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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household electric heating pads – Methods for measuring performance

Coussins chauffants électriques pour usage domestique – Méthodes de mesure des performances

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CONTENTS

FOREWORD 3
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Classification of heating pads 6
4.1 General 6
4.2 Means of temperature regulation 6
4.3 Type of supply 6
4.4 Application 6
4.5 Method of cleaning 6
4.6 Period of use 6
5 List of measurements 6
6 General conditions for measurements 7
7 Dimensions, mass and textile composition 7
7.1 Dimensions 7
7.2 Mass 8
7.3 Textile composition 8
8 Evenness of temperature 8
9 Heating-up time and energy consumption 9
10 Cyclic variation 10
11 Effect of laundering on dimensions 10
Bibliography 11

Figure 1 – Heated area showing the layout of the plates 8
Figure 2 – Heated area showing the layout of the disks 9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD ELECTRIC HEATING PADS – METHODS FOR MEASURING PERFORMANCE

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International standard IEC 61255 has been prepared by sub-committee 59C: Heating appliances, of IEC technical committee 59: Performance of household electrical appliances.

This second edition cancels and replaces the first edition published in 1994. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) extended classification;
b) extended list of measurements;
c) temperature measurement means changed to thermocouples.

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

FDIS	Report on voting
59C/182/FDIS	59C/183/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.

In this standard, the following print types are used:

– *test specifications: in italic type*
– notes: in small roman type
– other text: in roman type
– terms defined in Clause 3: in **bold** type.

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- withdrawn,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.

HOUSEHOLD ELECTRIC HEATING PADS – METHODS FOR MEASURING PERFORMANCE

1 Scope

This International Standard applies to electric **heating pads** for household use.

This International Standard defines the main performance characteristics of electric **heating pads** and specifies methods for measuring these characteristics, for the information of users.

This International Standard does not specify values for performance characteristics.

NOTE This International Standard does not deal with safety requirements that are covered by IEC 60335-2-17.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62301:2011, *Household electrical appliances – Measurement of standby power*

ISO 2439, *Polymeric materials, cellular flexible – Determination of hardness (indentation technique)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
heating pad
appliance comprising a **flexible part** having **a heated area** not exceeding 0,3 m^2 on each face and which is intended to heat part of the human body

Note 1 to entry: If the **pad** is constructed in a cylindrical or similar form, the limit for **heated area** is 0,6 m^2.

3.2
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.

3.3
heated area
area of the **flexible part** enclosed within the outer perimeter of the **heating element** or **electro-conductive textile**

Note 1 to entry: The **heated area** 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**.

Note 2 to entry: 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**.

Note 3 to entry: If the **heating pad** 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**.

4 Classification of heating pads

4.1 General

The classifications of the appliance are stated.

4.2 Means of temperature regulation

Heating pads are classified according to the means of temperature regulation:

– **heating pad** with a control having continuously variable settings;
– **heating pad** with a control having step settings.

4.3 Type of supply

Heating pads are classified according to the type of supply:

– **heating pad** for direct connection to the supply mains;
– extra low voltage **heating pad**.

NOTE An extra low voltage **heating pad** has a rated voltage not exceeding 24 V.

4.4 Application

Heating pads are classified according to their application:

– **heating pad** for dry application;
– **heating pad** for moist application including cosmetics.

4.5 Method of cleaning

Heating pads are classified according to the method of cleaning:

– washable by hand
– machine washable
– not washable

4.6 Period of use

Heating pads are classified according to the period of use:

– **heating pads** having a time-based operation
– **heating pads** for continuous use

5 List of measurements

Performance is determined by means of the following measurements:

– dimensions mass and textile composition (Clause 7);
– evenness of temperature (Clause 8);
– heating-up time and energy consumption (Clause 9);
– cyclic variation (Clause 10);
– effect of laundering (Clause 11).

