भारतीय मानक

Indian Standard

IS 302 (Part 2/Sec 3) : 2024
IEC 60335-2-3 : 2022

घरेलू एवं समान विद्युतीय साधित्र — सुरक्षा

भाग 2 विशेष अपेक्षाएँ

अनुभाग 3 विद्युत इस्त्री

(दूसरा पुनरीक्षण)

Household and Similar Electrical Appliances — Safety

Part 2 Particular Requirements

Section 3 Electric Irons

(Second Revision)

ICS 13.120; 97.060

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NATIONAL FOREWORD

This Indian Standard (Part2/Sec 3) (Second Revision) which is identical to IEC 60335-2-3 : 2022 'Household and similar electrical appliances — Safety — Part 2-3: Particular requirements for electric irons' issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Electrical Appliances Sectional Committee and approval of the Electrotechnical Division Council.

This standard was first published in 1992 and revised in 2007. This revision has been brought out to harmonize with the latest version of IEC 60335-2-3.

This standard covers the safety requirements of electric iron. This standard does not cover the performance requirements, which are covered under a separate standard (*see* IS 366 'Electrical irons').

This Part 2 is to be used in conjunction with IS 302 (Part 1) : 2024 'Household and Similar Electrical Appliances — Safety: Part 1 General Requirements (*seventh revision*)'.

NOTE — When 'Part 1' is mentioned in this standard, it refers to IS 302 (Part 1).

This standard supplements or modifies the corresponding clauses in IS 302 (Part 1), so as to convert that publication into the Indian standard: Safety requirements for electric irons.

When a particular subclause of Part 1 is not mentioned in this standard, 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.

NOTES

1 The following numbering system is used:

a) Subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
b) 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; and
c) Additional annexes are lettered AA, BB, etc.

2 The following print types are used:

a) Requirements: in roman type;
b) Test specifications: in italic type; and
c) Notes: in small roman type.

Should however, any deviation exist between IS 302 (Part 1) : 2024 and this standard, the provisions of the latter shall apply.

This revision includes the following significant technical changes with respect to the previous version (minor changes are not listed):

a) Deletion or conversion of some notes to normative text (**1, 5.2, 21.101, 22.106, 24.4, 25.5, 25.14**);
b) Addition of external accessible surface temperature limits (**3.6.103, 11.3, 11.8**);
c) Clarification of surfaces likely to be contacted when gripping a handle (**22.13**);
d) Clarification of the applicability of 30.2.2 and 30.2.3 (**30.2**);
e) Addition of direct current (d.c.) supplied appliances and battery-operated appliances (**1**);
f) Modifications in marking and instructions (**7**);
g) Introduction of a new Clause **12** Charging of metal-ion batteries;
h) Addition of mechanical strength test for iron (**21.102**);

j) Modifications in test to ensure incorporation of adequate safeguards against the risk of excessive pressure (**22.7**);

k) Modifications in protective device requirements (**22.107**);

m) Figure of Probe for measuring surface temperatures added;

n) Figure of simulated hand added;

p) Figure of feeler gauge added;

q) Figure of application of the simulated hand in a handle with closed ends added; and

r) Figure of application of the simulated hand in a handle with an open end added.

The text of IEC standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this standard, reference appears to International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IEC 60245 (all parts) Rubber insulated cables — Rated voltages up to and including 450/750 V	IS 9968 (Part 1) : 1988 Specification for elastomer insulated cables: Part 1 For working voltages up to and including 1 100 volts (*first revision*)	Technically Equivalent
IEC 60335-1 Household and similar electrical appliances — Safety — Part 1: General requirements	IS 302 (Part 1) : 2024/IEC 60335-1 : 2020 Household and similar electrical appliances — Safety: Part 1 General requirements (*seventh revision*)	Identical
IEC 60584-1 Thermocouples — Part 1: EMF specifications and tolerances	IS 16923 (Part 1) : 2018/ IEC 60584-1 : 2023 Thermocouples: Part 1 EMF specifications and tolerances (*first revision*)	Identical

This standard is one among the IS 302 series of Indian Standards on safety of household and similar electrical appliances. Part 1 of the series specifies the general requirements, and sections of Part 2 of the series specify the particular requirements for the safety of different types of household and similar electrical appliances. Information on IS 302 (Part 1) and all sections of the IS 302 (Part 2) series, published under the general title 'Household and similar electrical appliances — Safety', can be accessed from the BIS website www.bis.gov.in .

Only the English language text has been retained while adopting it in this Indian Standard, and as such, the page numbers given here are not the same as in the IEC publication.

India specific changes have been made to the adopted IEC 60335-2-3 as outlined in National Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding of numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

CONTENTS

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.

Indian Standard

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES — SAFETY

PART 2 PARTICULAR REQUIREMENTS

SECTION 3 ELECTRIC IRONS

(Second Revision)

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*

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.

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.

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.

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.

*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**.*

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.

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**.*

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.

