AS/NZS 60335.2.81:2015
(Incorporating Amendment Nos 1 and 2)

AS/NZS 60335.2.81:2015

Australian/New Zealand Standard™

Household and similar electrical appliances—Safety

Part 2.81: Particular requirements for foot warmers and heating mats (IEC 60335-2-81 Ed 3.1, MOD)

currently in preview, click buy full version

STANDARDS Australia

STANDARDS® NEW ZEALAND PAEREWA AOTEAROA

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers. It was approved on behalf of the Council of Standards Australia on 19 October 2015 and by the Council of Standards New Zealand on 6 November 2015.
This Standard was published on 30 November 2015.

The following are represented on Committee EL-002:

Association of Accredited Certification Bodies
Australian Industry Group
Business New Zealand
Consumer Electronic Suppliers Association, Australia
Consumers' Federation of Australia
Electrical Regulatory Authorities, Australia
Electrical consultants
Engineers Australia
JAS-ANZ
National Retailers Association (Australia)
New Zealand Electric Fence Energizer Manufacturers' Standards Group
Testing Interests New Zealand
WorkSafe, New Zealand

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com or Standards New Zealand web site at www.standards.govt.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 15904.

currently in preview, click buy full version

AS/NZS 60335.2.81:2015
(Incorporating Amendment Nos 1 and 2)

Australian/New Zealand Standard™

Household and similar electrical appliances—Safety

Part 2.81: Particular requirements for foot warmers and heating mats (IEC 60335-2-81 Ed 3.1, MOD)

Originally as AS/NZS 3350.2.81:1998.
Jointly revised and redesignated AS/NZS 60335.2.81:2006.
Jointly revised and designated AS/NZS 60335.2.81:2012.
Jointly revised and designated AS/NZS 60335.2.81:2015.
Reissued incorporating Amendment No. 1 (February 2017).
Reissued incorporating Amendment No. 2 (November 2018).

COPYRIGHT

© Standards Australia Limited

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6140.

ISBN 978 1 76035 314 8

currently in preview, click buy full version

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

AS/NZS 60335.2.81:2015

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2.81: Particular requirements for foot warmers and heating mats

Foreword

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002- Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 60335.2.81:2012 three years from the date of publication.

A1

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the appliance and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand

The text of IEC 60335-2-81 Ed 3, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption of the IEC standard as a Standards Australia/Standards New Zealand joint standard.

The principal changes in this edition as compared with the 2012 edition of AS/NZS 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, 25.14);
- Requirements for appliance inlets (22.105, 24.1.5, 29.1.3);

The text of IEC 60335-2-81 Edition 3 amendment 1, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption as an amendment to the Standards Australia/Standards New Zealand joint standard AS/NZS 60335.2.81:2015.

This standard incorporates Amendment No.1 (February 2017) and Amendment No. 2 (November 2018). The changes introduced by the amendments are indicated in the text by a marginal bar and amendment number against the part affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected. Unless otherwise indicated, the application date of the changes introduced by Amendment No. 1 is 3 February 2019.

A2

NOTE: Regulatory authorities that reference this Standard in regulation may apply these amendment requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements

This standard is an adoption with national modifications of the third edition of IEC 60335-2-81, *Household and similar electrical appliances – Safety – Part 2-81: Particular requirements for foot warmers and heating mats* including its amendment 1 (2017). It has been varied as indicated to take account of Australian and New Zealand conditions.

This part 2 has to be used in conjunction with the latest edition of AS/NZS 60335.1 Household and similar electrical appliances – Safety – Part 1: General requirements and its Amendments. It was established on the basis of AS/NZS 60335.1:2011.

COPYRIGHT

currently in preview, click buy full version

This part 2 supplements or modifies the corresponding clauses of AS/NZS 60335.1 so as to convert it into the Australian/New Zealand 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 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 letters AZ.

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.

p NOTE 3 In this document, p is used in the margin to indicate instructions for preparing a consolidated version.

The essential safety requirements in AS/NZS 3820[1] that could be applicable to requirements for foot warmers and heating mats are covered by this standard.

A2 The national variations to IEC 60335-2-81 Ed 3.1 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).

currently in preview, click buy full version

[1] AS/NZS 3820 *Essential safety requirements for electrical equipment*

COPYRIGHT

A2 The text of the International Standard IEC 60335-2-81 Ed 3.1 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.

AUSTRALIAN NATIONAL VARIATIONS

The national variations to this Part 2 are additional to those listed in the national variations in AS/NZS 60335.1:2011.