6 General conditions for measurements

Unless otherwise specified, measurements are made under the following conditions:

a) Test room:

The tests are carried out in a draught-free room in which the ambient temperature is maintained at 20 °C ± 5 °C.

b) Supply voltage:

The supply voltage is maintained at the rated voltage ± 1 %. When the **heating pad** is marked with a rated voltage range, the test report shall state the voltage used for the test.

NOTE 1 If the results obtained by testing the **heating pad** at rated voltage are considered to be misleading due to the national supply voltage, the **heating pad** can also be tested at a voltage corresponding to the nominal voltage of the national supply system.

c) *Arrangement of the **heating pad**:*

*The **flexible part** with any detachable cover fitted placed between sheets of thermal insulation, the size of which is such that the edges extend at least 100 mm beyond the out- line of the **heated area**.*

The thermal insulation is made of open-cell polyether having

- *cell count 18 + 2 per cm;*
- *specific mass 30 kg/m^3 + 10 %;*
- *hardness between 120 N and 170 N at 40 % impression measured according to ISO 2439.*

The thermal insulation is supported over its entire area by a piece of plywood 20 mm thick, situated not less than 300 mm above the floor.

*The thickness of the thermal insulation under the **heating pad** is approximately 72 mm and over the **heating pad** approximately 36 mm.*

NOTE 2 The specification of the thermal insulation is taken from IEC 60335-2-17.

7 Dimensions, mass and textile composition

7.1 Dimensions

7.1.1 The areas of the **flexible part** and the **heated area** are determined.

*The **heating pad** is spread out without tension on a flat surface and the length and width are measured at five evenly distributed places. The average values of the area of the **flexible part** and the **heated area** are calculated.*

The areas are stated in squared metres (m^2).

If the pad is not rectangular, its shape is stated.

7.1.2 The lengths of flexible cords are determined.

The measurements are made, as applicable, between

- *the cord-entry of the **flexible part** and the control or the transformer;*
- *the control or the transformer and the plug.*

The lengths are stated in metres (m), rounded down to the nearest 0,05 m.

7.2 Mass

The mass of the **heating pad** and its cover, if any, is determined.

The mass of the **heating pad** and the cover, if any, are stated separately and are measured in grams (g), rounded up to the nearest 10 g.

7.3 Textile composition

The textile composition of the external surface of the **heating pad** and its cover, if any, is stated.

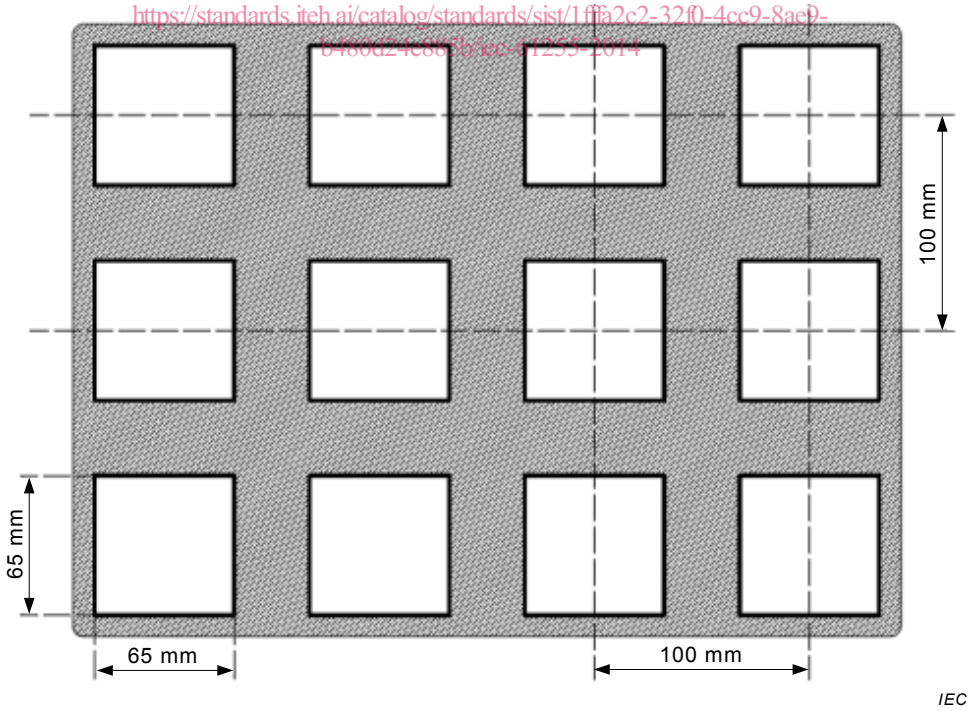
8 Evenness of temperature

The evenness of temperature of the **heated area** is determined.

