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colour inside

This full version of IEC 60335-2-96:2024 includes the content of the references made to IEC 60335-1:2020

Household and similar electrical appliances – Safety – Part 2-96: Particular requirements for flexible sheet heating elements for room heating

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 97.100.10; 13.120

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IEC 60335-1
Edition 6.0 2020-09

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 1: General requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

The text of this Interpretation Sheet is based on the following documents:

Draft	Report on voting
61/5999/DISH	61/6009/RVDISH

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

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INTRODUCTION

Edition 6 of IEC 60335-1:2020 defines and introduces requirements for a detachable power supply part of an appliance. In the document, 24.2 prohibits the use of a power supply in a flexible cord.

QUESTION:

Does Subclause 24.2 prohibit the use of a detachable power supply part?

ANSWER

No, a "detachable power supply part" is a defined term and is not captured by the term "power supply" as used in Subclause 24.2.

NOTE A detachable power supply part is captured by the defined term when the output of the power supply part is detachable from the class III construction part of the appliance at:

– the power supply part, or

– the class III construction part of the appliance.

However, the supply cord (if any) does not have to be detachable from the detachable power supply part.

IEC 60335-1:2020-09/ISH1:2021-11(en)

ICS 13.120; 97.030

CONTENTS

FOREWORD 6
INTRODUCTION to IEC 60335-1:2020 9
INTRODUCTION to IEC 60335-12-96:2024 11
1 Scope 12
2 Normative references 12
3 Terms and definitions 17
4 General requirement 29
5 General conditions for the tests 29
6 Classification 34
7 Marking and instructions 34
8 Protection against access to live parts 47
9 Starting of motor-operated appliances 49
10 Power input and current 50
11 Heating 52
12 Charging of metal-ion batteries 60
13 Leakage current and electric strength at operating temperature 62
14 Transient overvoltages 65
15 Moisture resistance 65
16 Leakage current and electric strength 67
17 Overload protection of transformers and associated circuits 70
18 Endurance 70
19 Abnormal operation 73
20 Stability and mechanical hazards 83
21 Mechanical strength 83
22 Construction 86
23 Internal wiring 101
24 Components 103
25 Supply connection and external flexible cords 108
26 Terminals for external conductors 116
27 Provision for earthing 119
28 Screws and connections 121
29 Clearances, creepage distances and solid insulation 123
30 Resistance to heat and fire 131
31 Resistance to rusting 136
32 Radiation, toxicity and similar hazards 136
Annex A (informative) Routine tests 163
Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances 165
Annex C (normative) Ageing test on motors 186
Annex D (normative) Thermal motor protectors 187
Annex E (normative) Needle-flame test 188
Annex F (normative) Capacitors 189

Annex G (normative) Safety isolating transformers 191
Annex H (normative) Switches 192
Annex I (normative) Motors having basic insulation that is inadequate for the rated voltage of the appliance 194
Annex J (normative) Coated printed circuit boards 196
Annex K (informative) Overvoltage categories 197
Annex L (informative) Guidance for the measurement of clearances and creepage distances 198
Annex M (informative) Pollution degree 201
Annex N (normative) Proof tracking test 202
Annex O (informative) Selection and sequence of the tests of Clause 30 203
Annex P (informative) Guidance for the application of this standard to appliances used in tropical climates 208
Annex Q (informative) Sequence of tests for the evaluation of electronic circuits 210
Annex R (normative) Software evaluation 213
Annex S (informative) Guidance for the application of this standard on measurement of power input and current based on the requirements of 10.1 and 10.2 concerning the representative period 227
Annex T (normative) UV-C radiation effect on non-metallic materials 228
Annex U (normative) Appliances intended for remote communication through public networks 231
Annex AA (informative) Summary of installation instructions 235
Bibliography 238
Index of defined terms 241

Figure 1 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of class II appliances and for parts of class II construction 137
Figure 2 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of other than class II appliances or parts of class II construction 138
Figure 3 – Circuit diagram for leakage current measurement at operating temperature for three-phase with neutral class II appliances and for parts of class II construction 139
Figure 4 – Circuit diagram for leakage current measurement at operating temperature for three-phase with neutral appliances other than those of class II or parts of class II construction 140
Figure 5 – Small part 141
Figure 6 – Example of an electronic circuit with low-power points 141
Figure 7 – Test finger nail 142
Figure 8 – Flexing test apparatus 143
Figure 9 – Constructions of cord anchorages 144
Figure 10 – An example of parts of an earthing terminal 145
Figure 11 – Examples of clearances 146
Figure 12 – Example of the placement of the cylinder 147
Figure 13 – Small parts cylinder 148
Figure 14 – Example of a specified operating region of a lithium-ion cell during charging 149
Figure 101 – Arrangement for testing heating units in timber ceilings 150

