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

This annex of Part 1 is applicable except as follows:

B.22.3 *For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

B.22.4 *For parts of batteries situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.* **11**

Bibliography

The Bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-49, *Household and similar electrical appliances – Safety – Part 2-49: Particular requirements for commercial electric appliances for keeping food and crockery warm*

IEC 60335-2-50, *Household and similar electrical appliances – Safety – Part 2-50: Particular requirements for commercial electric bains-marie*

List of comments

1 This revision is for alignment with IEC 60335-1:2020.

2 This revision is for alignment with IEC 60335-1:2020.

3 This revision is for alignment with IEC 60335-1:2020.

4 Appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applicable. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.

5 This Note is added to align with other 60335 Part 2 standards and to clarify that surface temperatures on these parts in Table 3 are still applicable.

6 This revision is for alignment with IEC 60335-1:2020.

7 Appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applicable. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.

8 Additional requirements for remote operation were added to IEC 60335-1:2020. However, the remote operation requirements in Subclauses 22.40, 22.49 and 22.51 are not applicable for appliances covered by this Part 2 standard because they are not considered to give rise to a hazard when operated continuously, automatically or remotely.

9 This requirement is relocated from NOTE 101 of Subclause 24.1.5 for alignment with other 60335 Part 2 standards.

10 This revision is for alignment with IEC 60335-1:2020 because this is now covered by Subclause 22.58.

11 Battery-operated appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applied to battery-operated appliances, detachable batteries and separable batteries. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.

IEC 60335-2-12

Edition 6.0 2024-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety –
Part 2-12: Particular requirements for warming plates and similar appliances

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-12: Règles particulières pour les chauffe-plats et appareils analogues

IEC 60335-2-12:2024-08(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-12: Particular requirements for warming plates and similar appliances

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-12 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This sixth edition cancels and replaces the fifth 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) alignment with IEC 60335-1:2020;
b) conversion of some notes to normative text (Clause 1, 5.2, 7.12, 15.2, 15.101, 24.1.5);
c) application of test probe 19 (8.1.1, 20.2, B.22.3, B.22.4);

d) clarification of applicability of requirements for remote operation (22.40, 22.49, 22.51).

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

Draft	Report on voting
61/7265/FDIS	61/7283/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.

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/publications.

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

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 warming plates and similar appliances.

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, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can 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.

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 and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

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 can 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 of 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 2-12: Particular requirements for warming plates and similar appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric warming plates, warming trays and similar appliances intended to keep food or vessels warm, for household and similar purposes, their **rated voltage** being not more than 250 V including direct current (DC) supplied appliances and **battery-operated appliances**.

Appliances intended for normal household and similar use and that can also be used by laypersons in shops, in light industry and on farms are within the scope of this standard. However, if the appliance is intended to be used professionally to keep vessels warm or to process food for commercial consumption, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

– persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledge

  prevents them from using the appliance safely without supervision or instruction;
– children playing with the appliance.

Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or in 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 and similar authorities.

This standard does not apply to

– appliances made of flexible material, such as textile material;
– appliances intended exclusively to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
– appliances intended exclusively for commercial catering (IEC 60335-2-49, IEC 60335-2-50);
– appliances intended exclusively industrial purposes;
– warming cabinets.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60320-1:2021, *Appliance couplers for household and similar purposes – Part 1: General requirements*

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

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Modification:*
normal operation

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

The appliance is operated with a shallow pan, 150 mm in diameter and filled with water to a height of at least 25 mm, placed on the heated surface. If vessels are supplied with the appliance, or specified in the instructions, these are used instead.

The appliance is operated without a pan if this condition is more unfavourable.

3.6 Definitions relating to parts of appliances

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

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.

5.2 *Addition:*

If the test of 15.101 has to be carried out, three additional samples are required.

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances intended to be partially immersed in water for cleaning shall be marked with the maximum level of immersion and with the substance of the following:

Do not immerse beyond this level.

When the provisions of footnote b to Table 101 apply, the appliance shall be marked with:

– the substance of "CAUTION: Hot surface", or
– symbol IEC 60417-5041 (2002-10).