*The temperature rise of the surface of the **flexible part** is measured by means of thermocouples attached to the centre of copper plates having dimensions of 65 mm × 65 mm × 0,5 mm.*

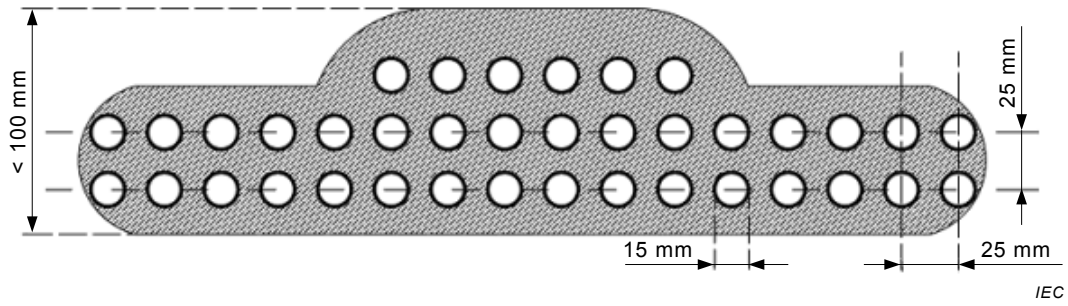
The plates are placed over the flexible part as shown in Figure 1 so that as many plates as possible cover the surface.

*If the length of the shortest side of the **heated area** is less than 100 mm, the temperature rise is measured instead by thermocouples attached to copper disks having a diameter of 15 mm and a thickness of 1,0 mm. The distance between the centres of adjacent disks is 25 mm. An example of layout is shown in Figure 2.*



No part of any plate is to project outside of the **heated area**.

Figure 1 – Heated area showing the layout of the plates



No part of any plate is to project outside of the **heated area**.

Figure 2 – Heated area showing the layout of the disks

The test is carried out with the control adjusted to the maximum setting and the temperature rises are measured when steady conditions are established or at the end of a cycle of operation.

The average temperature rise is calculated from all the measurements. The difference between the maximum and minimum temperature rises is also calculated.

NOTE If there is more than one **heated area**, the calculations are made for each **heated area** separately.

*The uniformity factor is calculated, being the percentage of the **heated area** which is within ± 2 K of the average temperature rise.*

The evenness of temperature is expressed as the difference between the maximum and minimum temperature rises, rounded to the nearest 1 K, and the uniformity factor, rounded to the nearest 1 %.

9 Heating-up time and energy consumption

The time taken for the temperature rise of a representative measuring point to rise by 20 K during the test of Clause 8 is stated in minutes (min), rounded to the nearest 1 min, as the heating-up time.

*The ambient temperature is maintained at 20°C ± 2°C and the **heating pad** is conditioned for at least 24 h at this temperature before starting the test.*

*The temperature rise is measured by means of a thermocouple attached to the centre of a copper plate having dimensions of 65 mm × 65 mm × 0,5 mm, which is placed in the centre of the **heated area.***

*The control is adjusted to the maximum setting and the **heating pad** is operated. The time taken for the temperature of the measuring point to obtain a temperature rise of 20 K is measured. The energy consumption during the heating-up time is determined as well as the energy consumption during a period of operation.*

*The operation is continued and the energy consumption is measured. The test is terminated for **heating pads** having a time-based operation when it switches off. The energy consumed for **heating pads** for continuous use is measured after 90 min of operation and between the second and third hour of operation.*