BS EN 60335-2-3:2016

BSI Standards Publication

Household and similar electrical appliances — Safety

Part 2-3: Particular requirements for electric irons

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National foreword

This British Standard is the UK implementation of EN 60335-2-3:2016. It is derived from IEC 60335-2-3:2012. It supersedes BS EN 60335-2-3:2002+A11:2010, which will be withdrawn on 20 May 2016.

The CEN common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags [C〉 〈C].

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

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

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Published by BSI Standards Limited 2016

ISBN 978 0 580 73821 0

ICS 13.120; 97.060

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 April 2016.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60335-2-3

January 2016

ICS 13.120; 97.060

English Version

Household and similar electrical appliances - Safety - Part 2-3: Particular requirements for electric irons (IEC 60335-2-3:2012 , modified)

Appareils électrodomestiques et analogues - Sécurité - Partie 2-3: Exigences particulières pour les fers à repasser électriques
(IEC 60335-2-3:2012 , modifiée)

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke - Teil 2-3: Besondere Anforderungen für elektrische Bügeleisen
(IEC 60335-2-3:2012 , modifiziert)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60335-2-3:2016 E

European foreword

This document (EN 60335-2-3:2016) consists of the text of IEC 60335-2-3:2012 prepared by IEC/TC 61 "Safety of household and similar electrical appliances", together with the common modifications 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) 2016-07-15
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-10-05

This document supersedes EN 60335-2-3:2002.

This document is to be used in conjunction with EN 60335-1:2012 including its amendments.

NOTE When “Part 1” is mentioned in this standard, it refers to EN 60335-1.

This Part 2 supplements or modifies the corresponding clauses in EN 60335-1:2012, so as to convert that publication into the European Standard: *Safety requirements for electric irons*.

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.

Clauses, subclauses, notes, tables, figures and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

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

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 60335-2-3:2012 was approved by CENELEC as a European Standard with agreed common modifications.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-3: Particular requirements for electric irons

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.
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This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This sixth edition cancels and replaces the fifth edition published in 2002 including its Amendment 1 (2004) and its Amendment 2 (2008). It constitutes a technical revision.

The principal changes in this edition as compared with the fifth edition of IEC 60335-2-3 are as follows (minor changes are not listed):

- some notes have been converted to normative text (20.1, 21.102, 22.106, 24.4, 25.5, 25.14);
- hoses that are subjected to the pressure test have been identified (22.7);
- the types of flexible cord that can be used are clarified (25.7).

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

FDIS	Report on voting
61/4342/FDIS	61/4353/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 electric irons.

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.

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 committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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.

The following differences exist in the countries indicated below:

- 5.7: The ambient temperature is 27 °C ± 5 °C (India).
- 6.1: Class 0 and Class 0I irons are not allowed (Indonesia, India).
- 11.8: For the test with the iron on the pointed support, all the temperature rise limits apply (USA).
- 13.2: The test circuit and some leakage current limits are different (India).
- 19.4: The test is also carried out with the iron on the pointed supports (USA).
- 21.101: The drop test is different (USA).
- 22.105: The endurance test is different (USA).
- 25.7: Polyvinyl chloride cords are not allowed (USA).
- 25.14: The flexing test is different (USA).

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 which 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 2-3: Particular requirements for electric irons

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric dry irons and **steam irons**, including those with a separate water reservoir or boiler having a capacity not exceeding 5 l, 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.

〈C〉 As far as practicable, this standard deals with the common hazards presented by appliances, which are encountered by all persons in and around the home. However, in general, it does not take into account

– children playing with the appliance,
– the use of the appliance by **very young children** and **young children**,
– user maintenance by **children**, including cleaning the appliance.

It is recognized that very vulnerable people may have needs beyond the level addressed in this standard. 〈C〉

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;
– additional requirements for pressure vessels may be specified by the national authorities responsible for the safety of pressure vessels.

NOTE 102 This standard does not apply to

– ironers (IEC 60335-2-44);
– appliances designed 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).

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation
operation of the appliance under the following conditions

The iron is placed on its **stand** and is operated with its **thermostat** at the highest setting.

