IEC 60311

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electric irons for household or similar use – Methods for measuring performance

Fers à repasser électriques pour usage domestique ou analogue – Méthodes de mesure de l'aptitude à la fonction

IEC 60311:2002-09(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC IRONS FOR HOUSEHOLD OR SIMILAR USE – METHODS FOR MEASURING PERFORMANCE

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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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International Standard IEC 60311 has been prepared by subcommittee 59E: Ironing and pressing appliances, of IEC technical committee 59: Performance of household electrical appliances.

This bilingual edition (2014-06) corresponds to the English version, published in 2002-09.

This fourth edition of IEC 60311 cancels and replaces the third edition published in 1995 and its amendment 1 (1997) and amendment 2 (1999).

The text of this standard is based on the third edition, amendments 1 and 2 and the following documents:

FDIS	Report on voting
59E/148/FDIS	59E/149/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.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes B and C form an integral part of this standard.

Annexes A and D are for information only.

In this standard, the following print types are used:

— *test specifications: in italic type*

— notes: in small roman type

— other texts: in roman type

Words in **bold** in the text are defined in clause 3.

The committee has decided that the contents of this publication will remain unchanged until February 2005. At this date, the publication will be

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- withdrawn;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

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

ELECTRIC IRONS FOR HOUSEHOLD OR SIMILAR USE – METHODS FOR MEASURING PERFORMANCE

1 Scope

This International Standard applies to electric irons for household or similar use.

The purpose of this standard is to state and define the principal performance characteristics of electric irons for household or similar use which are of interest to the user and to describe the standard methods for measuring these characteristics.

Electric irons covered by this standard include

– dry irons;
– steam irons;
– spray irons;
– steam irons with separate water reservoir or boiler/generator having a capacity not exceeding 5 l.

This standard is concerned neither with safety nor with performance requirements.

NOTE The primary characteristic to be taken into account in assessing the performance of an electric iron is its basic ability to produce a smooth finish to textile materials, without risk of scorching or other damage. It has not proved possible to devise a single method which will measure this characteristic in a consistently reproducible way and measurements have therefore been included to check certain factors, such as the temperature of the sole-plate at the mid-point, sole-plate temperature distribution, etc., which affect the basic characteristic. In evaluating the results, it must be realized that, while a very exceptional result in any one of them may significantly affect performance, there is considerable latitude in the combination of results which will give satisfactory ironing performance, and too much significance should not be attached to minor differences in any one result.

2 Normative references

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

IEC 60051-1:1997, *Direct acting indicating analogue electrical measuring instruments and their accessories – Part 1: Definitions and general requirements common to all parts*

IEC 60454-3-3:1998, *Pressure-sensitive adhesive tapes for electrical purposes – Part 3: Specifications for individual materials – Sheet 3: Polyester film tapes with rubber thermoplastic adhesive*

IEC 60734:2001, *Household electrical applicances – Performance – Hard water for testing*

ISO 105-F:1985, *Textiles – Tests for colour fastness – Part F: Standard adjacent fabrics*

ISO 1518:1992, *Paints and varnishes – Scratch test*

ISO 2409:1992, *Paints and varnishes – Cross-cut test*

ISO 3758:1991, *Textiles – Care labelling code using symbols*

ISO 3801:1977, *Textiles – Woven fabrics – Determination of mass per unit length and mass per unit area*

ISO 6330:2000, *Textiles – Domestic washing and drying procedures for textile testing*

ISO 7211-2:1984, *Textiles – Woven fabrics – Construction – Methods of analysis – Part 2: Determination of number of threads per unit length*

ISO 9073-2: 1995, *Textiles – Test methods for nonwovens – Part 2: Determination of thickness*

ISO 13934-1:1999, *Textiles – Tensile properties of fabrics – Part 1: Determination of maximum force and elongation at maximum force using the strip method*

3 Terms and definitions

For the purposes of this standard the following definitions apply.

3.1
electric iron
portable appliance, which has an electrically heated sole-plate and is used for ironing textile materials

NOTE In this standard, "electric iron" is referred to as "iron".

3.2
thermostatic iron
iron fitted with a thermostat, the setting of which can be adjusted manually to alter the sole-plate temperature over a range and maintain it within certain limits

3.3
electric iron with non-self-resetting thermal cut-out
iron fitted with a non-self-resetting thermal cut-out, such as a fusible link, for the purpose of disconnecting the heating element if the iron attains excessive temperature

3.4
dry iron
iron having neither means to produce and supply steam nor to spray water onto textile materials while ironing

3.5
steam iron
iron having means to produce and supply steam to textile materials while ironing. It can be provided with means to supply a shot of steam

3.5.1
shot-of-steam iron
iron provided with means to supply a shot of steam to textile materials while ironing

3.5.2
shot of steam
single emission of an increased volume of steam from the sole-plate for a short duration

3.5.3
vented steam iron
steam iron in which steam is produced when the water contacts the sole-plate, the water reservoir being at atmospheric pressure.

