

INTERNATIONAL STANDARD

IEC
60335-2-23

Fifth edition
2003-01

Household and similar electrical appliances – Safety –

Part 2-23: Particular requirements for appliances for skin or hair care

Appareils électrodomestiques et analogues – Sécurité –

*Partie 2-23:
Règles particulières pour les appareils destinés aux soins
de la peau ou des cheveux*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-23: Particular requirements for appliances
for skin or hair care**

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.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

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

This fifth edition cancels and replaces the fourth edition published in 1996 and its amendment 1 (2000). It constitutes a technical revision.

The text of this part of 60335 is based on the following documents:

FDIS	Report on voting
61/2205/FDIS	61/2288/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 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 fourth edition (2001) 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 appliances for skin or hair care.

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 publication will remain unchanged until 2004. At this date, the publication will be

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

The following differences exist in the countries indicated below.

- 3.1.9: Normal operation is different (USA).
- 6.1: Appliances fitted with a supply cord may be of class 0 or class 0I (Japan and USA).
- 6.2: The addition does not apply (USA).
- Clause 7: Additional markings and instructions are required (USA).
- 11.7: Rest periods are not allowed (USA).
- 11.101: The test is not carried out (USA).
- 19.2: Different methods are used to restrict heat dissipation (USA).
- 19.101: The temperature rise limits are different (USA).
- 21.101: The test is different (USA).
- Clause 22: Hand-held hairdryers are required to incorporate a protective device to comply with an immersion test (USA).
- 22.36: The requirement does not apply (Japan and USA).
- 22.102: The requirement does not apply (USA).
- 24.1.3: The number of cycles of operation is different (USA).
- 25.7: The use of PVC sheathed cords is not restricted by the surface temperature of the enclosure (Australia).
- 25.7: The addition does not apply (Japan).
- 25.7: PVC sheathed cords are not allowed if they could contact surfaces over 121 °C (USA).
- 25.8: The addition does not apply (Japan).
- 25.14: The test is different (USA).
- 25.101: The test is different (USA).

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

The contents of the corrigendum of July 2004 have been included in this copy.

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.

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.

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.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-23: Particular requirements for appliances for skin or hair care

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric appliances for the care of skin or hair of persons or animals and intended for household and similar purposes, their **rated voltage** being not more than 250 V.

NOTE 101 Examples of appliances that are within the scope of this standard are

- curling combs;
- curling irons;
- curling rollers with separate heaters;
- facial saunas;
- hairdryers;
- hand dryers;
- heaters with detachable curlers;
- permanent-wave appliances.

NOTE 102 Appliances covered by this standard may incorporate steam-producing or spray-producing devices.

Appliances not intended for normal household use but that 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.

NOTE 103 Examples are appliances for use in hairdressing salons.

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

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 104 Attention is drawn to the fact that

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

NOTE 105 This standard does not apply to

- appliances intended 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);
- shavers, hair clippers and similar appliances (IEC 60335-2-8);
- UV and IR radiation appliances (IEC 60335-2-27);
- sauna heating appliances (IEC 60335-2-53);
- appliances intended for medical purposes (IEC 60601).

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

ISO 3864, *Safety colours and safety signs*.

3 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

Helmet-type hairdryers are operated with the axis of the hood inclined at an angle of 60° to the horizontal or the maximum angle allowed by the construction if this is less. A dull black-painted wooden sphere, 200 mm in diameter, is placed in the hood so that its centre coincides with the axis of the hood, the shortest distance between the sphere and the air-outlet grille being 50 mm.

Hairdryers having a flexible hood attachment are operated with the hood attachment placed over the wire frame of Figure 101, the frame being positioned over the wooden sphere.

NOTE 101 **Helmet-type hairdryers** that are supported by the head are operated as hairdryers having a flexible hood attachment.

Hand-held hairdryers are operated with unrestricted airflow directed downwards.

Permanent-wave appliances are operated in the normal position of use, the curling rollers hanging freely.

Heaters for detachable curlers are operated in the normal position of use together with the curlers.

Curling irons, curling combs and similar appliances are operated with their major axis horizontal.

