

BSI Standards Publication

Household and similar electrical appliances — Safety

Part 2-81: Particular requirements for foot warmers and heating mats

bsi.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

National foreword

This British Standard is the UK implementation of EN IEC 60335-2-81:2023+A11:2023. It is derived from IEC 60335-2-81:2015, incorporating amendments 1:2017 and 2:2020. It supersedes BS EN IEC 60335-2-81:2023+A2:2023, which will be withdrawn on 22 November 2026.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by ▌A1〉 〈A1▐.

The start and finish of text introduced or altered by amendment A11 is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by ▌A11〉 〈A11▐.

The UK participation in its preparation was entrusted to Technical Committee CPL/61/7, Safety of electrical appliances - Heated appliance group.

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2024
Published by BSI Standards Limited 2024

ISBN 978 0 539 19346 6

ICS 13.120; 97.100.10

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 30 June 2023.

Amendments/corrigenda issued since publication

Date	Text affected
31 January 2024	Implementation of CENELEC amendment A11:2023

AVA Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60335-2-81:2023+A11

December 2023

ICS 13.120; 97.100.10

Supersedes EN 60335-2-81:2003; EN 60335-2-81:2003/A1:2007; EN 60335-2-81:2003/A2:2012

English Version

Household and similar electrical appliances - Safety - Part 2-81: Particular requirements for foot warmers and heating mats (IEC 60335-2-81:2015)

Appareils électrodomestiques et analogues - Sécurité - Partie 2-81: Exigences particulières pour les chancelières et les carpettes chauffantes électriques (IEC 60335-2-81:2015)

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke - Teil 2-81: Besondere Anforderungen an Fußwärmer und Heizmatten (IEC 60335-2-81:2015)

This European Standard was approved by CENELEC on 2022-03-14. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2023 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

European foreword

This document (EN IEC 60335-2-81:2023) consists of the text of IEC 60335-2-81:2015 prepared by IEC/TC 61 “Safety of household and similar electrical appliances”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-11-12
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-05-12

This document supersedes EN 60335-2-81:2003, and all its amendments/corrigenda (if any).

This document is read in conjunction with EN IEC 60335-2-81:2023/A1:2023 and EN IEC 60335-2-81:2023/A2:2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60335-2-81:2015 was approved by CENELEC as a European Standard without any modification.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

European foreword to amendment A1

This document (EN IEC 60335-2-81:2023/A1:2023) consists of the text of IEC 60335-2-81:2015/A1:2017 prepared by IEC/TC 61 “Safety of household and similar electrical appliances”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2023-11-12
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2026-05-12

This document is read in conjunction with EN IEC 60335-2-81:2023, and EN IEC 60335-2-81:2023/A2:2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60335-2-81:2023/A1:2017 was approved by CENELEC as a European Standard without any modification.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

European foreword to amendment A2

This document (EN IEC 60335-2-81:2023/A2:2023) consists of the text of IEC 60335-2-81:2015/A2:2020 prepared by IEC/TC 61 “Safety of household and similar electrical appliances”.

The following dates are fixed

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-03-01
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-03-01

This document is read in conjunction with EN IEC 60335-2-81:2023, and EN IEC 60335-2-81:2023/A1:2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN-CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN and CENELEC websites.

Endorsement notice

The text of the International Standard IEC 60335-2-81:2015/A2:2020 was approved by CEN-CENELEC as a European Standard without any modification.

European foreword to amendment A11

This document (EN IEC 60335-2-81:2023/A11:2023) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-11-22
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-11-22

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document is read in conjunction with EN IEC 60335-2-81:2023, EN IEC 60335-2-81:2023/A1:2023 and EN IEC 60335-2-81:2023/A2:2023.

The numbering system for European clauses, subclauses, notes, tables, figures and annexes that are additional to those in the IEC standard are prefixed with the letter “Z”.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

AVA Documents Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

CONTENTS

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

Figure 101 – Equipment for the flexing test for foot warmers 21
Figure 102 – Equipment for flexing heating elements and internal wiring 22
Figure 103 – Equipment for the spark ignition test 23
Figure 104 – Details of the mask 24

AVA Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

Figure 105 – Apparatus for pressure test on connectors 25

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-81: Particular requirements for foot warmers and heating mats

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

AVA Documents Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

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 constitutes a technical revision.

The principal changes in this edition as compared with the second edition of IEC 60335-2-81 are as follows (minor changes are not listed):

- Requirements for washable appliances (5.3, 7.1, 7.6, 7.12);
- Requirements for controls in flexible cords (15.1.1, 24.2);
- Requirements for appliance inlets (22.105, 24.1.5, 29.1.3).

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 foot warmers and heating mats.

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 the base publication and its amendments 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.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023

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.

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 following differences exist in the countries indicated below.

– 3.1.9: Normal operation is different (USA)
– 6.1: Class 0 appliances are allowed if their rated voltage does not exceed 150 V (Japan)
– 6.1: Class 0 and class I appliances are allowed (USA)
– 7.6: Symbols not permitted to replace required text (USA)
– 11.8: Temperature limit is different (USA)
– 13.2: Method and limit is different (USA)
– 19.2: The test is different (USA)
– 21.101: The test is different (USA)
– 22.101: The tests are different (USA)

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

Documents
Document Sharing Hub

Full document details: BS EN IEC 60335-2-81:2023+A11:2023