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Household electric blankets — Methods for measuring performance

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National foreword

This British Standard is the UK implementation of EN 60299:2014. It is identical to IEC 60299:2014. It supersedes BS EN 60299:1994 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPL/59, Performance of household electrical appliances.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Household electric blankets - Methods for measuring performance (IEC 60299:2014)

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Elektrische Haushalt-Wärmeunterbetten/Wärmezudecken - Prüfverfahren zur Bestimmung der Gebrauchseigenschaften (IEC 60299:2014)

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Foreword

The text of document 59C/181/FDIS, future edition 3 of IEC 60299, prepared by SC 59C "Heating appliances" of IEC/TC 59 "Performance of household and similar electrical appliances" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60299:2014.

The following dates are fixed:

– latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-05-14
– latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-08-14

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In the official version, for Bibliography, the following note has to be added for the standard indicated :

ISO 3758	NOTE	Harmonized as EN ISO 3758.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60335-2-17	2012	Household and similar electrical appliances - Safety - Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances	EN 60335-2-17	2013
IEC 62301 (mod)	2011	Household electrical appliances - Measurement of standby power	EN 50564	2011
ISO 2439	-	Flexible cellular polymeric materials - Determination of hardness (indentation technique)	EN ISO 2439	-

CONTENTS

HOUSEHOLD ELECTRIC BLANKETS – METHODS FOR MEASURING PERFORMANCE

1 Scope

This International Standard applies to electric **blankets**, **wraps** and **duvets** for household use.

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

This International Standard does not specify values for performance characteristics.

NOTE This 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 60335-2-17:2012 *Household and similar electrical appliances – Safety – Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances*

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

ISO 2439, *Polymeric materials, cellular flexible – Determination of linear dimensions*

3 Terms and definitions

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

3.1
blanket
appliance comprising a substantially flat **flexible part** that is intended to form part of the bedding, for heating the bed

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
underblanket
blanket to be used under the occupant of the bed

3.4
overblanket
blanket to be used over the occupant of the bed

3.5
wrap
blanket comprising a **flexible part** intended to be draped over the human body in order to keep it warm

3.6
duvet
quilted **overblanket** intended to be used without additional bedding over the occupant of the bed, the heated element providing supplementary heat

3.7
blanket with uniform temperature
blanket having an even temperature over the **heated area**

3.8
blanket with non-uniform temperature
blanket in which the temperature gradually increases from the head end to the foot end of the **heated area**

3.9
blanket with a high temperature zone
blanket having an even temperature over the major part and having a higher temperature zone generally at the foot end of the **heated area**

3.10
blanket with ambient temperature compensation
blanket having a power input which significantly varies inversely with changes in ambient temperature

3.11
heated area
area of the **flexible part** enclosed within the outer perimeter of the heating element or electro-conductive textile

Note 1: 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: 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: If a **blanket** has two separate 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

3.12
controlled appliance
appliance incorporating means in the **flexible part** for sensing changes in temperature when the appliance is operated under normal operation, thus automatically controlling the average power input

Note 1 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 parallel runs of the heating element.

Note 2 to entry: If a double **blanket** has two heating elements which are separately controlled, it has two **heated areas**.

4 Classification

4.1 General

The classifications of the appliance are stated.

4.2 Type

Electric **blankets**, **wraps** and **duvets** for household use are classified according to their type:

– **underblanket;**
– **overblanket;**
– **wrap;**
– **duvet.**

4.3 Heated areas

Electric **blankets**, **wraps** and **duvets** for household use are classified according to the size and the number of **heated areas**:

– single **blanket**;
– double **blanket** with one **heated area**;
– double **blanket** with two **heated areas**.

4.4 Temperature distribution

Electric **blankets**, **wraps** and **duvets** for household use are classified according to temperature distribution.

4.5 Means of control

Electric **blankets**, **wraps** and **duvets** for household use are classified according to the means of control:

– **non-controlled appliance**
– **controlled appliance**
– **blanket** with uniform **temperature**;
– **blanket with non-uniform temperature**;
– **blanket with a high temperature zone**.

4.6 Regulation

Electric **blankets**, **wraps** and **duvets** for household use are classified according to means of regulation:

– **blanket** without any control;
– **blanket** with a control having variable settings;
– **blanket** with a control having step settings;
– **blanket with ambient temperature compensation**;

4.7 Type of supply

Electric **blankets**, **wraps** and **duvets** for household use are classified according to the type of supply:

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

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

4.8 Method of cleaning

Electric **blankets**, **wraps** and **duvets** for household use are classified according to the method of cleaning:

– washable by hand;
– machine washable;
– not washable.