Appliances having steam-producing or spray-producing devices are operated with the container empty or filled, whichever is more unfavourable. However, if the appliance is marked to indicate that it is to be used with the container filled, the container is filled. Water is added, when necessary, to compensate for evaporation.

Hand dryers are operated in the normal position of use with unrestricted airflow.

Facial saunas are operated in the normal position of use and filled with water. Water is added, when necessary, to maintain the steam output.

3.101

helmet-type hairdryer

hairdryer having a rigid hood that is placed over the head in normal use

NOTE The hood may be supported by a stand or have means for attaching to a support.

3.102

heater for detachable curlers

appliance for heating curling irons or curling rollers that accumulate heat

3.103

swivel connection

means for connecting the **supply cord** so that the appliance can be rotated continuously without twisting the cord

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:

NOTE 101 The additional test of 25.14 for **hand-held appliances** is carried out on a separate appliance.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

Appliances shall be of one of the following classes with respect to protection against electric shock:

- hairdryers, curling irons, curling combs, facial saunas and other steam-producing or spray-producing appliances shall be **class II** or **class III**. However, **fixed hairdryers** intended to be permanently connected to fixed wiring, **helmet-type hairdryers** for hairdressers and steam-producing or spray-producing appliances for hairdressers may be **class I**;
- other appliances shall be **class I**, **class II** or **class III**.

Compliance is checked by inspection and by the relevant tests.

6.2 Addition:

Hand dryers shall be at least IPX1.

Curling rollers of permanent-wave appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Portable hairdryers, curling irons and similar appliances shall be marked with symbol 5582 of IEC 60417-1 combined with the prohibition sign of ISO 3864, except for the specified colours, or with the substance of the following:

WARNING: Do not use this appliance near water.

NOTE 101 This marking may be on a label that is permanently attached to the appliance.

7.6 Addition:



[symbol 5582 of IEC 60417-1]

Suitable for use in a bath or shower

7.12 Addition:

The instructions for **portable hairdryers** shall include the substance of the following:

- when the hairdryer is used in a bathroom, unplug it after use since the proximity of water presents a hazard even when the hairdryer is switched off;
- for additional protection, the installation of a residual current device (RCD) having a rated residual operating current not exceeding 30 mA is advisable in the electrical circuit supplying the bathroom. Ask your installer for advice.

The instructions for facial saunas shall state that after use the appliance should be cleaned to avoid the accumulation of grease and other residues.

If symbol 5582 of IEC 60417-1 is used, together with the prohibition sign, the meaning shall be explained. Instructions shall also state the substance of the following:

WARNING: Do not use this appliance near bathtubs, showers, basins or other vessels containing water.

7.12.1 Addition:

The installation instructions for **fixed hairdryers** intended for use in bathrooms shall include the substance of the following:

This hairdryer must be fixed out of reach of a person taking a bath or shower.

If the hand-held part of the hairdryer incorporates electrical components, the instructions shall state that the appliance must be fixed so that the hand-held part, when fully extended, is out of reach of a person taking a bath or shower.

7.14 Addition:

The diameter of the circle superimposed on symbol 5582 of IEC 60417-1 shall be at least 10 mm.

Compliance is checked by measurement.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.3 Not applicable.

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.

11.1 Addition:

For appliances incorporating a **swivel connection**, compliance is also checked by the test of 11.101.

11.2 Addition:

Appliances intended to be used on a stand or attached to a support are placed to give the most unfavourable results.

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**.

11.6 Replacement:

Combined appliances are operated as **heating appliances**.

11.7 Replacement:

Appliances without a timer are operated

- for 30 min, for **hand-held appliances**;
- in cycles of 30 s on and 5 s off until steady conditions are established, for hand dryers that are automatically controlled by the presence of the hands;
- until steady conditions are established, for other appliances.

Appliances incorporating a timer are operated in cycles until steady conditions are established. Each cycle consists of the maximum operating time of the timer followed by a rest period of 5 s.

11.8 Addition:

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**.

The temperature rise of the handles of curling irons heated by a **heater for detachable curlers** incorporating a timer is determined at the end of the first cycle.

11.101 Appliances incorporating a **swivel connection** are positioned with their major axis horizontal, the **supply cord** hanging vertically. A pull force of 1 N is applied to the **supply cord**.

