

INTERNATIONAL STANDARD



Household and similar electrical appliances – Safety – Part 2-52: Particular requirements for oral hygiene appliances



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**Household and similar electrical appliances – Safety –
Part 2-52: Particular requirements for oral hygiene appliances**

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COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-52: Particular requirements for oral hygiene appliances****FOREWORD**

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-52:2002+AMD1:2008+AMD2:2017 CSV. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60335-2-52 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2002, Amendment 1: 2008 and Amendment 2:2017. This edition constitutes a technical revision.

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

- a) the text has been aligned with IEC 60335-1:2020;
- b) some notes have been converted to normative text (Clause 1, 11.7, 22.101);
- c) clarification of requirements for battery-operated appliances (Clause 1, 11.7, B.11.1);
- d) application of test probe 19 has been introduced (8.1.1, 20.2);
- e) the stability test has been updated to cover hand-held parts of battery-operated appliances when placed on their charging stand (20.1);
- f) a drop test is introduced for hand-held parts of an appliance (21.101);
- g) additional strength tests for detachable power supply parts are introduced (21.102);
- h) Table B.2 and Table B.3 updated to reflect smaller cell capacities for battery-operated appliances covered by this Part 2 standard.

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

Draft	Report on voting
61/6368/FDIS	61/6418/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 in the IEC 60335 series, published 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: Particular requirements for oral hygiene appliances.

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.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 6.1: Class 0 appliances are allowed (Japan).
- 6.1: Appliances may have other classifications (USA).
- 7.12.1: Additional instructions are required (USA).
- 11.7: The duration and number of cycles are different (USA).
- 19.101: The test is different (USA).
- 22.36: Hand-held parts may be class 0 construction (Japan).

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 document using a colour printer.

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 may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IEC 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the Part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal ~~and generic standards~~ 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. ~~For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.~~

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

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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-52: Particular requirements for oral hygiene appliances

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric oral hygiene appliances for household and similar purposes, their **rated voltage** being not more than 250 V, including direct current (DC) supplied appliances and **battery-operated appliances**.

NOTE 101—Examples of appliances ~~covered by~~ that this standard is applicable to are

- oral irrigators;
- toothbrushes.

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

- persons (including children) whose
 - physical, sensory or mental capabilities; or
 - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

NOTE 102—Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can 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 103—This standard does not apply to appliances for medical purposes (IEC 60601).

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 ~~Replacement~~ Addition: ~~normal operation~~

operation of the appliance under the following conditions:

Oral irrigators are operated with the reservoir filled with water having a temperature of approximately 45 °C, to the level specified in the instructions. In the absence of such instructions, the reservoir is filled to the maximum level.

Other appliances are operated without load.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

Appliances shall be **class II** or **class III**.

6.2 Addition:

~~Class II appliances shall be at least IPX7 except that parts intended to be fixed, and transformers with pins for insertion into socket outlets, shall be at least IPX4.~~

~~Class III appliances shall be at least IPX4. However, if the rated voltage does not exceed 24 V, they may be IPX0.~~

Appliances shall be at least IPX7.

This classification does not apply to:

- parts that are intended to be fixed and **detachable power supply parts** with pins for insertion into socket outlets that are at least IPX4; or
- **class III appliances** or parts of **class III construction**, including hand-held parts, that are at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12.1 Addition:

The installation instructions shall state that parts that have to be fixed must be fixed so that they cannot fall into water, unless they are of IPX7 construction.

8 Protection against access to live parts

This clause of Part 1 is applicable *except as follows*.

8.1.1 *Addition:*

For toothbrushes, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18.

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*.

11.3 *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 $4\text{ N} \pm 1\text{ N}$ 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.

11.7 ~~Replacement~~ *Modification:*

Appliances are operated for five cycles, each cycle comprising an operating period of 3 min and a rest period of 1 min. During the rest period, the reservoir of oral irrigators is refilled.

~~NOTE 101~~ *If the reservoir empties during the operating period, it is refilled and the test is continued.*

*For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes:*

- the **battery** that has been **fully discharged** is charged for 1 h, while the appliance is operated as specified, if allowed by the construction of the appliance;*
- the **battery** that has been **fully discharged** is charged, for a duration of 24 h or until it is **fully charged** whichever is shorter, without the **battery-operated appliance** performing its intended function.*

11.8 ~~Addition~~ *Modification:*

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

Addition:

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

Surface	Temperature rise of external accessible surfaces K
Bare metal	38
Coated metal ^a	42
Glass and ceramic	51
Plastic and plastic coating > 0,4 mm ^{b, c}	58
NOTE The temperature rise limits of knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Metal is considered coated when a coating having a minimum thickness of 90 µm made by of enamel or non-substantially plastic coating is used.	
^b The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.	
^c When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of the coated metal or of glass and ceramic material apply.	