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

3.5.4
pressurized steam iron
steam iron in which steam is produced in a boiler at a pressure exceeding 50 kPa

NOTE The boiler may be incorporated in the iron or connected by a hose to the iron.

3.5.5
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/generator, the water reservoir being at atmospheric pressure

NOTE The water reservoir and the boiler are connected to the iron by a tube.

3.6
spray iron
iron provided with means to spray water onto textile materials while ironing

3.7
rated voltage

3.7.1
rated voltage
voltage assigned to the iron by the manufacturer

3.7.2
rated voltage range
range of voltage assigned to the iron by the manufacturer, expressed in terms of its lower and upper limits

3.8
rated input
input power of the iron under normal operating conditions assigned by the manufacturer

3.9
sole-plate
flat surface of the iron, which is heated electrically and pressed against textile materials while ironing

3.10
mid-point
point of the sole-plate in the geometrical centre of the centre-line of the sole-plate.

If this point is on a steam outlet, a groove or a cover, the nearest point of the sole-plate on the centre-line as is practicable is chosen

3.11
upright position
vertical still position for a heel-standing iron or normal resting position according to the manufacturer's instructions for other than a heel-standing iron

3.12
cordless iron

3.12.1
cordless iron
iron which is connected to the supply mains only when placed on its stand

3.12.2
cordless iron having a mains supply attachment
cordless iron which is provided, in addition, with a detachable part to which the supply cord is fixed, and which can be connected to the supply mains directly during ironing

3.13
auto switch-off device
device provided by the manufacturer to interrupt the heating element if the iron is not moved for a stated period of time

4 Measurements for various types of irons

The performance of the iron is determined by the measurements indicated in table 1. Relevant measurements for various types of irons are indicated in table 1 by x.

Measurements are performed in the order given in table 1.

Table 1 – Measurements of various types of irons

Item of measurement	Thermo-static dry irons	Thermostatic dry irons with non-self-resetting thermal cut out	Thermo-static steam irons	Thermo-static steam irons with non-self resetting thermal cut out	Cordless irons	Cordless irons having a mains supply attach-ment
6.1 (Determination of mass)	x	x	x	x	x	x
6.2 (Measurement of length of the supply cord)	x	x	x	x	x	x
7.1 (Measurement of heating-up time)	x	x	x	x	x	x
7.2 (Measurement of initial overswing temperature and heating-up excess temperature)	x	x	x	x	x	x
7.3 (Measurement of sole-plate temperature)	x	x	x	x	x	x
7.4 (Determination of the hottest point)	x	x	x	x	x	x
7.5 (Measurement of temperature distribution)	x	x	x	x	x	x
7.6 (Measurement of cyclic fluctuation of temperature of the hottest point)	x	x	x	x	x	x
8 (Assessment of spray function)	(x)	(x)	(x)	(x)	(x)	(x)
9.1 (Measurement of heating-up time for steaming operation)	x	x	x	x	x	x
9.2 (Measurement of steaming time)			x	x		x
9.2 (Measurement of steaming rate)			x	x	x	x
9.3 (Determination of mass of a shot of steam)			(x)	(x)	(x)	(x)
10 (Assessment of smoothing)	x	x	x	x	x	x
10.4 (Ironing with shot of steam)			(x)	(x)	(x)	(x)

Item of measurement	Thermo-static dry irons	Thermostatic dry irons with non-self-resetting thermal cut out	Thermo-static steam irons	Thermo-static steam irons with non-self resetting thermal cut out	Cordless irons	Cordless irons having a mains supply attach-ment
11.1 (Measurement of input power)	x	x	x	x	x	x
11.2 (Measurement of energy consumption)	x	x	x	x	x	x
12.1 (Determination of smoothness of the sole-plate)	x	x	x	x	x	x
12.2 (Measurement of scratch resistance of sole-plate)	x	x	x	x	x	x
12.3 (Determination of adhesion of polytetra-fluorethylene (PTFE) coating or similar coating on sole-plate)	x	x	x	x	x	x
13 (Measurement of thermostatic stability)	x	x	x	x	x	x
14 (Determination of total steaming time for hard water)			x	x		x
NOTE 1 Measurements for the spray iron are determined according to the table, whether it is of thermo-static type, steam or shot-of-steam-producing type, cordless iron type, or cordless iron having mains supply attachment type. For the non-steam-producing spray irons, the measurements for dry irons are applied. Steam and spray irons are tested with water container empty. NOTE 2 (x) means if applicable. NOTE 3 Reporting the data should be made according to the testing authorities.						