The appliance is supplied at **rated voltage**, the current being 1,25 times the **rated current**.

NOTE 1 This condition can be obtained by means of a resistor connected in place of the heating element.

The appliance is rotated about its major axis at a rate of approximately 50 rev/min, the direction of rotation being reversed every 20 revolutions. The test is carried out for 1 500 revolutions.

The temperature rise of the sliding contacts shall not exceed 65 K.

NOTE 2 The temperature rise may be determined by melting particles or colour changing indicators.

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.

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 Addition:

Hairdryers are also subjected to the tests of 19.101 and 19.102.

19.2 Addition:

Restricted heat dissipation is obtained as follows:

- *motors are disconnected;*
- **hand-held hairdryers** *are placed on the floor of the test corner in any stable position likely to occur;*
- *appliances intended to be filled with water are operated empty.*

Hairdryers having a flexible hood attachment are also tested with the motor operating, the airflow through the hose being restricted to give the most unfavourable result.

Heaters for detachable curlers *are placed on a piece of low-density glass-fibre insulation having a coefficient of thermal insulation of approximately 2,5 m²K/W.*

19.7 Addition:

The test is carried out for 5 min except for

- **hand-held appliances;**
- *appliances that have to be kept switched on by hand;*
- *appliances incorporating a timer.*

NOTE 101 Hand dryers are subjected to the test only when the locked rotor torque is less than the full load torque.

19.9 Not applicable.

19.10 Addition:

The test is carried out with the heating elements disconnected or switched off.

19.101 *Hairdryers are operated as specified in Clause 11 except that the motor is supplied separately at its **working voltage**.*

NOTE It may be necessary to compensate for the effect on the heating element of supplying the motor separately.

*When steady conditions are established, the voltage applied to the motor is reduced until the running speed of the motor is just sufficient to prevent a **thermal cut-out** from operating, the voltage applied to the heating elements being maintained at the value used for 11.4.*

*The reduced voltage applied to the motor is determined as follows. The voltage is reduced by 5 % and the motor is operated under this condition for 5 min. This procedure is repeated until a **thermal cut-out** operates. The voltage is then increased by 5 %, this being the reduced voltage to be used for the test.*

Under these conditions, the hairdryer is again operated until steady conditions are established.

The hairdryer shall not emit flames or molten metal, temperature rises shall not exceed the values specified in Table 9 and the other criteria of 19.13 do not apply.

19.102 ***Portable hair dryers** are operated under **normal operation** at 1,15 times **rated power input**.*

A sheet of polyethylene approximately 200 mm x 200 mm and having a thickness of 50 µm is placed against the air-inlet and moved in any direction in order to reduce the airflow so that the most unfavourable conditions are established.

The test is carried out for 30 min.

The test is repeated with the airflow directed horizontally.

NOTE The most unfavourable conditions are usually obtained by positioning the polyethylene sheet so that the **thermal cut-out** is prevented from operating.

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Addition:

Hand-held appliances are also subjected to the test of 21.101.

21.101 The appliance is placed on a horizontal surface positioned 700 mm above a rigidly supported hardwood board and operated while supplied at **rated voltage**.

*It is pulled from the surface by its **supply cord** and allowed to drop freely. The test is carried out five times, the appliance being placed on the horizontal surface in different positions likely to occur.*

The appliance shall not be damaged to such an extent that compliance with this standard is impaired. In particular, the requirements of Clauses 8 and 29 shall be fulfilled.

22 Construction

This clause of Part 1 is applicable except as follows.

22.24 *Addition:*

The heating element shall also be unlikely to come into contact with the skin or hair if it ruptures.

22.32 *Addition:*

Supplementary insulation and **reinforced insulation** in **class II curling irons** shall be resistant to aging.

Compliance is checked by the following test.

Samples of insulation not mentioned in Table 3 are suspended in a heating cabinet so that there is at least 10 mm between the samples, and between the samples and the top and bottom of the cabinet. The samples shall be at least 50 mm from the walls of the cabinet. The volume of the samples is not to exceed one-tenth of the capacity of the cabinet.

