

INTERNATIONAL STANDARD

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60335-2-12

Fifth edition
2002-10

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*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-12: Particular requirements for warming plates
and similar appliances**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This fifth edition cancels and replaces the fourth edition published in 1992. It constitutes a technical revision.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on voting
61/2232/FDIS	61/2307/RVD

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) 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: Safety requirements for electric 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 publication will remain unchanged until 2004. At this date, the publication will be

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

The following differences exist in the countries indicated below.

- 7.12: The indication concerning appliances with a connector incorporating a thermostat is to be marked on the appliance (USA).

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

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.

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.

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.

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.

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 International Standard 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.

Appliances not intended for normal household use but that nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are also within the scope of this standard.

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

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

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 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.

2 Normative references

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation

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.

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.

7.12 Addition:

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.

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 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:

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

11.7 Replacement:

Appliances are operated until steady conditions are established.

11.8 Addition:

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

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 Modification:

*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 are tested with 0,01 l of saline solution for each 100 cm² 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.

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 $4 \text{ kg/m}^2 \pm 0,4 \text{ kg/m}^2$ 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.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

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 $120 \text{ mm} \pm 10 \text{ mm}$, 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 $1,80 \text{ kg} \pm 0,01 \text{ kg}$. 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 $100 \text{ mm} \times 100 \text{ mm}$ is then applied to the most unfavourable part of the surface. The pad is formed from a cotton sheet $400 \text{ mm} \times 400 \text{ mm}$ 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.

22.101 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.*

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 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.

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.

Annexes

The annexes of Part 1 are applicable.

Bibliography

The bibliography of Part 1 is applicable.



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