7.6 *Addition:*

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

7.12 *Addition:*

The instructions shall include the substance of the following:

This appliance is intended to be used in household and similar applications such as:

– staff kitchen areas in shops, offices and other working environments;
– farm houses;
– by clients in hotels, motels and other residential type environments;
– bed and breakfast type environments.

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

The instructions for appliances incorporating an appliance inlet and intended to be partially or completely immersed in water for cleaning, shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

The instructions for appliances intended to be used with a connector incorporating a **thermostat** shall state that only the appropriate connector must be used.

The instructions for appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts** shall include the substance of the following:

WARNING: Do not use the appliance if the surface is cracked.

The instructions for appliances that have to be used with particular vessels that are not supplied shall specify the vessels to be used.

If symbol IEC 60417-5041 (2002-10) is marked on appliances, its meaning shall be explained and the location of areas where the limits are exceeded shall be stated or shown by a drawing.

7.14 *Addition:*

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

Compliance is checked by measurement.

7.15 *Addition:*

The marking specified for hot surfaces shall be clearly 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 on surfaces that are exempted from the limits of Table 101.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.

8.1.3 *Addition:*

Test probe 19 is not applied.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Addition:*

Portable appliances *are placed away from the walls of the test corner.*

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.

11.7 *Modification:*

Replace the first paragraph with the following:

Appliances are operated until steady conditions are established.

11.8 *Modification:*

Replace the first paragraph with the following:

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

Addition:

When an appliance connector incorporates a ***thermostat****, the temperature rise limit for the pins of the inlet does not apply.*

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

Surface	***Temperature rise of external accessible surfaces*** [a] ***K***	
	Appliances and parts situated not more than 850 mm above the floor after installation b	***Appliances and parts situated more than 850 mm above the floor after installation*** [b]
Bare metal	*38*	*42*
Coated metal [c]	*42*	*49*
Glass and ceramic	*51*	*56*
Plastic and plastic coating > 0,4 mm [d], [e]	*58*	*62*

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

[a] *The following surfaces or elements shall not be taken into consideration:*

- ***functional surfaces****;*
- *handles or control knobs including keypads, keyboards and the like: part of the equipment that a user needs to touch to operate or adjust the equipment. The equipment has to be installed according to the manufacturer's instructions;*
- *surfaces within 5 mm of touch controls regardless of their shape;*
- *surfaces within 25 mm of the outline of the functional surfaces;*
- *underside surfaces that are not accessible to a 75 mm diameter probe having a hemispherical end;*
- *lids and covers.*

[b] *When the required values are not met, the maximum temperature rise shall not be higher than two times the values indicated.*

[c] *Metal is considered coated when a coating having a minimum thickness of 90 μm made of enamel, powder 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 the coated metal or of glass and ceramic material apply.*

12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 *Addition:*

For appliances that are intended to be used with particular metallic vessels, the vessels are placed on the heated surface and connected to ***accessible metal parts****. The metal foil is not in contact with the heated surface.*

For other appliances, vessels are not placed on the heated surface, the metal foil being in contact with ***accessible surfaces*** *of insulating material.*

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 *Addition:*

Appliances without containers, other than appliances intended to be used for warming crockery only, are tested with 0,01 l of the spillage solution for each 100 cm^2 of the heated surface. The solution is poured steadily over the surface over a period of 1 min.

15.101 Appliances intended to be partially or completely immersed in water for cleaning shall have adequate protection against the effects of immersion.

Compliance is checked by the following tests, which are carried out on three additional appliances.

The appliances are operated under ***normal operation*** *at 1,15 times* ***rated power input****, until the* ***thermostat*** *operates for the first time. Appliances without a* ***thermostat*** *are operated until steady conditions are established. The appliances are disconnected from the supply, any appliance connector being withdrawn. They are then completely immersed in water containing approximately 1 % NaCl and having a temperature between 10 °C and 25 °C, unless they are marked with the maximum level of immersion, in which case they are immersed 50 mm deeper than this level.*

After 1 h, the appliances are removed from the saline solution. They are then dried, taking care that all moisture is removed from the insulation around the pins of the appliance inlets, and are then subjected to the leakage current test of 16.2.