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* ***stand*** *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.*

22.13 *Replacement:*

Appliances shall be constructed so that when handles are gripped in normal use, contact is unlikely between the operator's hand and parts that could be unintentionally touched having a temperature rise exceeding the value specified in Table 3 for handles which are held for short periods only in normal use and Table 101 for surfaces adjacent to a handle of a hand-held unit that could be unintentionally touched when gripping the handle.

Compliance is checked by inspection, measurement and, if necessary, by determining the temperature rise as follows.

Parts adjacent to the handle that could be unintentionally touched are those parts within 13 mm of the bottom of the hand. These are identified by use of a simulated hand as shown in Figure 102 in combination with a feeler gauge as shown in Figure 103 applied as shown in Figure 104 or Figure 105. The simulated hand is inserted in the handle opening as shown in Figure 104 or Figure 105. If the shape of the underside of the handle prevents contact of the simulated hand at both points A and B simultaneously, the simulated hand is moved as permitted by the opening first with one point and then with the other point in contact with the underside of the handle.

Temperature measurements are made on the surface defined by the vertical projection of the handle or gripping surface onto the body of the iron where the feeler gauge makes contact with surface plus 25 mm in all directions.

In situations where the simulated hand cannot be placed under the handle (such as palm-grip type irons or travel/compact irons), the temperature measurements are made on the surface defined by the vertical projection of the handle or gripping surface onto the body of the iron plus 25 mm in all directions.

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 can 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 boiler connected together shall incorporate a pressure-limiting **protective device** in each boiler.

Compliance is checked by inspection.

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 can 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 *Modification:*

Replace the two dashed items in the compliance criteria with the following:

– *for electric irons, 30.2.2 is applicable.*

30.2.2 *Modification:*

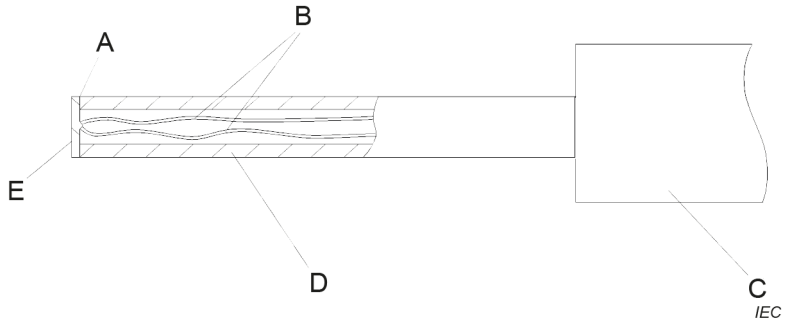
*The exclusion of **hand-held appliances** is not applicable.*

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K

C handle arrangement permitting a contact force of 4 N ± 1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with flat contact face

