

Household and similar electrical appliances — Safety —

**Part 2-106: Particular requirements for
heated carpets and for heating units
for room heating installed under
removable floor coverings**

ICS 97.100.10

National foreword

This British Standard is the UK implementation of EN 60335-2-106:2007. It is identical with IEC 60335-2-106:2007, incorporating corrigendum February 2008.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/07, Safety of electrical appliances, heated appliance group.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2007

© BSI 2008

ISBN 978 0 580 62046 1

Amendments/corrigenda issued since publication

Date	Comments
30 May 2008	Implementation of IEC corrigendum February 2008, correction to subclauses 18.101.1 and 18.101.2

**Household and similar electrical appliances -
Safety -
Part 2-106: Particular requirements for heated carpets
and for heating units for room heating
installed under removable floor coverings
(IEC 60335-2-106:2007)**

Appareils électrodomestiques
et analogues -
Sécurité -
Partie 2-106: Règles particulières
pour les tapis chauffants
et les unités chauffantes installées
sous des revêtements de sol amovibles,
pour le chauffage des locaux
(CEI 60335-2-106:2007)

Sicherheit elektrischer Geräte
für den Hausgebrauch
und ähnliche Zwecke -
Teil 2-106: Besondere Anforderungen
für beheizte Teppiche und für
Heizsysteme zur Raumheizung
unter abnehmbaren
Fußbodenbelägen
(IEC 60335-2-106:2007)

This European Standard was approved by CENELEC on 2007-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 61/3220/FDIS, future edition 1 of IEC 60335-2-106, prepared by the IEC Technical Committee 61, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60335-2-106 on 2007-05-01.

The following dates are applicable:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-02-01
- date on which national standards
conflicting with the EN have to be withdrawn (dow) 2010-05-01

This part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for heated carpets and for heating units for room heating installed under removable floor coverings.

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 of Part 1 is to be adapted accordingly.

NOTE 1 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.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 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.

Special national conditions causing a deviation from this European Standard are listed in Annex ZA and are in addition to those in EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

Endorsement notice

The text of the International Standard IEC 60335-2-106:2007 was approved by CENELEC as a European Standard without any modification.

CONTENTS

INTRODUCTION.....	5
1 Scope	6
2 Normative references	6
3 Definitions	6
4 General requirement.....	7
5 General conditions for the tests	7
6 Classification.....	8
7 Marking and instructions	8
8 Protection against access to live parts	10
9 Starting of motor-operated appliances	11
10 Power input and current.....	11
11 Heating	11
12 Void	13
13 Leakage current and electric strength at operating temperature	13
14 Transient overvoltages	13
15 Moisture resistance	13
16 Leakage current and electric strength	14
17 Overload protection of transformers and associated circuits	14
18 Endurance.....	14
19 Abnormal operation	17
20 Stability and mechanical hazards	19
21 Mechanical strength	19
22 Construction.....	21
23 Internal wiring.....	23
24 Components	23
25 Supply connection and external flexible cords	24
26 Terminals for external conductors	24
27 Provision for earthing.....	24
28 Screws and connections	25
29 Clearances, creepage distances and solid insulation	25
30 Resistance to heat and fire	25
31 Resistance to rusting	27
32 Radiation, toxicity and similar hazards	27
Annexes	36
Annex ZA (normative) Special national conditions.....	36
Bibliography	37

Figure 101 – Arrangement for testing heating units	28
Figure 102 – Arrangement for testing heating units to be used only above concrete or similar floors	29
Figure 103 – Arrangement for measuring leakage current and electric strength of the flexible part	30
Figure 104 – Jig for locating the contact needle	31
Figure 105 – Arrangement for the three-thickness fold test	32
Figure 106 – Equipment for flexing heating elements and internal wiring	33
Figure 107 – Equipment for the spark ignition test	34
Figure 108 – Details of the mask	35
Table 101 – Maximum temperature rises	13

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.

An investigation by CENELEC TC 61 has shown that all risks from products within the scope of this standard are fully covered by the Low Voltage Directive, 2006/95/EC. For products having mechanical moving parts, a risk assessment in accordance with the Machinery Directive, 2006/42/EC, has shown that the risks are mainly of electrical origin and consequently this directive is not applicable. However, the relevant essential safety requirements of the Machinery Directive are covered by this standard together with the principal objectives of the Low Voltage Directive.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-106: Particular requirements for heated carpets and for heating units for room heating installed under removable floor coverings

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of

- heated carpets and similar appliances;
- **heating units** to heat the room in which they are located and that are intended to be installed directly under a floor covering that is itself intended to be removable;

their **rated voltage** being not more than 250 V for single-phase installations and 480 V for other installations.

NOTE 101 Examples of materials used as removable floor coverings are carpet, cushion vinyl, or loose laid laminate.

NOTE 102 Attention is drawn to the fact that

- in many countries different wiring rules apply;
- 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 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.

NOTE 103 This standard does not apply to

- appliances intended exclusively for industrial purposes;
- 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);
- blankets, pads and similar flexible heating appliances (IEC 60335-2-17);
- heated mats and foot warmers (IEC 60335-2-81);
- flexible sheet heating systems permanently incorporated in the floor of the building structure (IEC 60335-2-96);
- flexible heating elements incorporated in other appliances.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60884-1:2002, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Addition:

Heating units are installed under a layer of material having a thermal resistance of approximately $0,1 \text{ m}^2\cdot\text{K}/\text{W}$. **Heating units**, the current of which can vary depending on the length of the heating element, and those that can supply other **heating units** are loaded so that the current marked on the heating element flows through the **heating unit**.

