

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-17: Particular requirements for blankets, pads, clothing and similar
flexible heating appliances**

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CONTENTS

FOREWORD	4
INTRODUCTION	7
1 Scope	8
2 Normative references	9
3 Terms and definitions	9
4 General requirement	11
5 General conditions for the tests	12
6 Classification	13
7 Marking and instructions	13
8 Protection against access to live parts	17
9 Starting of motor-operated appliances	17
10 Power input and current	17
11 Heating	17
12 Void Charging of metal-ion batteries	20
13 Leakage current and electric strength at operating temperature	20
14 Transient overvoltages	20
15 Moisture resistance	20
16 Leakage current and electric strength	22
17 Overload protection of transformers and associated circuits	22
18 Endurance	22
19 Abnormal operation	22
20 Stability and mechanical hazards	26
21 Mechanical strength	26
22 Construction	34
23 Internal wiring	36
24 Components	36
25 Supply connection and external flexible cords	36
26 Terminals for external conductors	38
27 Provision for earthing	38
28 Screws and connections	38
29 Clearances, creepage distances and solid insulation	38
30 Resistance to heat and fire	38
31 Resistance to rusting	41
32 Radiation, toxicity and similar hazards	41
Annexes	54
Annex A (informative) Routine tests	55
Annex AA (normative) Specification for the thermal insulation	56
Annex BB (normative) Equipment for the mechanical strength test for blankets	57
Annex CC (normative) Clothing	60
Annex DD (normative) Rigidity index test for mattresses	63

Bibliography.....	64
List of comments.....	65
Figure 101 101 – Sign for "Do not insert pins"	42
Figure 102 – Sign for “Not to be used by very young children (0-3 years)”.....	42
Figure 1023 1023 – Sign for "Do not use folded or rucked"	42
Figure 104 104 – Arrangement for measuring leakage current and electric strength of the flexible part.....	43
Figure 104 – Void.....	
Figure 105 – Void.....	
Figure 106 – Void.....	
Figure 107 103 – Tumbling barrel for testing the mechanical strength of pads.....	45
Figure 108 104 – Impact apparatus for testing enclosures of moisture-proof appliances	47
Figure 109 105 – Shape of the sample for the tear resistance test.....	48
Figure 110 106 – Equipment for flexing heating elements and internal wiring	49
Figure 111 – Void.....	
Figure 114 107 – Shape of the test piece for the tensile test.....	49
Figure 110 – Apparatus for pressure test on connectors.....	50
Figure 112 108 – Equipment for the spark ignition test	51
Figure 113 109 – Equipment for the spark ignition test – Details of the mask	53
Figure BB.1 – Equipment for the mechanical strength test of blankets.....	58
Figure BB.2 – Detail of the drum and cylinders.....	59
Figure BB.3 – Detail of the clamping bar.....	59
Figure DD.1 – Mattress rigidity index test setup	63
Table 101 – Maximum temperatures	18
Table 102 – Maximum temperature rises.....	19
Table 103 – Pulley diameter for heating elements with PTC characteristic in mattresses	32
Table A.101 – Test voltages	55

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating 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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This commented version (CMV) of the official standard IEC 60335-2-17:2022 edition 4.0 allows the user to identify the changes made to the previous IEC 60335-2-17:2012+AMD1:2015+AMD2:2019 CSV edition 3.2. 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 60335-2-17 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2012, Amendment 1:2015 and Amendment 2:2019. 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, 19.106, 21.103, 21.104, 21.110, 30.1, 30.102, Annex BB, CC.19.3);
- c) clarification of the definition of control unit (3.6.105);
- d) revision for adjusting the supply voltage of appliances, other than controlled appliances, when operation at rated power input times a factor is specified (5.12);
- e) clarification of testing of blankets that cannot be folded with five thicknesses (19.101);
- f) updated compliance criteria to include breakage of electrodes (21.1);
- g) clarification of the test method for mattresses based on the rigidity index of the flexible part (21.111.1, Annex DD);
- h) clarification for testing heating elements with a non-circular construction (21.111.3);
- i) addition of requirements to protect the user from overheating in the event of an interruption in the mains supply (22.111);
- j) inclusion of pressure test method from IEC 60320-1:2001 (30.1);
- k) update of test methods for resistance to fire tests (30.101.1, 30.102).