Figure 101 – Probe for measuring surface temperatures

Dimensions in millimetres

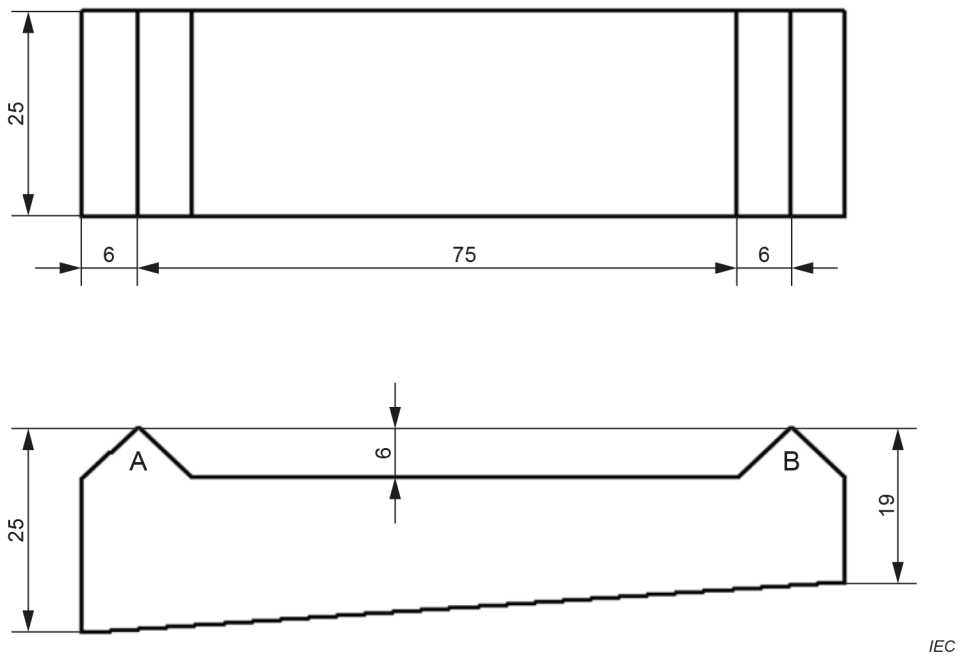


Figure 102 – Simulated hand

Dimensions in millimetres

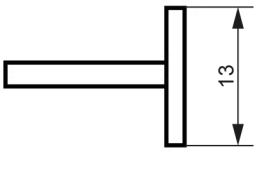
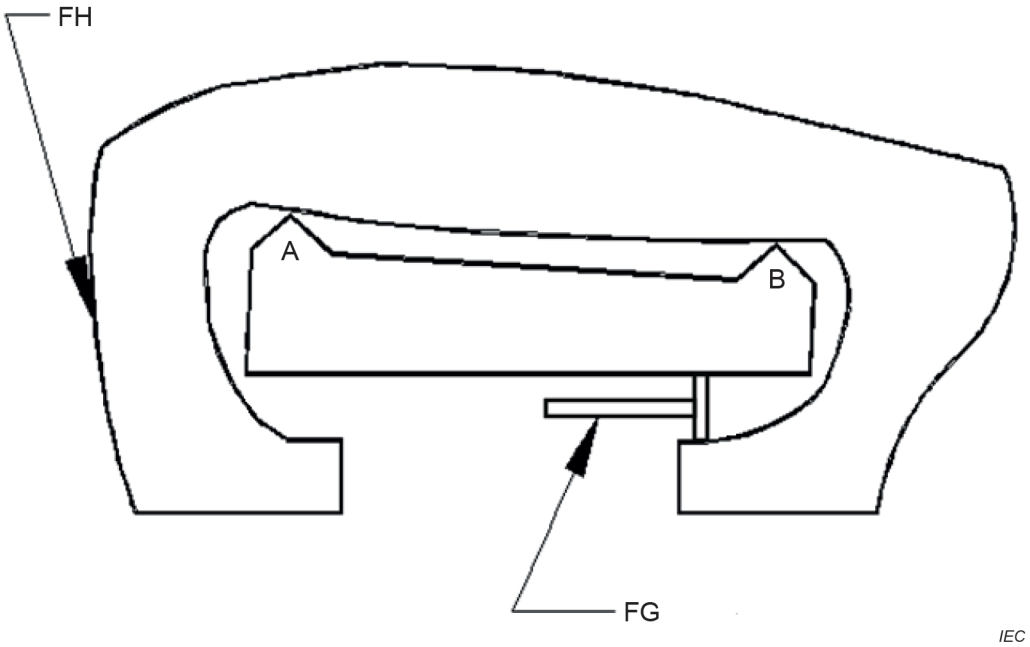


Figure 103 – Feeler gauge

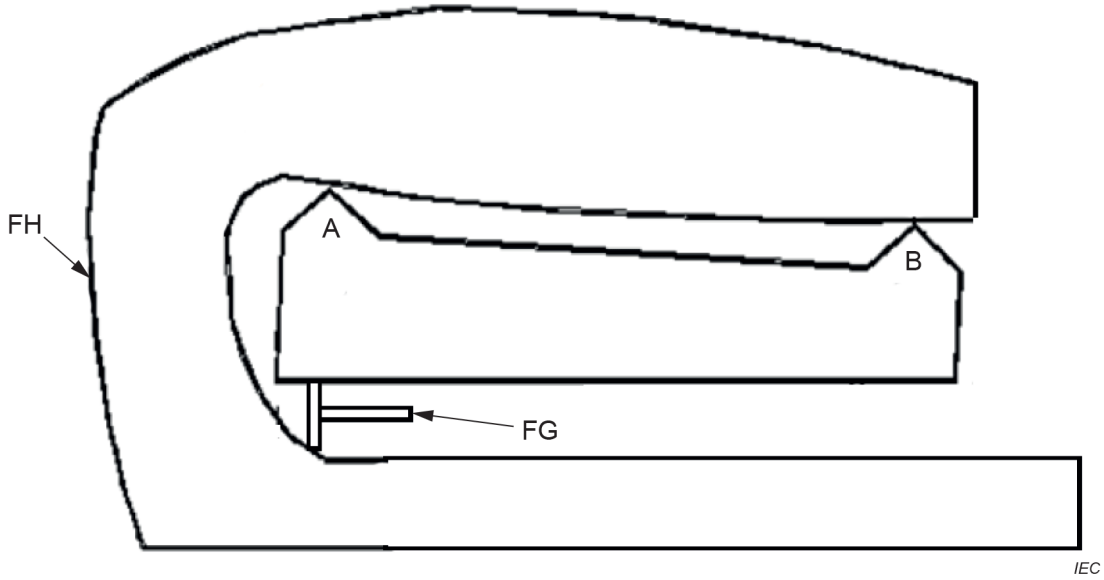


Key

FH front of handle

FG feeler gauge

Figure 104 – Application of the simulated hand in a handle with closed ends



Key

FH front of handle

FG feeler gauge

Figure 105 – Application of the simulated hand in a handle with an open end

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*

_____

NATIONAL ANNEX A

(*National Foreword*)

The National Annex A of Part 1 is applicable.

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