This test is carried out four more times, after which the appliances shall withstand the electric strength test of 16.3, the voltage being as specified in Table 4.

*The appliance having the highest leakage current after the fifth immersion is dismantled and inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

*The remaining two appliances are operated under **normal operation** at 1,15 times **rated power input** for 240 h. After this period, the appliances are disconnected from the supply and immersed again for 1 h. They are then dried and subjected to the electric strength test of 16.3, the voltage being as specified in Table 4.*

*Inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Modification:*

Instead of being subjected to the tests of 19.2 and 19.3, appliances are subjected to the test of 19.101.

19.101 *The appliance is operated at **rated power input** with the heated surface completely covered with felt strips for 7 h.*

The felt strips have a width of 100 mm and are lined with a single layer of textile material. The felt has a specific mass of 4 kg/m^2 ± 0,4 kg/m^2 and a thickness of approximately 25 mm. The textile material consists of pre-washed double-hemmed cotton sheet having a mass between 140 g/m^2 and 175 g/m^2 in the dry condition.

*If a **thermostat** operates, the test is repeated with the one-third of the heated surface furthest from the temperature-sensing element covered.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 *Addition:*

*For appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts**, three blows having an impact energy of 0,70 J are also applied to parts of such surfaces that are not exposed to impacts during the test of 21.101.*

21.101 Appliances having surfaces of glass-ceramic or similar material that forms part of the enclosure of **live parts**, shall withstand the stresses liable to occur in normal use.

Compliance is checked by the following test.

A vessel with its base horizontal is dropped from a height of 150 mm onto the surface. The vessel has a copper or aluminium base that is flat over a diameter of 120 mm ± 10 mm, its edges being rounded with a radius of at least 10 mm. It is uniformly filled with at least 1,3 kg of sand or shot so that the total mass is 1,80 kg ± 0,01 kg. The vessel is dropped 10 times.

*The appliance is then supplied at **rated voltage** and operated until steady conditions are established. A wet pad having dimensions approximately 100 mm × 100 mm is then applied to the most unfavourable part of the surface. The pad is formed from a cotton sheet of 400 mm × 400 mm having a mass between 140 g/m^2 and 175 g/m^2 in the dry condition. The sheet is folded four times to form the pad, which is then soaked with water containing approximately 1 % NaCl.*

The surface shall not be broken and the appliance shall withstand the leakage current test of 16.2.

22 Construction

This clause of Part 1 is applicable except as follows.

22.40 *Addition*:

Warming plates and similar appliances are not considered to be appliances that could give rise to a hazard when operated continuously, automatically, or remotely.

22.49 Not applicable.

22.51 Not applicable.

22.101 **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.

22.102 Thermal controls shall not be incorporated in connectors complying with the standard sheets of IEC 60320-3.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.5 *Addition:*

For appliance couplers incorporating thermostats, thermal cut-outs or fuses in the connector, IEC 60320-1:2021 is applicable except that

- *the earthing contact of the connector is allowed to be accessible, provided that this contact is not likely to be gripped during insertion or withdrawal of the connector;*
- *the temperature required for the test of Clause 18 is that measured on the pins of the appliance inlet during the heating test of Clause 11 of this standard;*
- *the breaking-capacity test of Clause 19 is carried out using the inlet of the appliance;*
- *the temperature rise of current-carrying parts specified in Clause 21 is not determined.*

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.7 *Addition:*

Light polyvinyl chloride sheathed cord (code designation 60227 IEC 52) is allowed, irrespective of the mass of the appliance.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