If the iron does not have a **thermostat**, the surface temperature at the mid-point of the centre line of the **soleplate** is maintained at 250 °C ± 10 °C by switching the supply on and off, or at the highest temperature if it is lower.

Steam irons with a separate water reservoir or boiler are operated with the water reservoir or boiler filled with water.

Pressurized steam irons incorporating the boiler are operated with or without water, whichever is more unfavourable.

Other **steam irons** are operated empty.

3.101
steam iron
iron having means to produce and supply steam to the textile material during ironing

Note 1 to entry **Steam irons** may incorporate a means for blowing steam onto clothes.

3.102
vented steam iron
steam iron in which steam is produced when the water contacts the **soleplate**, the water reservoir being at atmospheric pressure

Note 1 to entry The water reservoir may be incorporated in the iron or connected to the iron by a hose.

3.103
pressurized steam iron
steam iron in which steam is produced in a boiler at a pressure exceeding 50 kPa

Note 1 to entry The boiler may be incorporated in the iron or connected to the iron by a hose.

3.104
instantaneous steam iron
steam iron in which small quantities of water are pumped from the water reservoir and in which steam is produced when the water contacts the walls of the boiler, the water reservoir and the boiler being at atmospheric pressure

Note 1 to entry The water reservoir and the boiler are connected to the iron by a hose.

3.105
cordless iron
iron that is connected to the supply only when placed on its **stand**

Note 1 to entry **Cordless irons** may be directly connected to the supply mains during ironing by a **detachable part** to which the **supply cord** is fixed.

3.106
soleplate
heated part of the iron which is pressed against the textile material while ironing

3.107
stand
heel of the iron or a separate part provided with the iron, on which the iron is placed when at rest

Note 1 to entry The separate water reservoir or boiler may serve as the **stand**.

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:*

If a **protective device** becomes open circuit during the tests of 21.101, the test is continued on a separate appliance.

NOTE 101 The test of 21.102 is carried out on a separate appliance. The additional test of 25.14 is carried out on a separate appliance.

5.3 *Addition:*

*For irons with a **thermostat**, the test of 21.101 is carried out before the test of Clause 11.*

The test of 22.102 is carried out during the test of Clause 11.

5.101 *Irons are tested as **heating appliances** even if they incorporate a motor.*

5.102 *If a **cordless iron** can also be directly connected to the supply mains during ironing, the relevant tests are applicable for both modes of operation.*

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Modification:*

Appliances shall be marked with their **rated power input**.

Addition:

Separate **stands** shall be marked with

– name, trademark or identification mark of the manufacturer or responsible vendor;
– model or type reference of the **stand**.

Stands of **cordless irons** shall be marked with their

– **rated voltage** or **rated voltage range**;
– **rated power input**.

〈C〉 When the provisions of footnote [c] to Table Z101 apply, the appliance shall be marked with

– – the substance of “CAUTION: Hot surface”, or
– – symbol IEC 60417-5041.

The warning shall be put on the surface of the appliance having the highest temperature and shall be visible during normal operation.

7.6 *Addition*:

[symbol IEC 60417-5041] Caution, hot surface

7.10 *Addition:*

NOTE Z101 The sound of the steam emitted is regarded as audible feedback. 〈C〉

7.12 *Addition:*

The instructions shall contain the substance of the following:

– the iron must not be left unattended while it is connected to the supply mains;
– the plug must be removed from the socket-outlet before the water reservoir is filled with water (for **steam irons** and irons incorporating means for spraying water);
– the filling aperture must not be opened during use. Instructions for the safe refilling of the water reservoir shall be given (for **pressurized steam irons**);
– the iron must only be used with the stand provided (for **cordless irons**);
– the iron is not intended for regular use (for travel irons);
– the iron must be used and rested on a flat, stable surface;
– when placing the iron on its stand, ensure that the surface on which the stand is placed is stable;
– the iron is not to be used if it has been dropped, if there are visible signs of damage or if it is leaking;
〈C〉 – keep the iron and its cord out of reach of children less than 8 years of age when it is energized or cooling down.

If symbol IEC 60417-5041 is marked on the appliance, the instructions shall state that surfaces are liable to get hot during use. 〈C〉

〖C〗 **7.14** *Addition:*

The height of symbol IEC 60417-5041 shall be at least 8 mm.