5 General conditions for measurements

Unless otherwise specified, the measurements are conducted under the following conditions.

5.1 Ambient conditions

The measurements are conducted at an ambient temperature of 20 °C ± 5 °C, and the place for the measurements shall be free from any draughts.

5.2 Voltage for measurements

The voltage to be applied to the iron under measurement is that required to give the rated input under steady conditions. If an input power range is marked on the iron, the voltage is that required to give the mean of the input power range.

5.3 Steady conditions

The steady conditions for measurements are considered to be reached 30 min after switching-on of the iron or when the thermostat has operated four times, if this occurs earlier.

5.4 Iron support for measurements

The iron is placed on the three pointed metallic supports while under measurement. The three pointed supports are constructed so that they support the sole-plate of the iron horizontally at least 100 mm above the base surface on which the iron is placed.

For cordless irons, the iron is placed on its stand.

5.5 Temperature measurement

The temperature of the iron is measured by a fine-wire thermocouple, the wire diameter of which shall not exceed 0,3 mm.

Accuracy of the measuring instrument shall be better than, or equal to, class 1 in IEC 60051-1.

A movable silver disk, having a diameter of 10 mm and a thickness of 1 mm, rests on the top of a pointed ceramic tube which contains the thermocouple wires in two separate bores. An example of the arrangement is shown in figure 1.

The centre of the silver disk is pressed on to the sole-plate of the iron by applying a force of at least 1 N. In order to improve the heat transfer between the silver disk and the sole-plate, silicone grease or heat transfer paste can be used.

For the measurement of cordless irons, except cordless irons having a mains supply attachment, a thermocouple with silver disk as shown in figure1 is attached to the sole-plate directly.

5.6 Cordless irons having a mains supply attachment

Cordless irons having a mains supply attachment are tested as conventional irons.

5.7 Irons fitted with separate steam generator/boiler

Irons fitted with separate steam generator/boiler have to be kept in ironing mode under measurements.

5.8 Irons fitted with auto switch-off devices

Irons fitted with auto switch-off devices have to be kept in ironing mode under measurements.

5.9 Test sample

A new sample is used for the test of clause 13.

6 General requirements

6.1 Determination of mass

For all types of irons without separate water reservoir or boiler/generator, the mass is measured without the supply cord. The supply cord is removed from the iron by disconnection from the terminals or by removing the connector.

For steam irons with a separate water reservoir or boiler/generator, the mass is measured in two steps:

- *the total mass of the system, not filled up with water, and*
- *the iron with the interconnection hose.*

The mass is expressed in grams, rounded off to one decimal place.

For cordless irons, the mass is measured without its stand.

6.2 Measurement of length of the supply cord

The length of the supply cord of irons without separate water reservoir or boiler/generator is measured from the inlet point of the iron or connector to the inlet point of the plug including any cord guards.

The length is expressed in meters, rounded off to the nearest 50 mm.

7 Temperature measurements

7.1 Measurement of heating-up time

The iron is placed on the three metallic supports; for cordless irons, the iron is placed on its stand (see 5.4), and the thermocouple is attached at the mid-point of the sole-plate.

Starting from ambient temperature, the iron is heated up with the voltage specified in 5.2, the thermostat, if any, set at the highest temperature.

The time necessary for the temperature to exceed the ambient temperature by 180 K is measured, and is expressed in minutes and seconds.

7.2 Measurement of initial overswing temperature and heating-up excess temperature

The iron is placed on the three metallic supports, for cordless irons, the iron is placed on its stand (see 5.4), and a thermocouple is attached at the mid-point of the sole-plate.

The iron is switched on, with the voltage specified in 5.2.

Using a recording-type instrument, the time and temperature are measured at the mid-point with the thermostat set at the 1 dot marking position and at the highest position over five successive cycles to produce a graph of the type shown in figure 2.

The thermostat is first set to the 1 dot marking position. If there is no dot marking, the thermostat is so adjusted as to obtain an average temperature of the sole-plate as close as possible to 95 °C under steady conditions.

After the first measurement, the iron is allowed to cool to room temperature (20 °C ± 5 °C); then the sole-plate temperature is measured again at the highest setting position of the thermostat.

From the graph the following are determined:

a) the initial overswing temperature, which is the first peak temperature between the first and second cut-outs of the thermostat;

b) the mean peak temperature, which is the mean value of the last three peak temperatures;

c) the heating-up excess temperature, which is the difference between the initial overswing temperature and the mean peak temperature.