Figure 102 – Arrangement for testing modular heating units 151
Figure 103 – Arrangement for testing heating units in timber floors 152
Figure 104 – Arrangement for testing heating units above timber floors 153
Figure 105 – Arrangement for testing heating units below concrete 154
Figure 107 – Arrangement for testing heating units in timber floors and ceilings in combination 156
Figure 108 – Arrangement for testing heating units in timber walls 157
Figure 109 – Arrangement for testing heating units in both sides of timber wall applications 158
Figure 110 – Arrangement for testing heating units intended to be installed in a wall of concrete or similar materials 159
Figure 111 – Arrangement for testing heating units against wall of concrete or similar materials 160
Figure 112 – Jig for locating the contact needle 161
Figure 113 – Arrangement for measuring capacitive currents 162
Figure B.1 – Examples of battery-operated appliance constructions and application of normative Annex B *(1 of 2)* 183
Figure B.2 – Examples of correct polarity connection marking representing three batteries 185
Figure I.1 – Simulation of faults 195
Figure L.1 – Sequence for the determination of clearances 198
Figure L.2 – Sequence for the determination of creepage distances 199
Figure L.3 – Measurement of clearances 200
Figure O.1 – Tests for resistance to heat 203
Figure O.2 – Selection and sequence of tests for resistance to fire in hand-held appliances 204
Figure O.3 – Selection and sequence of tests for resistance to fire in attended appliances 204
Figure O.4 – Selection and sequence of tests for resistance to fire in unattended appliances 205
Figure O.5 – Some applications of the term "within a distance of 3 mm" 207
Figure Q.1 – Flowchart outlining the sequence of tests for the evaluation of electronic circuits *(1 of 2)* 211
Figure S.1 – Flowchart giving guidance on measurement of power input and current concerning the representative period 227

Table 1 – Power input deviation 50
Table 2 – Current deviation 51
Table 3 – Maximum normal temperature rises 57
Table 101 – Temperature rise limits for surfaces 60
Table 4 – Voltage for electric strength test 64
Table 5 – Characteristics of high-voltage sources 64
Table 6 – Impulse test voltage 65
Table 7 – Test voltages 69
Table 8 – Maximum winding temperature 76
Table 9 – Maximum abnormal temperature rise 81

Table 10 – Dimensions of cables and conduits 109
Table 11 – Minimum cross-sectional area of conductors 111
Table 12 – Pull force and torque 113
Table 13 – Nominal cross-sectional area of conductors 118
Table 14 – Torque for testing screws and nuts 122
Table 15 – Rated impulse voltage 124
Table 16 – Minimum clearances 124
Table 17 – Minimum creepage distances for basic insulation 128
Table 18 – Minimum creepage distances for functional insulation 129
Table 19 – Minimum thickness for accessible parts of reinforced insulation consisting of a single layer 131
Table A.1 – Test voltages 164
Table B.1 – Artificial source characteristics 167
Table B.2 – Total area of openings for metal-ion cells 175
Table B.3 – Volume of air injected at 2 070 kPa 175
Table C.1 – Test conditions 186
Table R.1 – General fault/error conditions 215
Table R.2 – Specific fault/error conditions 217
Table R.3 – Semi-formal methods 223
Table R.4 – Software architecture specification 223
Table R.5 – Module design specification 224
Table R.6 – Design and coding standards 225
Table R.7 – Software safety validation 225
Table T.1 – Minimum property retention limits after UV-C exposure 229
Table T.2 – Minimum electric strength for internal wiring after UV-C exposure 230
Table U.1 – Examples of acceptable measures against unauthorised access and transmission fault/error modes 233
Table AA.1 – Summary of installation instructions 236

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-96: Particular requirements for flexible sheet heating elements for room heating

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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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 extended version (EXV) of the official IEC Standard provides the user with the full content of the Standard.

IEC 60335-2-96:2024 EXV includes the content of IEC 60335-2-96:2024, and the references made to IEC 60335-1:2020.

The specific content of IEC 60335-2-96:2024 is displayed on a blue background.

IEC 60335-2-96 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2019. 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, 7.12.101);

c) correction to reinstate the touch current limit in 22.105.

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

Draft	Report on voting
61/7279/FDIS	61/7304/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 flexible sheet heating elements for room heating.