3.101

heating unit

heating element equipped with means for connection to the supply

3.102

modular heating unit

a prefabricated assembly consisting of a **heating unit** and other materials

3.103

electrode

conductive part incorporated in a flexible sheet heating element for supplying the heating material

3.104

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, which are intended to be under or part of the floor covering

NOTE The **flexible part** may be provided with a detachable cover.

3.105

controlled appliance

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

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 Addition:

For laminated heated carpets, an additional appliance is required for the tests of 22.103.

*For **heating units**, two additional appliances are required for the test of 18.102. For **heating units** with deposited film or printed circuit heating elements, two additional appliances are required for the test of 21.102.*

For heated carpets that incorporate a wear indicator, such as a colour change, special samples with the textile layer worn or removed to expose the indicator are required for the tests of Clauses 11, 13, 18 and Subclauses 19.2, 19.101, 21.101, 21.102, 21.103 and 21.104.

NOTE 101 The tests of 21.101 and 21.104 may be carried out on separate appliances.

5.3 Addition:

NOTE 101 The test of 21.101 may be carried out in conjunction with the conditioning in 18.102.2.

5.6 Addition:

Thermostats sensitive to room air temperature or outdoor air temperature are short circuited. However, the **thermostat** is not short circuited if it can be set so that it does not cycle.

NOTE 101 For electronic controls, it may be necessary to render the sensing elements inoperative instead of short circuiting the **thermostat**.

5.10 Addition:

For **heating units** that are cut to measure, the tests are carried out after connecting the **supply leads** and protecting the edges in accordance with the instructions.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Addition:

If a **heating unit** is classified, the relevant requirements apply.

6.2 Addition:

Heating units and other floor mounted parts shall be at least IPX7.

Heated carpets and similar appliances shall be IPX7.

NOTE 101 This does not apply to the plug for appliances connected via a **supply cord** fitted with a plug or to wall mounted controls.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Modification:

Instead of the marking of **rated power input** or **rated current**, the following applies:

Heating units shall be marked with their **rated power input** and the maximum **rated current** at 20 °C. **Heating units** that can be cut to measure shall be marked with their **rated power input** per metre length.

Heating units shall be marked with their maximum current if

- the current can vary depending on the length of the **heating unit**;
- other **heating units** can be supplied through them.

Appliances with **detachable controls** shall be marked with the reference number or by other means of identification of the control.

Addition:

Heating units shall be marked with the indication of orientation, unless they are symmetrical.

The marking shall be repeated at least once every 0,5 m of the heating element or on each section that can be cut to form a **heating unit**.

Heating units that can be cut to measure and have to be cut at specified places shall be marked appropriately.

Heating units intended to be installed only above a floor of concrete or similar material shall be permanently marked with the substance of the following:

In order to avoid a fire hazard, this heating unit is to be installed only above a floor of concrete or similar material.

7.12 *Addition:*

The instructions shall contain the substance of the following:

This appliance is for indoor use only.

For heated carpets that incorporate a wear indicator such as a colour change, the instructions shall clearly explain the purpose of the indicator and the action to be taken when it becomes visible.

Modification:

The instructions concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance are not required.

7.12.1 *Addition:*

Instructions for installation shall include the substance of the following:

- a) explanation of the marking, if necessary;
- b) information for installing the heating units, in particular
 - precautions to be taken to avoid damage during installation;
 - dimensions and distances to be taken into account;
 - a statement that **heating units** have to be separated from other heat sources;
 - description of the fixing areas of the **heating unit**;
 - guidance on how to avoid damage to a **heating unit** and its terminations due to relative movement after installation;
 - the lowest ambient temperature at which **heating units** may be installed;
 - the minimum radius for bending the heating element, if applicable;
 - precautions to be taken to avoid creasing the heating element;
 - a statement that the **heating unit** is not to be installed on irregular surfaces;
 - a statement that the **heating unit** is to be installed with the correct orientation if applicable;
 - a statement that the installation is to be in accordance with the national wiring rules;

- a recommendation that the **heating units** are to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA;
 - how to interconnect **heating units**, giving the cross-sectional area of the leads and type of leads, if applicable;
- c) the maximum current allowed to flow through one **heating unit** when other **heating units** are supplied through it or when the current can vary depending on its length;
- d) list of controls including the statement that the appliance must only be used in conjunction with these controls as they form part of the overheating protection system, unless they are incorporated into the **heating unit**;

NOTE 101 Only those controls that are necessary to ensure compliance with the standard need be listed.

- e) specification of any adhesive to be used;
- f) a label as detailed in 7.101 is to be fixed adjacent to the distribution board.

7.12.101 The instructions for **heating units** that can be cut to measure shall state that the installation work is only to be carried out by the manufacturer or its service agent in order to avoid a hazard.

7.14 Addition:

The height of the lettering of the marking for **heating units** intended to be installed only above a floor of concrete or similar material shall be at least 20 mm.

7.15 Addition:

The marking for **heating units** intended to be installed only above a floor of concrete or similar material shall be visible during installation.

7.101 A label that contains sufficient space for the locations of the **heating units** to be listed shall be provided for each installation (see 7.12.1 f) giving

- the name, trade mark or identification mark of the manufacturer or responsible vendor;
- the model or type reference;
- rated power input.

It shall state the substance of the following:

- where the **heating units** are installed;
- not to restrict the thermal emission of the heated floor;

NOTE The specific application is to be stated on the label.

- not to use fixing materials other than those recommended;
- not to insert nails or screws.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable.