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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety – Part 2-3: Particular requirements for electric irons

Appareils électrodomestiques et analogues – Sécurité – Partie 2-3: Exigences particulières pour les fers à repasser électriques

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Appareils électrodomestiques et analogues – Sécurité – Partie 2-3: Exigences particulières pour les fers à repasser électriques

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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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IEC 60335-2-3 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2012 and Amendment 1:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) alignment with IEC 60335-1:2020;
b) deletion or conversion of some notes to normative text (Clause 1, 5.2, 21.101);
c) addition of external accessible surface temperature limits (3.6.103, 11.3, 11.8);
d) clarification of surfaces likely to be contacted when gripping a handle (22.13);
e) clarification of the applicability of 30.2.2 and 30.2.3 (30.2, 30.2.3).

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The text of this International Standard is based on the following documents:

Draft	Report on voting
61/6670/FDIS	61/6746/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) 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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

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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.

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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.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

https://www.iec.ch/tc61/supportingdocuments

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

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 can 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 publications, basic safety publications and group safety publications 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.

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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

– IEC standards published by TC 59 concerning methods of measuring performance;
– CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
– CISPR 14-2 concerning electromagnetic immunity;
– IEC standards published by TC 111 concerning environmental matters.

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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 part of IEC 60335 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 including direct current (DC) supplied appliances and **battery-operated appliances**.

Appliances not intended for normal household use, but which nevertheless can 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, which 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.

Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can be necessary;
– in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national authorities responsible for the safety of pressure vessels. and similar authorities.

This standard does not apply to

– ironers (IEC 60335-2-44);
– ironing boards;
– 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 except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

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3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Addition:*
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 with respect to the compliance criteria for each test.

Note 1 to entry: It can be necessary to conduct a test with and without water to determine the more unfavourable condition.

Other **steam irons** are operated empty.

3.5 Definitions relating to types of appliances

3.5.101
steam iron
iron having means to produce and supply steam to the textile material during ironing

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

3.5.102
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 can be incorporated in the iron or connected to the iron by a hose.

3.5.103
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 can be incorporated in the iron or connected to the iron by a hose.

3.5.104
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.

3.5.105
cordless iron
iron that is connected to the supply only when placed on its **stand**

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

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3.6 Definitions relating to parts of appliances

3.6.101
soleplate
heated part of the iron which is pressed against the textile material while ironing

3.6.102
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**.

3.6.103
functional surface
surface that is intentionally heated by an internal heat source and has to be hot to carry out the function for which the appliance is intended

Note 1 to entry: An example is the **soleplate**.

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.*

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.

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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**.

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 iron must not be stored until it has cooled;
– 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, or decalcifying, or rinsing, or inspection apertures that are under pressure shall not be opened during use (for **steam irons** with pressurized compartments only);
– 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.

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.

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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.*

11.3 *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 101 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

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 *Modification:*

Irons are operated until steady conditions are established.

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*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:*

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.

*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.*

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**.*

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Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	*Temperature rise of external accessible surfaces* *K*		
	Temperature rise of surfaces of parts intended to be used below the work surface and not a part of the hand-held unit [a]	*Temperature rise of surfaces adjacent to a handle of a hand-held unit that could be unintentionally touched when gripping the handle*[b]	*Temperature rise of all other surfaces* [a, c, d, e, f]
Bare metal	*38*	*42*	*42*
Coated metal [g]	*42*	*49*	*49*
Glass and ceramic	*51*	*56*	*56*
Plastic and plastic coating > 0,4 mm [h, i]	*58*	*62*	*62*

NOTE The temperature limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

[a] *Temperatures rises are not measured on surfaces inaccessible to the hemispherical end of a 75 mm diameter probe applied perpendicular to the surface being evaluated. The probe is applied with a force not exceeding 1 N.*

[b] *See 22.13.*

[c] *Temperature rises on **functional surfaces** and surfaces within 12 mm of the **functional surfaces** are not measured.*

[d] *Temperatures rises are not measured on surfaces of separate **stands** in direct contact with the **functional surface** and the surfaces within 25 mm of the **functional surface** of the iron placed on the **stand**.*

[e] *Temperature rise limits of accessible external surfaces of units that are not hand-held and that enclose a boiler or heated water reservoir are increased by 10 K.*

[f] *Temperature rises are not measured on surfaces of a hand-held unit containing a **soleplate**.*

[g] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel or non-substantially plastic coating is used.*

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

[i] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

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.

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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 the spillage solution. 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 spillage 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.*

NOTE It can be necessary to conduct the test with and without water to determine the more unfavourable condition.

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

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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 an angle of 10° to the horizontal, the cord resting on the inclined plane in the position resulting in the least stable condition. 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 are tested empty or filled with the quantity of water up to the capacity indicated in the instructions resulting in the least stable condition.

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.

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