12 ~~Void~~ 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.

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:

Class II oral irrigators are also subjected to the test of 19.101.

19.2 Addition:

The test is carried out without water in the reservoir.

19.101 *The hose is punctured within the enclosure of the appliance at the most unfavourable location. Rubber hoses are punctured by means of a 0,8 mm diameter needle. Thermoplastic hoses are punctured by means of a 0,5 mm diameter heated needle, care being taken not to enlarge the hole.*

NOTE When reassembling the appliance, sealants such as silicone rubber ~~may~~ can be used to ~~insure~~ ensure that the joints are watertight.

The appliance is operated as specified in Clause 11, but with water containing 1 % NaCl. During the last cycle of operation, the water pressure in the hose is increased to the maximum obtainable by blocking the water outlet. The pressure is then reduced to its normal value.

A vessel of insulating material is filled with the saline solution and the hand-held part of the appliance is immersed to a depth of approximately 100 mm. The appliance is operated without restricting the water flow until 30 s after the reservoir has emptied. During the test, the leakage current is measured, as specified in 13.2. It is measured between any pole of the supply and a rectangular stainless steel electrode, having dimensions approximately 250 mm × 50 mm, placed in the solution.

The leakage current shall not exceed 0,5 mA.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 Replacement:

Appliances, other than **fixed appliances** and **hand-held appliances**, intended to be used on a surface such as the floor or a table, shall have adequate stability. Hand-held parts of appliances with a charging stand shall have adequate stability when the hand-held part is placed on its charging stand. However, adequate stability is not necessary if overturning of the appliance does not present a risk of fire, electric shock or injury.

Compliance is checked by the following test, appliances incorporating an appliance inlet being fitted with an appropriate connector and flexible cord. Hand-held parts of appliances with a charging stand are subjected to the test with the hand-held part placed on its charging stand.

*The appliance, not connected to the supply mains, is placed in any normal position of use on a plane inclined at an angle of 10° to the horizontal, the **supply cord** resting on the inclined plane in the most unfavourable position. However, if part of an appliance comes into contact with the horizontal supporting surface when the appliance is tilted through an angle of 10°, the appliance is placed on a horizontal support and tilted in the most unfavourable direction through an angle of 10°.*

The test on the horizontal support may be necessary for appliances provided with rollers, castors or feet. In this case, castors or wheels can be blocked to prevent the appliance from rolling.

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

The appliance shall not overturn unless the appliance or the part of the appliance that overturns complies with all of the following:

- *it only contains circuits operating at SELV in accordance with 8.1.4;*
- *it only contains low power circuits in accordance with 19.11.1;*
- *it is dropped from a height of 700 mm on a rigidly supported hard wood board five times, the appliance being held in different positions likely to occur. After the drops, the appliance or part of the appliance, as relevant, shall show no damage so that compliance with 15.1 and 20.2 is not impaired;*
- *it has a maximum weight of 450 g when ready for use;*
- *it does not have sharp edges when ready for use. An edge with a radius of 1 mm or more is not considered a sharp edge.*

The test is repeated on appliances with heating elements with the angle of inclination increased to 15°. If the appliance overturns in one or more positions, it is subjected to the tests of Clause 11 in each of these overturned positions.

During this test, temperature rises shall not exceed the values shown in Table 9.

20.2 Addition:

For toothbrushes, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18.

Modification:

Test probe 18 and test probe 19 are not applied to appliances for commercial use.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Addition:

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

21.101 *The hand-held part of the appliance is 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 concrete, or similarly hard, surface.*

The hand-held part of the appliance in the sling is dropped from a stationary position. The test is carried out a total of five times with the hand-held part of the appliance being positioned so that it falls onto the concrete surface in five different orientations.

The hand-held part of the appliance shall not be damaged to such an extent that compliance with 8.1 and Clause 29 is impaired.

21.102 For appliances with a **detachable power supply part**, the enclosure of the **detachable power supply part** shall have adequate mechanical strength against dropping.