The cabinet is ventilated by natural convection, with at least three air changes per hour. The temperature of the cabinet is maintained at $30\text{ K} \pm 1\text{ K}$ in excess of the temperature rise of the part determined during the tests of Clause 19 or at $70\text{ °C} \pm 2\text{ °C}$, whichever is higher.

The samples are kept in the cabinet for 240 h and then at ambient temperature for at least 16 h.

*The samples shall show no cracks and shall withstand the electric strength test of 16.3 for **supplementary insulation**.*

NOTE 101 Insulation mentioned in Table 3 is considered to be resistant to aging.

22.36 *Addition:*

For **class I appliances**, other than hand dryers and face dryers, metal parts that could be in contact with skin or hair in normal use shall be separated from **live parts** by **double insulation** or **reinforced insulation** and shall not be earthed.

22.40 Addition:

The switch in the **off-position** shall disconnect **electronic circuits**, unless compliance with Clause 19 does not depend on the operation of a **self-resetting thermal cut-out**.

22.101 Appliances having steam-producing or spray-producing devices shall be constructed so that there is no spillage or unintentional burst of steam or water that is likely to cause a hazard.

Compliance is checked during the test of Clause 11.

22.102 Curling rollers of permanent-wave appliances having integral heating elements shall be supplied with **safety extra-low voltage** not exceeding 24 V.

Compliance is checked by inspection and by the relevant tests.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 Addition:

The number of flexings for conductors that are only flexed when the appliance is stored is 5 000.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

Switches incorporated in hand dryers are subjected to 50 000 cycles of operation.

24.2 Modification:

Helmet-type hairdryers and permanent-wave appliances may incorporate a switch in a flexible cord.

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

- **hand-held appliances;**
- hairdryers with a flexible hood attachment;
- **heaters for detachable curlers** having not more than 10 curlers.

25.7 Modification:

Light polyvinyl chloride sheathed cords are allowed regardless of the mass of the appliance.

The temperature rise limit of 130 K is allowed as long as the temperature rise decreases to 75 K within 5 min of the appliance being switched off.

25.14 Addition:

The force applied to the **supply cord** of appliances provided with a **swivel connection** is

- 20 N, for cords having a nominal cross-sectional area exceeding 0,75 mm²;
- 10 N, for other cords.

Hand-held appliances are additionally tested while mounted on an apparatus similar to that of Figure 8 with the **supply cord** hanging vertically and loaded with a force of 10 N. The oscillating part of the apparatus is moved through an angle of 180° and back to the original position. The number of flexings is 4 000, the rate of flexing being 6 per min.

NOTE 101 The appliance is mounted so that the direction of flexing corresponds to that most likely to occur when the **supply cord** is wound around the appliance for storage.

NOTE 102 This test is not carried out on appliances incorporating a **swivel connection**.

25.15 Addition:

The **swivel connection** is not locked during the tests.

25.101 Swivel connections shall be adequate for normal use of the appliance.

Compliance is checked by the following test.

The appliance is operated under the conditions specified in 11.101, the number of revolutions being increased to 20 000.

After this test, the **swivel connection** and the **supply cord** shall be fit for further use. **Live parts** shall not have become accessible and the appliance shall withstand the electric strength test of 16.3.

26 Terminals for external conductors

This clause of Part 1 is applicable except as follows.

26.10 Addition:

Terminals with screw clamping and screwless terminals shall not be used for **type X attachments** in appliances incorporating a **swivel connection**.

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 except as follows.

29.3 Addition:

For curling irons, the distance through insulation between metal parts separated by **supplementary insulation** may be reduced to 0,6 mm, provided that the distance through **basic insulation** is at least 1 mm.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.1 Addition:

For hand dryers and hairdryers, the temperature rises occurring during the tests of Clause 19 are not taken into account.