1 Scope

p 1 *Insert* the following variation after the first paragraph:

This standard also deals with the safety of **electric hot water bottles.** Additional requirements for these appliances are given in Annex AZ.

p Annexes *Replace* the text by the following variations:

The annexes of part 1 are applicable except as follows.

Annex AZ
(normative)

Electric hot water bottles

The following modifications to this standard are applicable for **electric hot water bottles**.

A1
DOA
3/2/19

AZ.2 Normative references

IEC 60320-3, *Appliance couplers for household and similar general purposes - Part 3: Standard sheets and gauges*

AS/NZS ISO 8124.1: 2010, *Safety of toys Part 1: Safety aspects related to mechanical and physical properties*
Amendment 1 (2011)

BS 1970:2012, *Hot water bottles manufactured from rubber and PVC – Specification*

AZ.3 Terms and definitions

AZ.3.101
electric hot water bottle
appliance that is for application of heat to parts of the human body and incorporates a bladder containing a liquid and internal electrical components that are used in heating the internal liquid

AZ.3.102
electric hot water bottle bladder (bladder)
material that encloses and retains, and is in contact with, the liquid that is in contact with the internal electrical components and may comprise multiple layers

AZ.3.103
electric hot water bottle cover (cover)
any removable material that encloses the **bladder**

AZ.3.104
cradle
device specific for each electric hot water bottle that incorporates the appliance inlet for attaching the electric hot water bottle to the supply

COPYRIGHT

currently in preview, click buy full version

AZ.5 General conditions for the tests

AZ.5.1 *Additional samples are required for the tests of AZ.16.3, AZ.22.7, AZ.22.101, AZ.22.102 and AZ.22.103.*

AZ.5.5 *The tests are carried out with any **cover** removed*.

AZ.6 Classification

AZ.6.1 **Electric hot water bottles** shall be **Class I**, **Class II** or **Class III**.

AZ.7 Marking and instructions

AZ.7.1 The appliance shall be marked with the substance of the following:

– details of the composition of the contained liquid;

– Do not use while charging;

– This appliance cannot be refilled.

The appliance shall be marked with the following warning:

WARNING: Use a Residual Current Device (RCD) while charging

AZ.11 Heating

AZ.11.2 ***Electric hot water bottles*** *are placed on the floor in the test corner away from the walls.*

AZ.11.7 ***Electric hot water bottles*** *are operated for a period of one hour or until steady conditions are established, whichever occurs first.*

A1
DOA
3/2/19

AZ.11.8 *The temperature rise of the **bladder** surface in contact with the floor of the test corner and the temperature rise of the upper surface of the **bladder** shall not exceed 45 K. The internal fluid shall be mixed before determining the maximum temperature. After heating but before measurement of the temperature, the internal fluid shall be mixed by inverting the **bladder** 10 times and then allowing one minute to settle before determining temperatures of the **bladder**.*

AZ.16 Leakage current and electric strength

AZ.16.3 ***Electric hot water bottles*** *with heating elements of **Class II construction** are subject to the following additional electric strength test.*

*In a new sample of the appliance, **double insulation** between the electric components and the liquid are separated and the **basic insulation** and the **supplementary insulation** are subject to the relevant electric strength test values of Table 7. For this test it is not permitted to test the two layers of insulation to the **reinforced insulation** electric strength test in lieu of conducting the separate tests on the **basic insulation** and **supplementary insulation**, if the layers cannot be separated specially prepared samples may need to be supplied.*

AZ.19 Abnormal operation

AZ.19.4 *The appliance is operated until steady conditions are established.*

AZ.19.13 *During the test of 19.4 the temperature of the*

– ***bladder*** *surface shall not exceed 90 ^{O}C; and*

– *liquid shall not exceed 10 K below its boiling point.*

currently in preview, click buy full version

COPYRIGHT

AZ.22 Construction

AZ.22.7 *A new sample of the **electric hot water bottle** is tested as described in Annex F of BS 1970 modified as follows.*

The upper and lower plates shall incorporate cut outs to avoid any contact between the plates and any incorporated appliance inlet or other solid components.

At the conclusion of the test there shall be no sign of leakage or other detrimental effect.

AZ.22.101 The **bladder** shall have adequate thickness.

Compliance is checked by the following test.

*In a new sample of the appliance, find the most likely thinnest point in the **bladder** material. If there is doubt as to the thinnest point, randomly choose ten points on a **bladder** in order to find the thinnest point. The thickness is then measured to a resolution of 0.01mm.*

A total of three specimens are subjected to this measurement.

All measurements shall exceed 0,7 mm.

AZ.22.102 Bonded or welded seams shall have adequate tensile strength.