The height of the warning “CAUTION. Hot surface” shall be at least 4 mm (measured on the capital letters). 〖C〗

7.15 *Addition:*

For **steam irons** with a separate water reservoir or boiler, the total **rated power input** shall be marked on the part containing the supply terminals or **supply cord**.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.2 *Addition:*

NOTE 101 Connecting devices in **stands** of **cordless irons** are not considered to be socket-outlets.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Replacement:*

*Irons are placed on their **stands** on the floor of a test corner and away from the walls. However, the separate water reservoir or boiler of **steam irons** is placed as near to the walls as possible. Dull black painted plywood approximately 20 mm thick is used for the test corner.*

***Vented steam irons** with a separate water reservoir, **pressurized steam irons** and **instantaneous steam irons** are tested with the water reservoir empty and filled but without steam emission.*

*Irons, other than **cordless irons**, are also tested with the **soleplate** in the horizontal position placed on three pointed metallic supports that have a height of at least 100 mm. **Vented steam irons** with a separate water reservoir, **pressurized steam irons** and **instantaneous steam irons** are operated with the water reservoir or boiler filled.*

For appliances provided with an automatic cord reel, one-third of the total length of the cord is unreeled. The temperature rise of the cord sheath is determined as near as possible to the hub of the reel and also between the two outermost layers of the cord on the reel. However, if the cord reel is incorporated in a part that is moved during ironing, the cord is completely unreeled.

*For cord storage devices, other than automatic cord reels, that are intended to partially accommodate the **supply cord** while the appliance is in operation, 50 cm of the cord is unwound. However, for cord storage devices on parts that are moved during ironing, the cord is completely unwound. The temperature rise of the stored part of the cord is determined at the most unfavourable place.*

11.4 *Addition:*

*If the temperature rise limits are exceeded in appliances incorporating motors, transformers or **electronic circuits** and the power input is lower than the **rated power input**, the test is repeated with the appliance supplied at 1,06 times **rated voltage**.*

11.7 *Replacement:*

Irons are operated until steady conditions are established.

*When **vented steam irons** with a separate water reservoir, **pressurized steam irons** and **instantaneous steam irons** are tested with the iron placed on the pointed supports, steam is emitted in cycles, each cycle having a period of 10 s with steam emission and a period of 10 s with the steam emission interrupted.*

11.8 *Modification:*

*Except for **supply cords** connected to separate containers, the temperature rise limit for the insulation of wiring and **supply cords** is increased from 50 K to 60 K.*

〚C〛 *Replace the first paragraph of Part 1 by the following:*

“During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table Z101 in accordance with 11.Z101.”

*In Table 3, delete the row “External enclosure of **motor-operated appliances**, except handles held in normal use” and the corresponding footnotes.* 〚C〛

Addition:

*During the test with the iron placed on the pointed supports, only the temperature rises of the insulation of internal wiring and flexible cords are measured. However, the temperature rise limits apply to the water reservoir and the hose of **pressurized steam irons** and **instantaneous steam irons**. The temperature rise of the **accessible surface** of the hose shall comply with the temperature rise limits for handles that are held for short periods only in normal use. However, if a non-metallic hose is covered by textile material, the temperature rise of the surface of the textile material shall not exceed 80 K.*

*The temperature rise limits of motors, transformers and components of **electronic circuits**, including parts directly influenced by them, may be exceeded when the appliance is operated at 1,15 times **rated power input**.*

〈C〉 **Table Z101 – Maximum temperature rises for external surfaces under normal operating conditions**

Surface [a, b]	*Temperature rise of external surfaces* *K*	
	Surfaces of separate tanks and boilers likely to be situated on the floor	*Surfaces of other parts of appliances situated on a work surface* [c]
Bare metal	*40*	*45*
Coated metal [d]	*45*	*55*
Glass and ceramic	*55*	*60*
Plastic and plastic coating > 0,3 mm [e]	*60*	*65*

[a] The following surfaces or elements shall not be taken into consideration:

- hot functional surface: surface which is intentionally heated by an internal heat source and which has to be hot to carry out the function for which the equipment is intended to be used;

  EXAMPLE The soleplate of an iron regardless of the thickness of the soleplate, including the metallic side parts and metallic functional ironing tips, if any;
- adjacent surface: a surface adjacent to a functional surface. The adjacent surface and the functional surface may consist of the same piece of material or are in thermal contact and have similar thermal properties. The adjacent surface is not heated intentionally during use of the product. However, as it is adjacent to the functional surface and may become hot through conduction, its temperature will be in the range between the functional and a touchable surface.