4.9 Fixing of the underblanket to the mattress

Electric **blankets**, **wraps** and **duvets** for household use are classified according to the means of fixing of the **underblanket** to the mattress:

– **underblanket** without means of fixing;
– **underblanket** with tie tapes;
– fitted **underblanket**.

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);
– stability of temperature (Clause 10);
– effect of laundering (Clause 11);
– control settings (Clause 12).

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 appliance is marked with a rated voltage range, the report shall state the voltage used for the test.

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

c) Arrangement of the appliance:

Any detachable cover is fitted and the **flexible part** is placed between sheets of thermal insulation , the size of which is such that the edges extend at least 100 mm beyond the outline of the **heated area**.

d) 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 appliance is approximately 72 mm and over the appliance approximately

– no material for **duvets,**

– 7,2 mm for **overblanket**s and **wraps,**

– 36 mm for **underblankets**

NOTE 2 The specification of the thermal insulation is taken from IEC 60335-2-17:2012, Annex AA.

The above specified thickness of the thermal insulation is for reference; the exact thickness shall be calibrated as specified in IEC 60335-2-17:2012, Annex AA.

7 Dimensions, mass and textile composition

7.1 Dimensions

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

7.1.2 The dimensions of a washable detachable cover are also determined in order to assess the effect of laundering.

The appliance is spread out without tension on a flat surface and the length and width are measured.

The average values for each dimension are calculated.

The dimensions are stated in millimetres (mm), rounded to the nearest 10 mm.

7.1.3 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;*

– *two controls.*

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

7.2 Mass

*The mass of the **flexible part** is measured after the test of Clause 10.*

The appliance is conditioned by operating it for 3 h at rated voltage and then the mass is measured. The specific mass is calculated by dividing the mass by the area of the **flexible part**.

The specific mass is stated in g/m^2 rounded up to the nearest 10 g/m^2.

NOTE The mass of flexible cords and other external components is not included.

7.3 Textile composition

The textile composition of the external surface of the **flexible part** and detachable cover, if any, is stated.

8 Evenness of temperature

*The temperature of the surface of the **flexible part** is measured by means of thermocouples attached to the centre of copper plates having dimensions of 100 mm × 100 mm × 0,5 mm.*

*For **overblankets**, **wraps** and **duvets** the plates are placed under the **flexible part**.*

*For **underblankets** the plates are placed over the **flexible part**.*

*A plate is placed at the centre of the **heated area** and oriented so that its axes are at 45° to the axes of the appliance. Other plates are placed on the **heated area**, as shown in Figure 1.*