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

Draft	Report on voting
61/6671/FDIS	61/6747/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/standardsdev/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 blankets, pads, clothing and similar flexible heating 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,
- replaced by a revised edition, or
- amended.

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

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

The following differences exist in the countries indicated below.

- 6.1: Class 0 products are allowed (Japan).

<p>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.</p>
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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~~ 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 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **blankets, pads**, clothing and other flexible appliances that heat the bed or human body, 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**

This standard also applies to **control units** supplied with the appliance.

Appliances not intended for normal household use but which nevertheless ~~may be~~ possibly pose a source of danger to the public, such as appliances intended to be used in beauty parlours or by persons in cold ambient temperatures, are within the scope of this standard.

Requirements and tests for clothing are given in normative Annex CC.

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~~—Children are considered to be old enough to use an appliance without supervision when they have been adequately instructed by a parent or guardian and are deemed competent to use the appliance safely.

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

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can be necessary;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

~~NOTE 103~~—This standard does not apply to

- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- rigid bed warmers, such as those of metal or ceramic material;
- water bed heaters (IEC 60335-2-66);
- heating appliances for breeding and rearing animals (IEC 60335-2-71);
- foot warmers and heating mats (IEC 60335-2-81);

- appliances specifically intended for use under medical supervision (IEC 60601-2-35);
- heated carpets (IEC 60335-2-106).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

~~IEC 60320-1:2001, Appliance couplers for household and similar general purposes—Part 1: General requirements
Amendment 1 (2007)⁴~~

ISO/IEC Guide 37, *Instructions for use of products ~~of consumer interest~~ by consumers*

ISO 2439, *Flexible cellular polymeric materials – Determination of hardness (indentation technique)*

ISO 3758, *Textiles – Care labelling code using symbols*

~~ISO 7000:2014, Graphical symbols for use on equipment—Registered symbols~~

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~~ Addition: **4** **normal operation**

operation of the appliance under the following conditions:

- **blankets** and **pads** are placed between sheets of thermal insulation;
- **duvets** are placed on a sheet of thermal insulation but not covered;
- **mattresses** are covered by a sheet of thermal insulation

Note 101 to entry: The specification for the thermal insulation is given in normative Annex AA

The **flexible part** is supported on a plywood base 20 mm thick and positioned not less than 300 mm above the floor. The size of the plywood base is such that the thermal insulation can be fully supported over its entire area. The size of the sheets of thermal insulation is such that the edges extend at least 100 mm beyond the outline of the **heated area**.

Control units held in the hand when they are actuated and cord switches are positioned to hang away from the plywood base. Other **control units** are placed on a supporting surface away from the plywood base.

~~3.101~~

~~flexible part~~

~~all layers of material forming the permanent enclosure of the appliance together with the heating element, electro-conductive textile, thermostats and all other current-carrying parts contained within it~~

~~Note 1 to entry: The flexible part may be inside a detachable cover.~~

⁴ ~~There exists a consolidated edition 2.1 (2007) that includes edition 2 and its Amendment 1.~~

3.5 Definitions relating to types of appliances

3.102 5.101

blanket

appliance comprising a substantially flat **flexible part** that is intended to form part of the bedding, for heating the bed

3.103 5.102

underblanket

blanket intended to be used under the occupant of the bed

3.104

Void

3.105 5.103

overblanket

blanket intended to be used over the occupant of the bed

3.106 5.104

duvet

quilted **overblanket** intended to be used without additional bedding over the occupant of the bed, the **heating element**, **electro-conductive textile**, providing supplementary heat

3.107 5.105

pad

appliance comprising a **flexible part** having a **heated area** not exceeding 0,3 m² on each face and which is intended to heat part of the human body

If the **pad** is constructed in a cylindrical or similar form, the limit for the **heated area** is 0,6 m².

3.108 5.106

mattress

appliance for supporting the human body and which incorporates an upholstered **flexible part** for heating the bed

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Note 1 to entry: The appliance may be placed on the floor and referred to as a mat.

3.109 5.107

controlled appliance

appliance incorporating means in the **flexible part**, such as **heating elements with PTC characteristics** or other means, for sensing changes in temperature when the appliance is operated under **normal operation**, thus automatically controlling the average power input

3.5.108

moisture-proof appliance

appliance having a **flexible part** that is suitable for use under moist conditions

3.5.109

wrap

appliance comprising a **flexible part** intended to be draped over the human body in order to keep it warm

3.6 Definitions relating to parts of an appliance

3.6.101

flexible part

all layers of material forming the permanent enclosure of the appliance together with the **heating element**, **electro-conductive textile**, **thermostats** and all other current-carrying parts contained within it

Note 1 to entry: The flexible part may be inside a detachable cover.