Compliance is checked as described in Annex E of BS 1970 on a new sample of the appliance.

The tensile force so obtained shall be not less than 72 N.

A1
DOA
3/2/19

AZ.22.103 The **bladder** shall have adequate strength against penetration from sharp objects.

Compliance is checked by the test procedure specified in 5.19 of AS/NZS ISO 8124.1.

At the conclusion of the test there shall be no leakage of liquid, there shall be no access to the liquid with the test probe B of IEC 61032 and there shall be no damage that would impair compliance with clause 8.

AZ.22.104 The **bladder** shall not be user refillable.

Compliance is checked by inspection.

AZ.22.105 The **electric hot water bottle** shall be supplied with a dedicated **cradle** that has the means of connection to supply. The **cradle** shall obstruct at least 10% of the largest projected surface area of the **bladder** on two opposing sides. The **cradle** shall extend 25% of the longest distance across the largest surface of the **bladder** on two opposing sides. The surface coverage shall be maintained during charging.

The **cradle** shall be made of a rigid material.

Compliance is checked by inspection and measurement.

AZ.23 Internal wiring

AZ.23.101 The internal wiring shall remain intact during **normal operation**.

Consideration shall be given when conducting this test as to how the internal wiring and fluid will behave. The most onerous operation is to be conducted based on good engineering judgment. This test is to be conducted twice, once each on different samples at right angles to one another to ensure that the assessment is thorough.

Compliance is checked by the following test.

COPYRIGHT

currently in preview, click buy full version

A new sample of the appliance is mounted on a flexing machine by supporting the appliance at four diagonally dispersed points of the enclosure. The cover, if supplied, can be suitable to hold the appliance.

*The unit is flexed by rotating the **electric hot water bottle** through 5000 flexings each of 360 degrees. One flexing being a rotation of 360 degrees in one direction and then back to its original position.*

A second test is taken on a new sample of the appliance, the new axis of rotation taken at 90° degrees to the axis of the preceding test.

*The appliance is supplied at **rated voltage** during the test.*

There shall be no damage or displacement of conductors or leakage of liquid.

After this test clause 16.3 is repeated on each sample tested.

AZ.24 Components

AZ.24.101 The **electric hot water bottle** shall have a detachable **cradle** incorporating an appliance inlet that complies with AS/NZS 60320.1 as a Group 2 appliance inlet. The **electric hot water bottle** shall not incorporate an appliance inlet complying with the standard sheets of IEC 60320-3 or AS/NZS 60320.1.

Compliance is checked by inspection and appropriate tests.

AZ.24.102 Devices incorporated in **electric hot water bottles** in order to comply with 19.4 shall not be self-resetting or manually resettable by disconnection of the appliance from the supply mains.

A1
DOA
3/2/19

Compliance is checked by inspection.

AZ.25 Supply connection and external flexible cords

AZ.25.1 **Electric hot water bottles** shall not be fitted with a **supply cord** fitted with a plug or pins for insertion into socket outlets.

AZ.30 Resistance to heat and fire

AZ.30.101 The **bladder** and **cover** of **electric hot water bottles** shall be resistant to fire.

Compliance is checked by the following test.

*The **electric hot water bottle** is emptied of liquid by puncturing the enclosure or by some other suitable method. It is then supplied at **rated voltage**.*

*The **bladder** and **cover** shall not ignite or deform to such an extent that **live parts** become accessible to test probe B of IEC 61032.*

currently in preview, click buy full version

COPYRIGHT

NEW ZEALAND NATIONAL VARIATIONS

The national variations to this Part 2 are additional to those listed in the national variations in AS/NZS 60335.1:2011.

1 Scope

p 1 *Insert* the following variation after the first paragraph:

This standard also deals with the safety of **electric hot water bottles.** Additional requirements for these appliances are given in Annex AZ.

p Annexes *Replace* the text by the following variations:

The annexes of part 1 are applicable except as follows.

Annex AZ
(normative)

Electric hot water bottles

The following modifications to this standard are applicable for **electric hot water bottles**.

