

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-17: Exigences particulières pour les couvertures, coussins, vêtements  
et appareils chauffants souples analogues



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –**
**Part 2-17: Particular requirements for blankets, pads,  
clothing and similar flexible heating appliances**

## FOREWORD

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

This third edition cancels and replaces the second edition published in 2002 including its Amendment 1 (2006) and its Amendment 2 (2008). It constitutes a technical revision.

The principal changes in this edition as compared with the second edition are as follows (minor changes are not listed):

- The definition of PTC heating element has been deleted and the definition in Part 1 now applies. A definition of a heating element with PTC characteristics has been introduced instead (3.117). This has resulted in editorial changes to 5.7, 5.8.2, 7.1, 10.101, 11.2, 21.105, 21.111.1 and 21.112.
- The allowance for class I appliances has been deleted and requirements for appliances incorporating a functional earth have been incorporated (6.1, 7.1, 22.115).

- The working voltage of parts of class III construction is limited to 24 V (22.26).
- Some notes have been deleted or converted to normative text (3.107, 3.111, 3.113, 5.2, 5.3, 5.8.2, 11.8, 11.101, 11.102, 15.1, 15.101, 19.1, 19.13, 19.102, 19.103, 19.105, 19.106, 19.108, 19.109, 19.110, 19.111, 19.112, 21.1, 21.102, 21.103, 21.109, 21.110.3, 21.111.1, 21.111.2, 21.111.3, 21.112, 22.103, 22.114, 25.23, Annex AA, Annex CC 3.1.9, 19.201, 19.203).
- Modification of the marking requirements (7.1, 7.14, 7.15).
- Modification of the instructions (7.12).
- Clarification of the heat stroke test (11.101).
- The figure numbers have been updated to take into account deletion of Figure 103 in the previous edition.

The text of this standard is based on the following documents:

FDIS	Report on voting
61/4336/FDIS	61/4352/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) of that standard.

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard. Safety requirements for 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.

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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication 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 and USA).
- Annex AA: Felt is used for the thermal insulation (USA).

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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.

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 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 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.

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

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

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard 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.

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

Appliances not intended for normal household use but which nevertheless may be 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 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 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).

## 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)<sup>1</sup>

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

ISO 3758:2005, *Textiles – Care labelling code using symbols*

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

## 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

### 3.1.9 Replacement: iTeh STANDARD PREVIEW

#### 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 The specification for the thermal insulation is given in 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, thermostats** and all other current-carrying parts contained within it

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

#### 3.102

##### blanket

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

<sup>1</sup> There exists a consolidated edition 2.1 (2007) that includes edition 2 and its Amendment 1.

**3.103**

**underblanket**

**blanket** intended to be used under the occupant of the bed

**3.104**

**ruck-resistant blanket**

**underblanket** that has sufficient rigidity to prevent rucking of the **flexible part**

**3.105**

**overblanket**

**blanket** intended to be used over the occupant of the bed

**3.106**

**duvet**

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

**3.107**

**pad**

appliance comprising a **flexible part** having a **heated area** not exceeding 0,3 m<sup>2</sup> 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 m<sup>2</sup>.

**3.108**

**mattress**

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

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**3.109**

**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

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**3.110**

**heating element**

heating conductor, including the core on which it is wound and the insulation, together with any other integrated conductor

**3.111**

**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**.

**3.112****moisture-proof appliance**

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

**3.113****bonded enclosure**

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

**3.114****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 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**.

**3.115****wrap**

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

**3.116****electro-conductive textile**

textile incorporating carbon or other conductive material for the purpose of providing a uniformly heated surface

**3.117****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 m<sup>2</sup> 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 for the test of 19.112.

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

### 5.3 Replacement:

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

Appliance A: 7, 22.11, 8, 22.112, 10, 21.102 to 21.107, 22.108, 13, 15, 16, 17, 20, 25.15, 25.16, 19 (except 19.111), 21.108, 22.18, 30, 31 and 32.

Appliance B: 10, 11, 19.111, 21 (remainder), 22 (remainder), 23, 24, 25 (remainder), 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:

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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**.

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If the **heating element** can move in the channels, it is manipulated so that the individual runs are placed in the most unfavourable position.

### 5.6 Addition:

When testing appliances for d.c. only, the possible influence of polarity on the operation of the appliance is taken into account.

### 5.7 Modification:

For **flexible parts** incorporating **heating elements with PTC characteristics**, the tests of Clauses 10, 11 and 19 are carried out at the most unfavourable ambient temperature within the range of 0 °C to 25 °C.

For other **controlled blankets and mattresses**, the tests of Clauses 10, 11 and 19 are carried out at the most unfavourable ambient temperature within the range of 0 °C to 15 °C.

#### 5.8.1 Addition:

Appliances for d.c. only are tested with d.c.

**5.8.101 Controlled appliances** are supplied as specified for **motor-operated appliances**.

#### 5.12 Modification:

In the note, replace “25 %” by “10 %”.

**5.101** *Duvets and wraps are tested as overblankets.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Modification:

Appliances shall be **class II** or **class III**. **Class III appliances** shall have a **rated voltage** not exceeding 24 V.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Modification:

Appliances shall be marked with the **rated power input**.

Parts of **class III construction** shall not be marked with the **rated voltage** of the appliance.

*Addition:*

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**Flexible parts** and **detachable covers** shall be marked with the name, trademark or identification mark of the manufacturer or responsible vendor.

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**Detachable covers** shall be marked with the model or type reference of the appliance with which they are intended to be used.

The **flexible part** of appliances to be used with a **detachable control unit** shall be marked with the reference of the **control unit** to be used.

The **flexible part** of appliances to be used with a **detachable transformer** shall be marked with the reference of the transformer to be used.

**Flexible parts** shall be marked with the substance of the following:

- symbol ISO 7000-0790 (2004-01), or by the text ‘read the instructions’;
- the symbol shown in Figure 102, or by the text ‘do not insert pins’;
- the symbol ‘Not to be used by very young children (0-3 years)’, or by similar text;
- intended orientation of blankets and mattresses (this marking is not required if the appliance complies with 11.101, whichever way it is placed on the bed).

**Underblankets**, other than those having a **heating element with PTC characteristics**, shall be marked with the symbol shown in Figure 101 or by the text ‘do not use folded or rucked’.

**Detachable covers** shall be marked with the following:

- symbol ISO 7000-0790 (2004-01);
- symbol of Figure 102.

The **flexible part** of **blankets** and **detachable covers** shall be marked with the appropriate laundering symbols specified in ISO 3758. Washable appliances fitted with a **non-detachable flexible cord** shall be marked with the “hand wash” symbol specified in Table 1 of ISO 3758.