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 following additional differences exist in the countries indicated below.

– 1: Flexible sheet heating elements that are cut on site are not allowed (France).

– 7.12.1 c): The instructions in timber floors shall state that the heating unit is to be covered with additional insulation, be supplied through an isolating transformer, or be class II (Sweden).

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.

The content of the corrigendum 1 (2025-10) has been included in this copy.

INTRODUCTION to IEC 60335-1:2020

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 –

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 differ.

If the functions of an appliance are covered by different parts 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.

Throughout this publication, when "part 2" is mentioned, it refers to the relevant part of IEC 60335.

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.

Individual countries may wish to consider the application of this standard, as far as is reasonable, to appliances not mentioned in a part 2, and to appliances designed on new principles. In this case, consideration should be given to defining normal operation, specifying the classification of the appliance according to Clause 6 and specifying whether the appliance is operated attended or unattended. Consideration should also be given to particular categories of likely users and to related specific risks such as access to live parts, hot surfaces or hazardous moving parts.

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

INTRODUCTION to IEC 60335-12-96:2024

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 which 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.

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– IEC standards published by TC 111 concerning environmental matters.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 1: General requirements

1 Scope

This part of IEC 60335 deals with the safety of **flexible sheet heating elements** intended to be incorporated into floors and walls below 1,2 m and above 2,3 m and in ceilings, their **rated voltage** being not more than 250 V for single-phase installations and 480 V for other installations including direct current (DC) supplied appliances.

Flexible sheet heating elements are converted into **heating units** that are incorporated in the building in accordance with the instructions after which the required level of protection against hazards is achieved.

Attention is drawn to the fact that

– in many countries, different wiring rules apply;

– for **heating units** intended to be used in vehicles or on-board ships or aircraft, additional requirements can be necessary;

– in many countries, additional requirements are specified by the national authorities for fire protection, the national authorities for building regulations, the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

This standard does not apply to

– **heating units** intended exclusively for industrial purposes;

– **heating units** intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

– blankets, pads, clothing and similar flexible heating appliances (IEC 60335-2-17);

– foot warmers and heating mats (IEC 60335-2-81);

– heated carpets and for heating units for room heating installed under removable floor coverings (IEC 60335-2-106);

– **flexible sheet heating elements** incorporated in other appliances.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60065:2014, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*
IEC 60112:2003/AMD1:2009[1]

IEC 60127 (all parts), *Miniature fuses*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60227-5:2011, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*

IEC 60238, *Edison screw lampholders*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60252-1:2010, *AC motor capacitors – Part 1: General – Performance, testing and rating – Safety requirements – Guidance for installation and operation*
IEC 60252-1:2010/AMD1:2013[2]

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

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

IEC 60320-2-3, *Appliance couplers for household and similar general purposes – Part 2-3: Appliance couplers with a degree of protection higher than IPX0*

IEC 60320-3, *Appliance couplers for household and similar general purposes – Part 3: Standard sheets and gauges*

IEC 60364-7-701, *Low-voltage electrical installations – Part 7-701: Requirements for special installations or locations – Locations containing a bath or shower*

IEC 60384-14:2013, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection*

_____

1 There exists a consolidated edition 4.1:2009 that includes edition 4 and its Amendment 1.

2 There exists a consolidated edition 2.1:2013 that includes edition 2 and its Amendment 1.

to the supply mains
IEC 60384-14:2013/AMD1:2016[3]

IEC 60417, *Graphical symbols for use on equipment*

IEC 60445:2017, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013[4]

IEC 60598-1:2014, *Luminaires – Part 1: General requirements and tests*
IEC 60598-1:2014/AMD1:2017[5]

IEC 60603-11, *Connectors for frequencies below 3 MHz for use with printed boards – Part 11: Detail specification for concentric connectors (dimensions for free connectors and fixed connectors)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60691, *Thermal-links – Requirements and application guide*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

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3 There exists a consolidated edition 4.1:2016 that includes edition 4 and its Amendment 1.