A1
DOA
3/2/19

AZ.2 Normative references

IEC 60320-3, *Appliance couplers for household and similar general purposes - Part 3: Standard sheets and gauges*

AS/NZS ISO 8124.1: 2010*, Safety of toys Part 1: Safety aspects related to mechanical and physical properties*
Amendment 1 (2011)

BS 1970:2012, *Hot water bottles manufactured from rubber and PVC – Specification*

AZ.3 Terms and definitions

AZ.3.101
electric hot water bottle
appliance that is for application of heat to parts of the human body and incorporates a bladder containing a liquid and internal electrical components that are used in heating the internal liquid

AZ.3.102
electric hot water bottle bladder (bladder)
material that encloses and retains, and is in contact with, the liquid that is in contact with the internal electrical components and may comprise multiple layers

AZ.3.103
electric hot water bottle cover (cover)
any removable material that encloses the **bladder**

AZ.3.104
cradle
device specific for each electric hot water bottle that incorporates the appliance inlet for attaching the electric hot water bottle to the supply

AZ.5 General conditions for the tests

AZ.5.1 *Additional samples are required for the tests of AZ.16.3, AZ.22.7, AZ.22.101, AZ.22.102 and AZ.22.103.*

AZ.5.5 *The tests are carried out with any **cover** removed*.

COPYRIGHT

currently in preview, click buy full version

AZ.6 Classification

AZ.6.1 Electric hot water bottles shall be **Class I**, **Class II** or **Class III**.

AZ.7 Marking and instructions

AZ.7.1 The appliance shall be marked with the substance of the following:

– details of the composition of the contained liquid;

– Do not use while charging;

– This appliance cannot be refilled.

The appliance shall be marked with the following warning:

WARNING: Use a Residual Current Device (RCD) while charging.

AZ.11 Heating

AZ.11.2 ***Electric hot water bottles*** *are placed on the floor of the test corner away from the walls.*

AZ.11.7 ***Electric hot water bottles*** *are operated for a period of one hour or until steady conditions are established, whichever occurs first.*

AZ.11.8 *The temperature rise of the* ***bladder*** *surface in contact with the floor of the test corner and the temperature rise of the upper surface of the* ***bladder*** *shall not exceed 45 K. The internal fluid shall be mixed before determining the maximum temperature. After heating but before measurement of the temperature, the internal fluid shall be mixed by inverting the* ***bladder*** *10 times and then allowing one minute to settle before determining temperatures of the* ***bladder****.*

A1
DOA
3/2/19

AZ.16 Leakage current and electric strength

AZ.16.3 ***Electric hot water bottles*** *with heating elements of* ***Class II construction*** *are subject to the following additional electric strength test.*

In a new sample of the appliance, ***double insulation*** *between the electric components and the liquid are separated and the* ***basic insulation*** *and the* ***supplementary insulation*** *are subject to the relevant electric strength test values of Table 7. For this test it is not permitted to test the two layers of insulation to the* ***reinforced insulation*** *electric strength test in lieu of conducting the separate tests on the* ***basic insulation*** *and* ***supplementary insulation****, if the layers cannot be separated specially prepared samples may need to be supplied.*

AZ.19 Abnormal operation

AZ.19.4 *The appliance is operated until steady conditions are established.*

AZ.19.13 *During the test of 19.4 the temperature of the*

– ***bladder*** *surface shall not exceed 90 ^{O}C; and*

– *liquid shall not exceed 10 K below its boiling point.*

AZ.22 Construction

AZ.22.7 *A new sample of the* ***electric hot water bottle*** *is tested as described in Annex F of BS 1970 modified as follows.*

The upper and lower plates shall incorporate cut outs to avoid any contact between the plates and any incorporated appliance inlet or other solid components.

At the conclusion of the test there shall be no sign of leakage or other detrimental effect.

COPYRIGHT

AZ.22.101 The **bladder** shall have adequate thickness.

Compliance is checked by the following test.

*In a new sample of the appliance, find the most likely thinnest point in the **bladder** material. If there is doubt as to the thinnest point, randomly choose ten points on a **bladder** in order to find the thinnest point. The thickness is then measured to a resolution of 0.01mm.*

A total of three specimens are subjected to this measurement.

All measurements shall exceed 0,7 mm.

AZ.22.102 Bonded or welded seams shall have adequate tensile strength.

Compliance is checked as described in Annex E of BS 1970 on a new sample of the appliance.

The tensile force so obtained shall be not less than 72 N.

AZ.22.103 The **bladder** shall have adequate strength against penetration from sharp objects.

Compliance is checked by the test procedure specified in 5.19 of AS/NZS ISO 8124.1.

At the conclusion of the test there shall be no leakage of liquid, there shall be no access to the liquid with the test probe B of IEC 61032 and there shall be no damage that would impair compliance with clause 8.

AZ.22.104 The **bladder** shall not be user refillable.

A1
DOA
3/2/19

Compliance is checked by inspection.

AZ.22.105 The **electric hot water bottle** shall be supplied with a dedicated **cradle** that has the means of connection to supply. The **cradle** shall obstruct at least 10% of the largest projected surface area of the **bladder** on two opposing sides. The **cradle** shall extend 25% of the longest distance across the largest surface of the **bladder** on two opposing sides. The surface coverage shall be maintained during charging.