30.2 Addition:

*For **heaters for detachable curlers**, 30.2.3 is applicable. For other appliances, 30.2.2 is applicable.*

30.101 Helmet-type hairdryers shall be resistant to fire.

Compliance is checked by inspection and by applying the needle-flame test of Annex E to

- parts of non-metallic material enclosing the heating element and other electrical components;*
- non-metallic parts within the enclosure.*

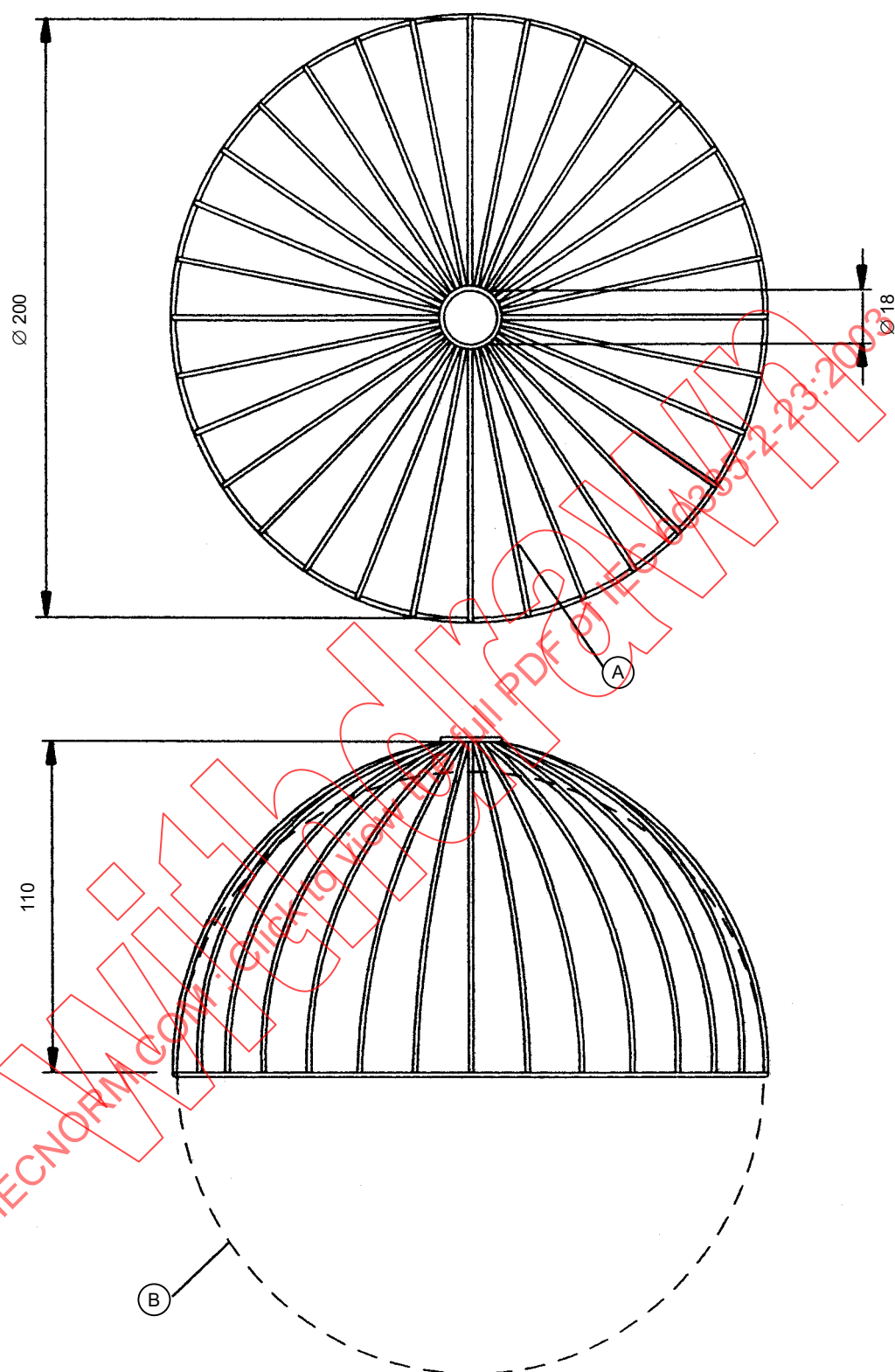
The needle-flame test is not carried out on material classified as V-0 or V-1 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



IEC 2695/02

Dimensions in millimetres

Key

- A Frame consisting of 32 equally spaced wires $\varnothing 1,5 \text{ mm} \pm 0,5 \text{ mm}$
- B Location of the wooden sphere

Figure 101 – Wire frame