4 There exists a consolidated edition 2.2:2013 that includes edition 2 and its Amendment 1 and Amendment 2.

5 There exists a consolidated edition 8.1:2017 that includes edition 8 and its Amendment 1.

IEC 60730-1:2013, *Automatic electrical controls – Part 1: General requirements*
IEC 60730-1:2013/AMD1:2015[6]

IEC 60730-2-8:2018, *Automatic electrical controls – Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements*

IEC 60730-2-9:2015, *Automatic electrical controls – Part 2-9: Particular requirements for temperature sensing controls*
IEC 60730-2-9:2015/AMD1:2018[7]

IEC 60730-2-10, *Automatic electrical controls for household and similar use – Part 2-10: Particular requirements for motor-starting relays*

IEC 60738-1, *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification*

IEC 60799, *Electrical accessories – Cord sets and interconnection cord sets*

IEC 60884-1:2022, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC 60906-1, *IEC system of plugs and socket-outlets for household and similar purposes – Part 1: Plugs and socket-outlets 16 A 250 V a.c.*

IEC 60934, *Circuit-breakers for equipment (CBE)*

IEC 60990:2016, *Methods of measurement of touch current and protective conductor current*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm^2 up to 35 mm^2 (included)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

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6 There exists a consolidated edition 5.1:2015 that includes edition 5 and its Amendment 1.

7 There exists a consolidated edition 4.1:2018 that includes edition 4 and its Amendment 1.

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*
IEC 61000-4-13:2002/AMD1:2009
IEC 61000-4-13:2002/AMD2:2015[8]

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*
IEC 61000-4-34:2005/AMD1:2009[9]

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1:2016, *Switches for appliances – Part 1: General requirements*

IEC 61058-1-1:2016, *Switches for appliances – Part 1-1: Requirements for mechanical switches*

IEC 61058-1-2:2016, *Switches for appliances – Part 1-2: Requirements for electronic switches*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 61558-1:2017, *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

IEC 61558-2-6:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

IEC 61558-2-16:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*
IEC 61558-2-16:2009/AMD1:2013[10]

IEC 61770, *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets*

IEC 62133-1:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 1: Nickel systems*

IEC 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems*

IEC 62151, *Safety of equipment electrically connected to a telecommunication network*

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8 There exists a consolidated edition 1.2:2015 that includes edition 1 and its Amendment 1 and Amendment 2.

9 There exists a consolidated edition 1.1:2009 that includes edition 1 and its Amendment 1.

10 There exists a consolidated edition 1.1:2013 that includes edition 1 and its Amendment 1.

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

IEC 62477-1, *Safety requirements for power electronic converter systems and equipment – Part 1: General*

IEC 62821 (all parts), *Electric cables – Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltages up to and including 450/750 V*

ISO 178, *Plastics – Determination of flexural properties*

ISO 179-1, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

ISO 180, *Plastics – Determination of Izod impact strength*

ISO 527 (all parts), *Plastics – Determination of tensile properties*

ISO 1463, *Metallic and oxide coatings – Measurement of coating thickness – Microscopical method*

ISO 2178, *Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method*

ISO 2768-1, *General tolerances – Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 4892-1:2016, *Plastics – Methods of exposure to laboratory light sources – Part 1: General guidance*

ISO 4892-2: 2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 7000, *Graphical symbols for use on equipment – Registered symbols*

ISO 8256, *Plastics – Determination of tensile-impact strength*

ISO 9772, *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*

ISO 9773, *Plastics – Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source*

IEC 60335-2-96

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2025-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety –
Part 2-96: Particular requirements for flexible sheet heating elements for room heating

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-96: Exigences particulières pour les films souples chauffants pour le chauffage des locaux



IEC 60335-2-96:2024-10(en-fr)

CONTENTS

FOREWORD 4
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 9
4 General requirement 10
5 General conditions for the tests 10
6 Classification 11
7 Marking and instructions 11
8 Protection against access to live parts 16
9 Starting of motor-operated appliances 17
10 Power input and current 17
11 Heating 17
12 Charging of metal-ion batteries 21
13 Leakage current and electric strength at operating temperature 21
14 Transient overvoltages 22
15 Moisture resistance 22
16 Leakage current and electric strength 22
17 Overload protection of transformers and associated circuits 23
18 Endurance 23
19 Abnormal operation 25
20 Stability and mechanical hazards 26
21 Mechanical strength 26
22 Construction 28
23 Internal wiring 30
24 Components 30
25 Supply connection and external flexible cords 30
26 Terminals for external conductors 31
27 Provision for earthing 31
28 Screws and connections 31
29 Clearances, creepage distances and solid insulation 31
30 Resistance to heat and fire 32
31 Resistance to rusting 32
32 Radiation, toxicity and similar hazards 32
Annexes 46
Annex AA (informative) Summary of installation instructions 47
Bibliography 50

Figure 101 – Arrangement for testing heating units in timber ceilings 33
Figure 102 – Arrangement for testing modular heating units 34
Figure 103 – Arrangement for testing heating units in timber floors 35
Figure 104 – Arrangement for testing heating units above timber floors 36