The **cradle** shall be made of a rigid material.

Compliance is checked by inspection and measurement.

AZ.23 Internal wiring

AZ.23.101 The internal wiring shall remain intact during **normal operation**.

Consideration shall be given when conducting this test as to how the internal wiring and fluid will behave. The most onerous operation is to be conducted based on good engineering judgment. This test is to be conducted twice, once each on different samples at right angles to one another to ensure that the assessment is thorough.

Compliance is checked by the following test.

A new sample of the appliance is mounted on a flexing machine by supporting the appliance at four diagonally dispersed points of the enclosure. The cover, if supplied, can be suitable to hold the appliance.

*The unit is flexed by rotating the **electric hot water bottle** through 5000 flexings each of 360 degrees. One flexing being a rotation of 360 degrees in one direction and then back to its original position.*

A second test is taken on a new sample of the appliance, the new axis of rotation taken at 90° degrees to the axis of the preceding test.

COPYRIGHT

*The appliance is supplied at **rated voltage** during the test.*

There shall be no damage or displacement of conductors or leakage of liquid.

After this test clause 16.3 is repeated on each sample tested.

AZ.24 Components

AZ.24.101 The **electric hot water bottle** shall have a detachable **cradle** incorporating an appliance inlet that complies with AS/NZS 60320.1 as a Group 2 appliance inlet. The **electric hot water bottle** shall not incorporate an appliance inlet complying with the standard sheets of IEC 60320-3 or AS/NZS 60320.1.

Compliance is checked by inspection and appropriate tests.

A1 DOA 3/2/19

AZ.24.102 Devices incorporated in **electric hot water bottles** in order to comply with 19.4 shall not be self-resetting or manually resettable by disconnection of the appliance from the supply mains.

Compliance is checked by inspection.

AZ.25 Supply connection and external flexible cords

AZ.25.1 **Electric hot water bottles** shall not be fitted with a **supply cord** fitted with a plug or pins for insertion into socket outlets.

AZ.30 Resistance to heat and fire

AZ.30.101 The **bladder** and **cover** of **electric hot water bottles** shall be resistant to fire.

Compliance is checked by the following test.

*The **electric hot water bottle** is emptied of liquid by puncturing the enclosure or by some other suitable method. It is then supplied at **rated voltage**.*

*The **bladder** and **cover** shall not ignite or deform to such an extent that **live parts** become accessible to test probe B of IEC 61032.*

COPYRIGHT

Annex ANZ
(normative)
Normative references to international publications with their corresponding joint Australia/New Zealand publications

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

NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used.

	Publication	Year	Title	AS/NZS	Year
	IEC 60320-1: IEC 60320-1:2001/ AMD1:	2001 2007[2]	*Appliance couplers for household and similar general purposes – Part 1: General requirements*	60320.1	2012
A1 DOA 3/2/19	IEC 60320-3		*Appliance couplers for household and similar general purposes - Part 3: Standard sheets and gauges*		
	ISO 2439:		*Flexible cellular polymeric materials – Determination of hardness (indentation technique)*		
A1 DOA 3/2/19	ISO 8124-1	2014	*Safety of toys Part 1: Safety aspects related to mechanical and physical properties*	8124.1 A1	2010 2011
	BS 1970	2012	*Hot water bottles manufactured from rubber and PVC – Specification*		

[2] There exists a consolidated edition 2.1 (2007) that includes the second edition and its Amendment 1.

COPYRIGHT

NOTES

CONTENTS

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.

DISCLAIMER
This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60335-2-81 bears the edition number 3.1. It consists of the third edition (2015-04) [documents 61/4841/FDIS and 61/4896/RVD] and its amendment 1 (2017-10) [documents 61/5292/CDV and 61/5378A/RVC]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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 amendment 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.

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)

A bilingual version of this publication may be issued at a later date.

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

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric **foot warmers** and **heating mats** for household and similar purposes, their **rated voltage** being not more than 250 V.

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 by laymen in shops, in light industry and on farms, are within the scope of this standard.

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 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 102 This standard does not apply to

– appliances specifically intended for use under medical supervision;
– electric blankets and pads (IEC 60335-2-17);
– electrically heated carpets (IEC 60335-2-106);
– electrical heating appliances for breeding and rearing animals (IEC 60335-2-71).

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*
IEC 60320-1:2001/AMD1:2007[1]

_____

1 There exists a consolidated edition 2.1 (2007) that includes the second edition and its Amendment 1.