3.4106.102**heating element**

heating conductor, including any core and insulation, together with any other integrated conductor

3.4116.103**heated area**

area of the **flexible part** enclosed within the outer perimeter of the **heating element** or **electro-conductive textile**

It includes a margin outside the perimeter that has a width equal to 0,5 times the average distance between adjacent runs of the **heating element**.

The **heated area** includes the return length of the **heating element** if the average distance between this part and the adjacent **heating element** does not exceed the average distance between adjacent runs of the **heating element**.

If a **blanket** or **mattress** has two separate **heated areas**, the surface between the two areas is considered to be part of the **heated areas**, if at any place the distance between the two **heating elements** does not exceed 1,5 times the average distance between adjacent runs of the **heating element**.

3.412~~**moisture-proof appliance**~~

~~appliance having a **flexible part** that is suitable for use under moist conditions~~

3.4136.104**bonded enclosure**

enclosure of the **flexible part** that has the opposite faces joined together by means of an adhesive or by welding

3.4146.105**control unit**

device, ~~other than a multi-position cord switch, that does not incorporate components for regulating the power input,~~ external to the **flexible part**, by means of which the average power input of the appliance or the temperature of the **flexible part** can be adjusted or regulated

Note 1 to entry: **Control units** may be incorporated in the **supply cord** or at the end of an **interconnection cord**.

3.415~~**wrap**~~

~~appliance comprising a **flexible part** intended to be draped over the human body in order to keep it warm~~

3.4166.106**electro-conductive textile**

material incorporating carbon or other conductive substance, together with any associated insulation, which is connected to a pair of electrodes for the purpose of providing a heated surface

3.4176.107**heating element with PTC characteristics**

heating element consisting of a pair of conductors separated by conductive material that has a rapid non-linear increase in resistance when the temperature is raised through a particular range

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 Modification:

The tests are carried out on two appliances, identified as appliance A and appliance B.

Addition:

If a further appliance is required in order to continue testing after a test of Clause 19, it shall be adequately preconditioned taking into account 21.102 to 21.107.

*For appliances having a **bonded enclosure**, additional appliances are required for the tests of 21.108 and 21.111. For other appliances, a length of 15 m of **heating element** is required for the tests of 21.111.*

*For **moisture-proof pads** subjected to the tests of 21.110, five additional appliances and 1 m² of enclosure material are required.*

*If heat-shrink material is used to insulate connections in the **flexible part**, a sample at least 150 mm in length is required for the test of 30.102.*

An additional appliance may be ~~required~~ used for the test of 19.107.

*Additional samples of **pads** may be ~~required~~ used for the test of 30.101.*

*For appliances having a **flexible part** incorporating **electro-conductive textile** and a **working voltage** above 24 V, an additional sample may be ~~required~~ used for the test of 21.113.2 and a 1 m length of sheet insulation ~~will be~~ is required for the test of 21.113.1.*

5.3 Replacement:

The order in which the tests are carried out is as follows:

*Appliance A: Clause 7, 22.11, Clause 8, 22.108, ~~22.112~~, 10, 21.102 to 21.107, 22.104, Clauses 13, 15, 16, 17, 20, 25.15, 25.16, 19 (except 19.106), 21.108, 22.18, Clauses 30, 31 and 32. The tests of Clauses 13, 15 and 16 are not carried out on **class III appliances** having a **rated voltage** not exceeding 24 V or on **class III constructions** having a **working voltage** not exceeding 24 V.*

Appliance B: Clauses 10, 11, 19.106, 21 (remainder), Clause 22 (remainder), Clauses 23, 24, 25 (remainder), Clauses 26, 27, 28, 29 and 14.

*The **flexible part** of washable appliances is laundered twice in accordance with the instructions before testing is started.*

If it is evident from the construction of the appliance that a particular test is not applicable, the test is not carried out.

5.5 Addition:

*If the **flexible part** of the appliance is provided with a **detachable cover**, the tests are carried out with or without this cover, whichever is more unfavourable. However, **duvets** are tested without a **detachable cover**.*