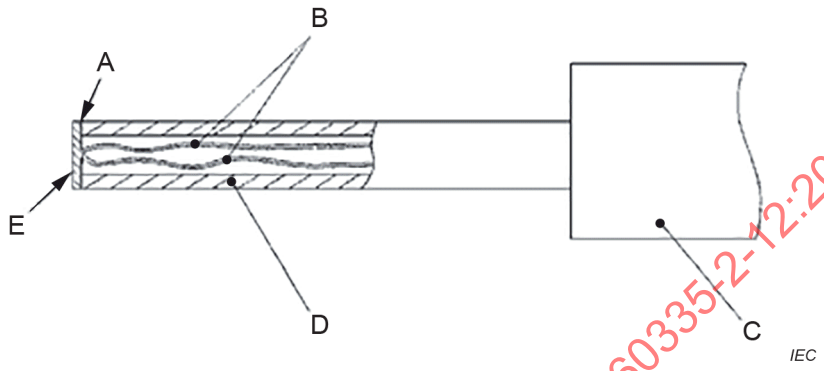
30.2.2 Not applicable.

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 according 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

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

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

This annex of Part 1 is applicable except as follows:

B.22.3 *For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

B.22.4 *For parts of batteries situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

Bibliography

The Bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-49, *Household and similar electrical appliances – Safety – Part 2-49: Particular requirements for commercial electric appliances for keeping food and crockery warm*

IEC 60335-2-50, *Household and similar electrical appliances – Safety – Part 2-50: Particular requirements for commercial electric bains-marie*

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SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-12: Exigences particulières pour les chauffe-plats et appareils analogues

AVANT-PROPOS

1) La Commission Électrotechnique 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. À 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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L'IEC 60335-2-12 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 sixième édition annule et remplace la cinquième édition parue en 2002, son Amendement 1:2008 et son Amendement 2:2017. Cette édition constitue une révision technique.

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

a) texte aligné sur l'IEC 60335-1:2020;

b) transformation de certaines notes en texte normatif (Articles et paragraphes 1, 5.2, 7.12, 15.2, 15.101, 24.1.5);

c) application du calibre d'essai 19 (8.1.1, 20.2, B.22.3, B.22.4);

d) clarification de l'applicabilité des exigences pour la commande à distance (22.40, 22.49, 22.51).

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

Projet	Rapport de vote
61/7265/FDIS	61/7283/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.

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/publications.

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.

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 chauffe-plats et appareils analogues.

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;

– notes: 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 modifiés ou 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 figurant en caractères **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. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

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 adopté pour application nationale au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

INTRODUCTION

Il a été admis par hypothèse, en établissant la présente Norme internationale, que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant la qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être obtenus par le biais des documents d'accompagnement du comité d'études 61 sur le site web de l'IEC:

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

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et ne constitue nullement un remplacement du texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les risques 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 qui peuvent être attendues dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent altérer le fonctionnement sûr des appareils.

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, les 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 s'applique, l'influence d'une fonction sur les autres fonctions est prise en compte.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les dangers 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 prévaut 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 danger ne s'appliquent pas, 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 la présente norme peut être examiné et soumis aux essais 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 présente norme.

NOTE 3 Les normes traitant d'aspects autres que la sécurité des appareils électrodomestiques sont:

– les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure de l'aptitude à la fonction;
– les normes CISPR 11, CISPR 14-1 et 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 2-12: Exigences particulières pour les chauffe-plats et appareils analogues

1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des chauffe-plats électriques et appareils analogues destinés à maintenir au chaud des aliments ou des récipients, pour usages domestiques et analogues, dont la **tension assignée** est inférieure ou égale à 250 V, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

Les appareils destinés à un usage domestique et analogue normal et qui peuvent être également utilisés par des usagers non avertis dans des magasins, chez des artisans et dans des fermes sont compris dans le domaine d'application de la présente norme. Toutefois, si l'appareil est destiné à être utilisé professionnellement pour garder des récipients au chaud ou pour préparer des aliments à des fins commerciales, l'appareil n'est pas considéré comme étant seulement à usage domestique et analogue.

Dans la mesure du possible, la présente norme traite des dangers courants que présentent les appareils et auxquels sont exposés tous les individus à l'intérieur et autour de l'habitation. Cependant, elle ne tient en général pas compte

– des personnes (y compris des enfants) dont:
  - les capacités physiques, sensorielles ou mentales; ou
  - le manque d'expérience et de connaissance

  les empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
– de l'utilisation de l'appareil comme jouet par des enfants.