The requirement is not applicable to a **detachable power supply part** with pins for insertion into a socket outlet.

Compliance is checked by the following test.

*The **detachable power supply part** is 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 concrete, or similarly hard, surface.*

*The **detachable power supply part** in the sling is dropped from a stationary position. The test is carried out a total of five times with the **detachable power supply part** being positioned so that it falls onto the concrete surface in five different orientations.*

*The **detachable power supply part** shall not be damaged to such an extent that compliance with 8.1 and Clause 29 is impaired.*

22 Construction

This clause of Part 1 is applicable except as follows.

22.36 Addition:

Hand-held parts shall be **class III construction** having a **working voltage** not exceeding 24 V.

22.101 Class II appliances shall be constructed so that parts intended to be fixed can be fixed securely, unless they are classified at least IPX7.

~~NOTE—Keyhole slots, hooks and similar means, without further means to prevent the appliance being inadvertently lifted off the support, are not considered to be adequate means for fixing the appliance securely.~~

The **Class II appliances** shall not be fixed by keyhole slots, hooks and similar means, without further means to prevent the appliance being inadvertently lifted off the support.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.5 Addition:

Type X attachment is not allowed for appliances classified IPX7.

Type Z attachment is allowed.

25.23 *Addition:*

Interconnection cords for parts of **class III construction** are not required to comply with the requirements for **supply cords**.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is not 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.

30.2 *Modification:*

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

For oral hygiene appliances, 30.2.2 is applicable.

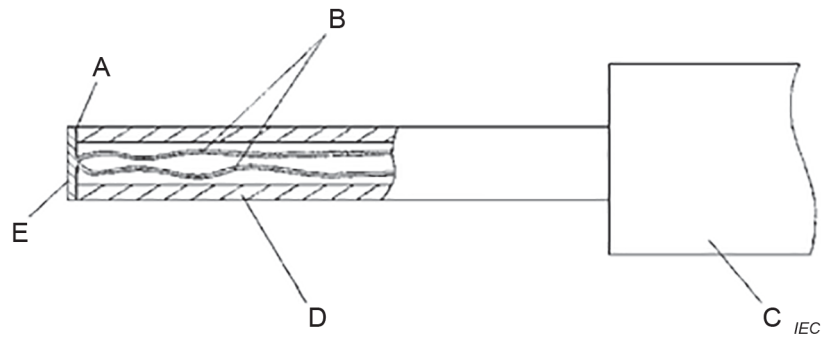
~~**30.2.3** — Not applicable.~~

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

- A adhesive
- B thermocouple wires 0,3 mm diameter according to IEC 60584-1 Type K ~~(chrome-alumel)~~
- C handle arrangement permitting a contact force of $4\text{ N} \pm 1\text{ N}$
- 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

Annexes

The annexes of Part 1 are applicable **except as follows**.

Annex B (normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

Annex B of Part 1 is applicable except as follows.

11 Heating

B.11.1 Modification:

Battery-operated appliances are tested under the conditions of **normal operation** with the appliance operated for five cycles, where each cycle comprises an operating period of 3 min and a rest period of 1 min. During the rest period, the reservoir of oral irrigators is refilled. If the reservoir empties during the operating period, it is refilled and the test is continued.

For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes, and that cannot perform their intended function while the **batteries** are being charged, the appliance is operated as specified until it cannot perform its intended function due to the depletion of the **batteries**.

20 Stability and mechanical hazards

B.20.1 Modification:

Table B.2 – Total area of openings for metal-ion cells

Capacity of the single metal-ion cell with the highest capacity <i>Ah</i>	Min. total area of openings <i>mm²</i>
$0,2 \leq Ah < 1$	6
$1 \leq Ah < 3$	10
$3 \leq Ah < 5$	20
$5 \leq Ah < 25$	30
$25 \leq Ah < 100$	50
$Ah \geq 100$	100

Table B.3 – Volume of air injected at 2 070 kPa

Capacity of the single metal-ion cell with the highest capacity <i>Ah</i>	Volume of air ($\pm 10\%$) <i>ml</i>
$0,2 \leq Ah < 1$	6
$1 \leq Ah < 3$	10
$3 \leq Ah < 5$	20
$5 \leq Ah < 25$	30
$25 \leq Ah < 100$	50
$Ah \geq 100$	100