  Examples are: the stand of an iron on a separated boiler and surface of the enclosure immediately surrounding the water heater enclosure plus 50 mm on all sides of a separated boiler, any part of the enclosure of an iron surrounding the soleplate plus 25 mm.
- handles or control knobs including keypads, keyboards and the like: part of the equipment that a user needs to touch to operate or adjust the equipment

The equipment has to be installed according to the manufacturer's instructions.

[b] When the thickness of the plastic coating does not exceed 0,3 mm, the temperature rise limits of the coated metal or of glass and ceramic material apply.

[c] When, due to the construction or dimensional limitations of the appliance, the required values cannot be met, the maximum temperature rise shall not be higher than twice the values indicated. In such cases, a warning shall be marked on the relevant surface of the appliance.

[d] Metal is considered coated when a coating having a minimum thickness of 80 µm made by enamel or non substantially plastic coating is used.

[e] The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.

11.Z101 For the measurement of temperature rises, the instructions from the manufacturer on where the appliance has to be situated during normal operations shall be followed.

Temperature rises are not measured on the underside of appliances intended to be used on a working surface or floor. 〈C〉

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 *Modification:*

*The test for **steam irons**, other than those with a separate water reservoir or boiler, is carried out as follows.*

*The iron is placed in the filling position according to the instructions and filled with water containing approximately 1 % NaCl. A further quantity of 0,1 l is steadily poured into the filling opening over a period of 1 min. The iron is then placed on its **stand** and subjected to the electric strength test of 16.3. The iron is left on its **stand** for 10 min after which the electric strength test is repeated.*

*The iron, while still filled, is operated at **rated power input** for 1 min under **normal operation**. It shall then withstand the electric strength test of 16.3.*

***Cordless irons** are also filled with the saline solution while resting on their **stands**, if the iron can easily be filled in this position.*

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Modification:*

*The tests of 19.2 and 19.3 are not carried out. The test of 19.5 is only carried out on separate boilers of **steam irons**.*

Addition:

***Cordless irons** are also subjected to the test of 19.101.*

19.4 *Modification:*

*The test is carried out at **rated power input**.*

Addition:

***Steam irons** are tested with or without water, whichever is more unfavourable.*

*The test is only carried out with the iron resting on its **stand**.*

Any control that limits the pressure during the test of Clause 11 is rendered inoperative.

19.7 *Addition:*

The test is carried out for 5 min unless the motor is kept switched on by hand.

19.101 ***Cordless irons** are operated under **normal operation** at **rated power input** until the **thermostat** operates for the first time. The iron is then placed on its **stand** in the position that most adversely affects the material of the **stand**.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 *Replacement:*

Irons shall have adequate stability.

Compliance is checked by the following test, which is carried out with the appliance not connected to the supply mains.

*Irons incorporating a **stand** are placed on their **stand** on a plane inclined at* 〚C〛 *an angle of 15°* 〚C〛 *to the horizontal, the cord resting on the inclined plane in the most unfavourable position. Irons supplied with a separate **stand** are placed on the **stand** on a plane inclined at an angle of 15° to the horizontal.*

Appliances intended to be filled with liquid by the user in normal use are tested empty or filled with the most unfavourable quantity of water up to the capacity indicated in the instructions.

NOTE The **stand** can be tapped to overcome static friction between the iron and the **stand**.

*If the iron overturns or slips off the **stand** in one or more positions, it is tested as specified in Clause 11 in all these positions.*

The temperature rise shall not exceed the values specified in Table 9.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 *Addition:*

Compliance is also checked by the tests of 21.101 and 21.102.