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'aéronefs, des exigences supplémentaires peuvent être nécessaires;
– dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé publique, par les organismes nationaux responsables de la protection des travailleurs et par des organismes analogues.

La présente norme ne s'applique pas

– aux appareils constitués de matériaux souples tels que le tissu;
– aux appareils destinés à être utilisés exclusivement dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz);
– aux appareils prévus exclusivement pour la restauration commerciale (IEC 60335-2-49, IEC 60335-2-50);
– aux appareils prévus exclusivement pour des usages industriels;
– aux meubles de maintien au chaud.

2 Références normatives

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

Addition:

IEC 60320-1:2021, *Connecteurs pour usages domestiques et usages généraux analogues – Partie 1: Exigences générales*

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

3 Termes et définitions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.9 *Modification:*
conditions de fonctionnement normal

Remplacer le premier alinéa par ce qui suit:

fonctionnement de l'appareil dans les conditions suivantes:

L'appareil est mis en fonctionnement avec une sauteuse de 150 mm de diamètre, remplie d'eau jusqu'à une hauteur d'au moins 25 mm, placée sur la surface chauffée. Si des récipients sont fournis avec l'appareil ou sont spécifiés dans les instructions d'emploi, ces récipients sont utilisés à la place.

L'appareil est mis en fonctionnement sans sauteuse si cette condition est la plus défavorable.

3.6 Définitions relatives aux types d'appareils

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 pour laquelle l'appareil est destiné à être utilisé

4 Exigence générale

L'article de la Partie 1 s'applique.

5 Conditions générales d'essai

L'article de la Partie 1 s'applique avec l'exception suivante.

5.2 *Addition:*

Si l'essai du 15.101 est à effectuer, trois échantillons supplémentaires sont nécessaires.

6 Classification

L'article de la Partie 1 s'applique.

7 Marquage et instructions

L'article de la Partie 1 s'applique avec les exceptions suivantes.

7.1 *Addition:*

Les appareils destinés à être immergés partiellement dans l'eau pour le nettoyage doivent porter l'indication du niveau maximal d'immersion, ainsi qu'en substance:

Ne pas immerger au-delà de ce niveau.

Lorsque les dispositions de la note b du Tableau 101 s'appliquent, l'appareil doit porter le marquage suivant:

– en substance "ATTENTION: Surface chaude", ou
– symbole IEC 60417-5041 (2002-10).

7.6 *Addition:*

 [symbole IEC 60417-5041 (2002-10)] attention, surface chaude

7.12 *Addition:*

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

Cet appareil est destiné à être utilisé dans des applications domestiques et analogues telles que:

– les coins cuisines réservés au personnel des magasins, bureaux et autres environnements professionnels;
– les fermes;
– par les clients des hôtels, motels et autres environnements à caractère résidentiel;
– les environnements du type chambres d'hôtes.

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.

Les instructions d'emploi des appareils équipés d'un socle de connecteur et qui sont destinés à être partiellement ou complètement immergés dans l'eau pour le nettoyage doivent indiquer que la prise mobile de connecteur doit être enlevée avant le nettoyage de l'appareil et que le socle de connecteur doit être séché avant toute nouvelle utilisation de l'appareil.

Pour les appareils destinés à être utilisés avec une prise mobile de connecteur comportant un **thermostat**, les instructions d'emploi doivent indiquer que seule la prise mobile appropriée doit être utilisée.

Les instructions pour les appareils qui possèdent des surfaces en vitrocéramique ou en matériaux similaires qui constituent une partie de l'enveloppe des **parties actives** doivent inclure en substance les indications suivantes:

AVERTISSEMENT: Ne pas utiliser l'appareil si la surface est fêlée.

Les instructions pour les appareils qui doivent être utilisés avec des récipients spéciaux qui ne sont pas fournis, doivent spécifier les récipients à utiliser.