Figure 105 – Arrangement for testing heating units below concrete 37
Figure 107 – Arrangement for testing heating units in timber floors and ceilings in combination 39
Figure 108 – Arrangement for testing heating units in timber walls 40
Figure 109 – Arrangement for testing heating units in both sides of timber wall applications 41
Figure 110 – Arrangement for testing heating units intended to be installed in a wall of concrete or similar materials 42
Figure 111 – Arrangement for testing heating units against wall of concrete or similar material 43
Figure 112 – Jig for locating the contact needle 44
Figure 113 – Arrangement for measuring capacitive currents 45

Table 101 – Temperature rise limits for surfaces 21
Table AA.1 – Summary of installation instructions 48

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-96: Particular requirements for flexible sheet heating elements for room heating

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.
2) The formal decisions or agreements of 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 IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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 60335-2-96 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2019. 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, 7.12.101);
c) correction to reinstate the touch current limit in 22.105.

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

Draft	Report on voting
61/7279/FDIS	61/7304/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 flexible sheet heating elements for room heating.

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 following additional differences exist in the countries indicated below.

– 1: Flexible sheet heating elements that are cut on site are not allowed (France).
– 7.12.1 c): The instructions in timber floors shall state that the heating unit is to be covered with additional insulation, be supplied through an isolating transformer, or be class II (Sweden).

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.

The content of the corrigendum 1 (2025-10) has been included in this copy.

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 which 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 2-96: Particular requirements for flexible sheet heating elements for room heating

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of **flexible sheet heating elements** intended to be incorporated into floors and walls below 1,2 m and above 2,3 m and in ceilings, their **rated voltage** being not more than 250 V for single-phase installations and 480 V for other installations including direct current (DC) supplied appliances.

Flexible sheet heating elements are converted into **heating units** that are incorporated in the building in accordance with the instructions after which the required level of protection against hazards is achieved.

Attention is drawn to the fact that

– in many countries, different wiring rules apply;
– for **heating units** intended to be used in vehicles or on-board ships or aircraft, additional requirements can be necessary;
– in many countries, additional requirements are specified by the national authorities for fire protection, the national authorities for building regulations, the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

This standard does not apply to

– **heating units** intended exclusively for industrial purposes;
– **heating units** intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
– blankets, pads, clothing and similar flexible heating appliances (IEC 60335-2-17);
– foot warmers and heating mats (IEC 60335-2-81);
– heated carpets and for heating units for room heating installed under removable floor coverings (IEC 60335-2-106);
– **flexible sheet heating elements** incorporated in other appliances.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60364-7-701, *Low-voltage electrical installations – Part 7-701: Requirements for special installations or locations – Locations containing a bath or shower*

IEC 60884-1:2022, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

SOMMAIRE

AVANT-PROPOS 54
INTRODUCTION 57
1 Domaine d'application 58
2 Références normatives 59
3 Termes et Définitions 59
4 Exigences générales 60
5 Conditions générales d'essais 60
6 Classification 61
7 Marquage et instructions 61
8 Protection contre l'accès aux parties actives 67
9 Démarrage des appareils à moteur 67
10 Puissance et courant 68
11 Échauffements 68
12 Charge des batteries à ions métalliques 73
13 Courant de fuite et rigidité diélectrique à la température de régime 73
14 Surtensions transitoires 74
15 Résistance à l'humidité 74
16 Courant de fuite et rigidité diélectrique 74
17 Protection contre la surcharge des transformateurs et des circuits associés 75
18 Endurance 75
19 Fonctionnement anormal 78
20 Stabilité et dangers mécaniques 78
21 Résistance mécanique 78
22 Construction 80
23 Conducteurs internes 82
24 Composants 83
25 Raccordement au réseau et câbles souples extérieurs 83
26 Bornes pour conducteurs externes 83
27 Dispositions en vue de la mise à la terre 84
28 Vis et connexions 84
29 Distances dans l'air, lignes de fuite et isolation solide 84
30 Résistance à la chaleur et au feu 84
31 Protection contre la rouille 85
32 Rayonnement, toxicité et dangers analogues 85
Annexes 98
Annexe AA (informative) Récapitulatif des instructions d'installation 99
Bibliographie 102

Figure 101 – Dispositif pour l'essai des unités chauffantes dans les plafonds en bois 85
Figure 102 – Dispositif pour l'essai des unités chauffantes modulaires 86
Figure 103 – Dispositif pour l'essai des unités chauffantes dans les planchers en bois 87