21.101 *The iron is operated under **normal operation** at **rated power input** and, except for **cordless irons**, the **soleplate** temperature is maintained under these conditions throughout the test.*

*The iron is then suspended by its handle with the **soleplate** in the horizontal position. It is dropped from a height of 40 mm onto a rigidly supported steel plate having a thickness of at least 15 mm and a mass of at least 15 kg. The test is carried out 1 000 times at a rate not exceeding 20 drops per min.*

The test is conducted so that the iron rests on the steel plate for approximately 15 % of the time.

NOTE The iron is suspended so that the impact energy is only influenced by its mass.

*After the test, the iron shall not be damaged to such an extent that compliance with 8.1, 15.2 and Clause 29, is impaired. In case of doubt, **supplementary insulation** and **reinforced insulation** is subjected to the electric strength test of 16.3.*

21.102 *A separate sample of the iron is supplied at **rated voltage** with the **thermostat** set to the highest position. When the **thermostat** operates, the iron is disconnected from the supply.*

The hand-held part of the iron is then placed in a sling that is constructed by tying together the four corners of a single layer of cheesecloth. The lowest point of the sling is suspended at a height of 900 mm above a horizontal hardwood board approximately 20 mm thick placed on a concrete or similar hard surface.

The iron in the sling is dropped from a stationary position. The test is carried out three times, the iron being positioned so that it falls onto the board first on the right side, then on the left side and subsequently on its heel. The iron is reheated prior to each drop.

*After the test, the iron shall withstand the electric strength test of 16.3, **steam irons** first being filled with water as specified in the instructions and allowed to rest for 10 min on their **stands**.*

The iron shall not be damaged to such an extent that compliance with 8.1 and 19.4 is impaired.

22 Construction

This clause of Part 1 is applicable except as follows.

22.7 *Replacement:*

Pressurized steam irons and **instantaneous steam irons** shall incorporate adequate safeguards against the risk of excessive pressure.

If jets of steam or hot water are emitted through **protective devices**, the electrical insulation shall not be affected or the user exposed to a hazard.

Compliance is checked by inspection and by the following test.

*For **pressurized steam irons**, the maximum pressure occurring during the test of Clause 11 with the boiler filled but without steam emission is measured. All pressure-regulating devices that operated during the test are rendered inoperative and the pressure shall not exceed three times the previously measured value. Any pressure-limiting **protective device** is then rendered inoperative and the pressure in the boiler is raised hydraulically to five times the pressure measured originally or twice the pressure measured with the pressure-regulating devices rendered inoperative, whichever is higher. This pressure is maintained for 1 min. There shall be no leakage from the appliance. Hoses that are subjected to the pressure within the boiler when the iron is placed on its rest or during normal use of the appliance are also subjected to the hydraulic pressure test.*

Pressurized steam irons *in which the device regulating the steam supply is within the boiler are operated as specified in Clause 11 but with all pressure-regulating devices operating during the test of Clause 11 rendered inoperative. All vents in the* ***soleplate*** *are sealed and the device regulating the steam supply is opened. There shall be no leakage from the hose except at an intentionally weak place within the enclosure of the boiler. If this occurs, the test is repeated on another appliance that shall also leak in the same way.*

All vents in the ***soleplate*** *of* ***instantaneous steam irons*** *are sealed and the pressure in the water reservoir is raised hydraulically until the pressure-limiting* ***protective device*** *operates. The pressure shall not exceed 50 kPa. The outlet through the* ***protective device*** *is then sealed and the pressure is raised to 100 kPa and maintained at this value for 1 min. There shall be no leakage from the appliance.*

22.101 Irons shall be provided with a **stand**.

Compliance is checked by inspection.

22.102 Steam irons shall be constructed so that there is no spillage of water or sudden jets of steam or hot water likely to expose the user to a hazard when the iron is used in accordance with the instructions.

When removing the filling cap of boilers, the pressure shall be relieved in a controlled manner before the cap is removed completely, to avoid the emission of jets of steam or hot water in a manner likely to expose the user to a hazard.

Compliance is checked by inspection during the test of Clause 11 and by removing the filling cap at the end of the test.

22.103 The boiler of **steam irons** with a separate boiler shall incorporate at least one **non-self-resetting thermal cut-out** that is only accessible by means of a **tool**.

Compliance is checked by inspection.