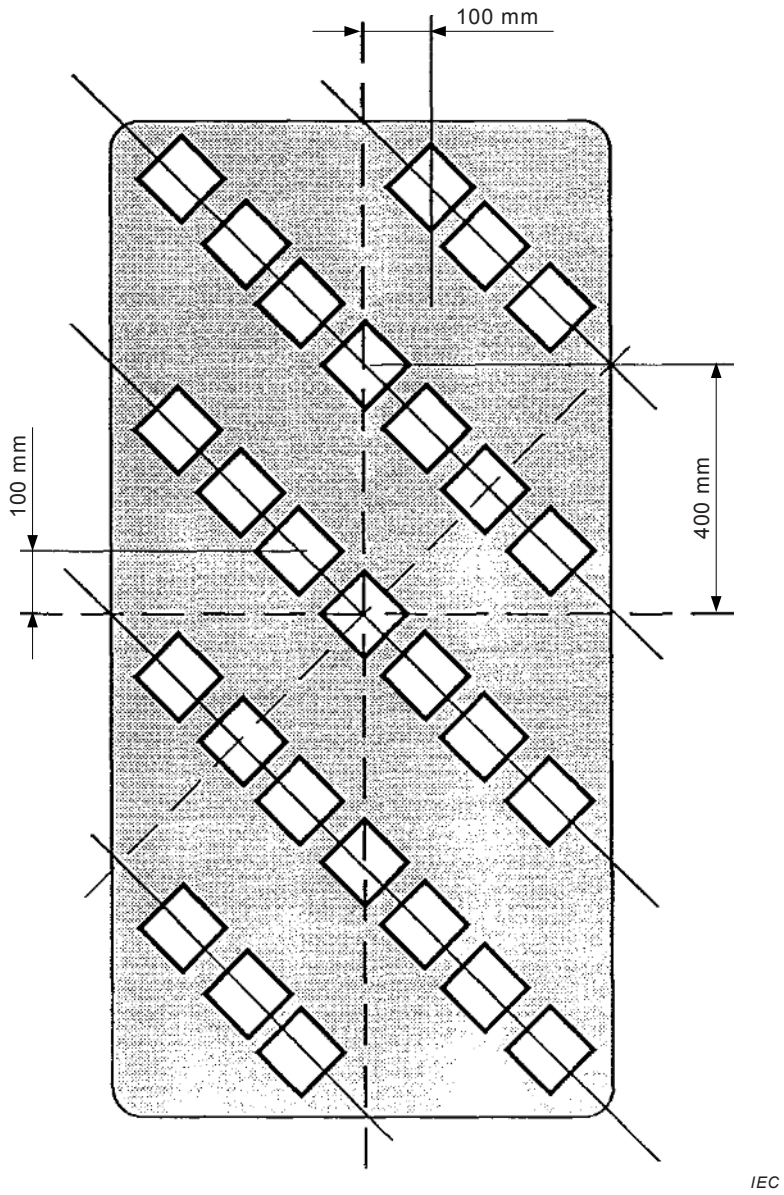

Figure 1 – Heated area showing the layout of the plates

No part of any plate shall project beyond the **heated area**.

The temperature rises are measured when steady conditions are established.

*For each **heated area**, the average temperature rise is calculated from all the measurements. The range of temperature rises is determined, being the difference between the maximum and the minimum temperature rises.*

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

The test is carried out and the calculation made for both the maximum and minimum settings of the control.

The evenness of temperature is expressed as the range of temperature rise and the uniformity factor.

For both settings of the control the range temperature rise is stated rounded to the nearest Kelvin (K) and the uniformity factor is stated rounded to the nearest 1 %.

NOTE 1 For appliances with a **high temperature zone**, the calculations are made separately for both parts of the **heated area**.

NOTE 2 Evenness of temperature is not measured on appliances with **non-uniform heating**.

9 Heating-up time and energy consumption

The time taken by the appliance to heat up is determined. The energy consumption during the heating-up time is determined as well as the energy consumption during a period of operation. If there is a stand-by setting on the control, the stand-by energy consumption is also determined.

The test is carried out at an ambient temperature of 15 °C ± 2 °C, the appliance being pre-conditioned at this temperature for at least 24 h.

The appliance is then operated with the control at the maximum setting until a temperature rise of 15 K is obtained, the time taken being measured.

The energy consumption is measured during the heat-up time. The control is then adjusted to the highest setting for continuous use and the appliance is operated for a further period of 8 h, the energy consumption being measured.

*The power input when the appliance is in the stand-by mode is measured in accordance with Clause 5 of IEC 62301:2011.The temperature rise is measured by means of the plate described in Clause 8 which is placed at the centre of the **heated area**. The heating-up time is stated, rounded to the nearest minute.*

The energy consumption during the heating-up time and for the complete cycle of operation is stated in Wh, rounded to the nearest Wh. The stand-by power input is stated, if applicable, in accordance with Clause 6 of IEC 62301:2011.

10 Stability of temperature

The stability of temperature is determined for **controlled appliances**.

*The appliance is operated at the continuous use setting of the control or, if not provided, at the lowest setting, the ambient temperature being maintained at 20 °C ± 1 °C. When steady conditions are established, the temperature rises are measured according to clause 8 and the average temperature of the **heated area** is calculated.*

If the appliance does not operate under this condition, the ambient temperature is reduced until it does operate.

The ambient temperature is then reduced by 10 K ± 1 K and the average temperature is again calculated when steady conditions are established.

The stability of temperature C is calculated from the formula:

$$C = \frac{(t_1 - t_2) - (s_1 - s_2)}{(t_1 - t_2)} \times 100\ \%$$

where

s_1 *is the average temperature of the* ***heated area*** *when the ambient temperature is* t_1*;*

s_2 *is the average temperature of the* ***heated area*** *when the ambient temperature is* t_2*.*

The stability of temperature is stated rounded to the nearest 1 %.

11 Effect of laundering on dimensions

The effect of laundering on dimensions is determined for washable appliances.

The appliance or its detachable cover is laundered three-times in accordance with the manufacturers instructions. The dimensions are then measured again in accordance with 7.1.1.

The percentage shrinkage S is calculated from the formula:

$$S = \frac{A_1 - A_2}{A_1} \times 100\ \%$$

where

A_1 *is the area of the* ***flexible part*** *or detachable cover;*

A_2 *is the area of the* ***flexible part*** *or detachable cover after laundering.*

The shrinkage is stated rounded to the nearest 1 %.

NOTE If the result is negative, it is stated that the appliance has stretched instead.

If the manufacturer recommends alternative cleaning methods, the effect of each method is determined on separate appliances.

12 Control settings

The functions of the different settings of controls are stated, for example, settings for temperature, time and programmes.

Bibliography

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

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