Figure 104 – Dispositif pour l'essai des unités chauffantes au-dessus des planchers en bois 88
Figure 105 – Dispositif pour l'essai des unités chauffantes sous le béton 89
Figure 107 – Dispositif pour l'essai des unités chauffantes dans les planchers et plafonds en bois, combinés 91
Figure 108 – Dispositif pour l'essai des unités chauffantes dans les murs en bois 92
Figure 109 – Dispositif pour l'essai des unités chauffantes des deux côtés d'applications murales en bois 93
Figure 110 – Dispositif pour l'essai des unités chauffantes à installer dans un mur en béton ou en matériaux similaires 94
Figure 111 – Dispositif pour l'essai des unités chauffantes placées contre un mur en béton ou en matériaux similaires 95
Figure 112 – Gabarit pour le logement de l'aiguille de contact 96
Figure 113 – Dispositif de mesure des courants capacitifs 97

Tableau 101 – Limites des échauffements des surfaces 73
Tableau AA.1 – Récapitulatif des instructions d'installation 100

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-96: Exigences particulières pour les films souples chauffants pour le chauffage des locaux

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.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse https://patents.iec.ch. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

L'IEC 60335-2-96 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 troisième édition annule et remplace la deuxième édition parue en 2019. Cette édition constitue une révision technique.

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

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

b) certaines notes ont été converties en texte normatif (Article 1, 5.2, 7.12.101);

c) le 22.105 a été corrigé pour rétablir la limite du courant de contact.

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

Projet	Rapport de vote
61/7279/FDIS	61/7304/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.

La version française n'a pas été soumise au vote.

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 films souples chauffants pour le chauffage des locaux.

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

NOTE 2 Le système de numérotation suivant est utilisé:

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

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

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

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

– exigences: caractères romains;

– *modalités d'essais: caractères italiques*;

– notes: petits caractères romains.

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

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

– 1: Les films souples chauffants découpés sur site ne sont pas admis (France).
– 7.12.1 c): Pour les planchers bois, les instructions doivent préciser que l'unité chauffante doit être revêtue d'une isolation supplémentaire, être alimentée par l'intermédiaire d'un transformateur d'isolement ou être de la classe II (Suède).

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 (obligatoire) au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Le contenu du corrigendum 1 (2025-10) a été pris en considération dans cet exemplaire.

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 une qualification appropriée.

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

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

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et 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 auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

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

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

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un 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 des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

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

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-96: Exigences particulières pour les films souples chauffants pour le chauffage des locaux

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 **films souples chauffants** destinés à être intégrés aux planchers, aux murs au-dessous d'une hauteur de 1,2 m et au-dessus d'une hauteur de 2,3 m ainsi qu'aux plafonds, leur **tension assignée** ne dépassant pas 250 V pour les installations monophasées et 480 V pour les autres installations, y compris les appareils alimentés en courant continu.

Les **films souples chauffants** sont convertis en **unités chauffantes** qui sont intégrées au bâti conformément aux instructions relatives à l'installation après laquelle le niveau de protection contre les dangers est atteint.

L'attention est attirée sur le fait que

– dans de nombreux pays, des règles d'installation différentes s'appliquent;

– pour les **unités chauffantes** destinées à être utilisées dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires;

– dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux responsables de la protection contre l'incendie, par les organismes nationaux responsables des règlements d'installation, par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas

– aux **unités chauffantes** prévues exclusivement pour des usages industriels;

– aux **unités chauffantes** destinées à être utilisées dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz);

– aux couvertures, coussins, vêtements et appareils chauffants souples analogues (IEC 60335-2-17);

– aux chancelières et carpettes chauffantes (IEC 60335-2-81);

– aux tapis chauffants et aux unités chauffantes pour le chauffage des locaux, installés sous des revêtements de sol amovibles (IEC 60335-2-106);

– aux **films souples chauffants** intégrés dans d'autres appareils.

2 Références normatives

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

Addition:

IEC 60364-7-701, *Installations électriques à basse tension – Partie 7-701: Exigences pour les installations et emplacements spéciaux – Emplacements contenant une baignoire ou une douche*

IEC 60884-1:2022, *Prises de courant pour usages domestiques et analogues – Partie 1: Exigences générales*

ISO 3864-1, *Symboles graphiques – Couleurs de sécurité et signaux de sécurité – Partie 1: Principes de conception pour les signaux de sécurité et les marquages de sécurité*