22.104 Pressure-limiting **protective devices** that operate during the tests of 19.4 and 22.7 shall have an inlet aperture at least 5 mm in diameter or 20 mm^2 in area and a width of at least 4 mm. The area of the aperture at the outlet shall not be less than that of the aperture at the inlet.

Compliance is checked by measurement.

22.105 The connection contacts of **cordless irons** shall be constructed so that any electrical or mechanical failure occurring in normal use will not give rise to a hazard.

Compliance is checked by the following test.

The two live pins of the iron are connected together and an external resistive load is connected in series with the supply. The external load is such that the current is 1,1 times ***rated current*** *when the iron is supplied at* ***rated voltage****.*

The iron is placed on its ***stand*** *and withdrawn 50 000 times, at a rate of 10 times per minute. The test is continued for a further 50 000 times without current flowing.*

After the test, the iron shall be fit for further use and compliance with 8.1, 16.3, 27.5 and Clause 29 shall not be impaired.

22.106 Cordless irons that may be directly connected to the supply mains during ironing shall be constructed so that the iron is adequately retained to the **stand** during ironing with the **stand** connected.

Compliance is checked with any locking device engaged before carrying out the test.

*The force necessary to withdraw the **stand** from the iron shall be at least 30 N.*

22.107 Pressurized steam irons incorporating more than one water reservoir connected together shall incorporate a pressure-limiting **protective device** in each reservoir containing a heating element.

Pressurized steam irons incorporating more than one boiler connected together shall incorporate a pressure-limiting **protective device** in each boiler.

Compliance is checked by inspection.

〖C〗 **22.Z101** For irons fitted with a **supply cord**, other than those with a separate reservoir or boiler, the free length of the **supply cord**, measured between the point where the cord or the cord guard enters the iron and the point where the cord or cord guard enters the plug, shall be more then 1,9 m. 〈C〗

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 *Addition:*

Switches that control steam or water emission are subjected to 50 000 cycles of operation.

24.4 *Addition:*

This requirement is not applicable to the connection between the iron and the **stand** of **cordless irons**.

24.101 Any component incorporated in an iron for compliance with 19.4 shall not be self-resetting and shall only be accessible by means of a **tool**.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.5 *Addition:*

Type Z attachment is allowed for travel irons and **cordless irons**.

Type Z attachment is not allowed for **cordless irons** that may also be directly connected to the supply mains during ironing.

25.7 *Addition:*

Braided cords (code designation 60245 IEC 89) may be used.

25.14 *Modification:*

Instead of the load specified for the cord, the cord is loaded with a mass of 2 kg.

Instead of the number of flexings specified, the number of flexings is 20 000.

*The test is not carried out on **cordless irons** unless the iron can also be directly connected to the supply mains during ironing.*

Addition:

*For **steam irons** with a separate water reservoir or boiler, the test is made on the steam hose and the **interconnection cord** together. If they are contained in one sheath or otherwise attached to each other, the assembly is not turned through an angle of 90°.*

The test shall not result in

– *loosening of the hose;*
– *damage to the hose to such an extent that compliance with this standard is impaired;*
– *leakage from the hose.*

Appliances are also subjected to the following test while mounted on an apparatus similar to that of Figure 8. This test is carried out on a separate appliance.

*The **supply cord** is suspended vertically from the appliance and loaded so that a force of 10 N is applied. The oscillating member is moved through an angle of 180° and back to the initial position. The number of flexings is 2 000, the rate of flexing being six per minute.*

*The appliance is mounted so that the direction of flexing corresponds to that most likely to occur when the **supply cord** is wound around it for storage.*

*The test is not carried out if it is unlikely that the cord will be wrapped around the appliance, for example **cordless irons** and irons with a separate water reservoir.*

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.1 *Addition:*

*For irons with **thermostats**, the temperature rises occurring during Clause 19 are not taken into consideration.*

30.2.3 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Annexes

The annexes of Part 1 are applicable.

Bibliography

The bibliography of Part 1 is applicable except as follows:

Addition:

IEC 60335-2-44, *Household and similar electrical appliances – Safety – Part 2-44: Particular requirements for ironers*

〈C〉 NOTE Harmonized as EN 60335-2-44. 〈C〉

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