

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-54: Particular requirements for surface-cleaning appliances for
household use employing liquids or steam**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-54: Particular requirements for surface-cleaning appliances for household use employing liquids or steam

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This commented version (CMV) of the official standard IEC 60335-2-54:2022 edition 5.0 allows the user to identify the changes made to the previous IEC 60335-2-54:2008+AMD1:2015+AMD2:2019 CSV edition 4.2. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60335-2-54 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2008, Amendment 1: 2015 and Amendment 2: 2019. This edition constitutes a technical revision.

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

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 15.2, 21.103, 21.105, 22.103);
- c) addition of external accessible surface temperature limits (3.6.102, 3.6.103, 7.1, 11.3, 11.8)
- d) exception for hand-held appliances (20.1);

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

Draft	Report on voting
61/6672/FDIS	61/6749/RVD

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

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

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

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

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

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for surface-cleaning appliances for household use employing liquids or steam.

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.

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INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

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

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

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

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules ~~may~~ 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 ~~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.~~ **1**

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. **2**

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-54: Particular requirements for surface-cleaning appliances for household use employing liquids or steam

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric cleaning appliances for household use that are intended for cleaning surfaces by using liquid cleansing agents or steam, their **rated voltage** being not more than 250 V including direct current (DC) supplied appliances and **battery-operated appliances** 3. It also covers wallpaper strippers and surface cleaning appliances incorporating heating elements or means for pressurizing the liquid container.

~~NOTE 101—Appliances may incorporate heating elements or means for pressurising the liquid container.~~

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 knowledge 60335-2-54:2022 prevents them from using the appliance safely without supervision or instruction; efi/iec-
- children playing with the appliance. 60335-2-54:2022

~~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~~

- floor treatment and wet scrubbing machines (IEC 60335-2-10);
- cleaning appliances that are permanently fixed to a building;
- cleaning appliances covered by IEC 60335-2-79, namely those having a
 - pressure exceeding 2,5 MPa;
 - pressurised volume over 5 l;
 - product of pressure (in MPa) and container volume (in l) exceeding 5;
 - liquid temperature exceeding 160 °C;
 - **rated power input** exceeding 3 500 W;
- cleaning appliances intended for commercial or industrial use;
- 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);
- fabric steamers (IEC 60335-2-85).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

ISO 6344-2, *Coated abrasives – Determination and designation of grain size—analysis distribution – Part 2: ~~Determination of grain size distribution of~~ Macrogrits sizes P12 to P220*

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: 4

normal operation

operation of the appliance under the most unfavourable conditions specified in the instructions

The cleaning head is pressed with a force of 30 N against a vertical pane of plain glass and moved up and down over a length of 1 m at a rate of 15 cycles per minute. A film of water is maintained on the pane of glass by continuously applying water having a temperature of 20° C ± 5 °C.

For steam cleaners and wallpaper strippers, a sheet of stainless steel is used instead of glass, without additional wetting. However, if the steam outlet is not intended to be pressed against the surface, the appliance is operated with the outlet in free air directed downwards at an angle of approximately 45°.

For steam cleaners intended to clean horizontal surfaces, the sheet of stainless steel is horizontal and the appliance is moved forward and backward over a length of 1 m at a rate of 15 cycles per minute instead of up and down. No additional force other than the weight of the appliance is applied.

3.5 Definitions relating to types of appliances

3.5.101

pressurised appliance

appliance in which steam is produced in a boiler at a pressure exceeding 50 kPa and in which the pressure does not drop to atmospheric pressure when the steam is not supplied

Note 1 to entry: The boiler ~~may~~ can be incorporated in the appliance or connected to the appliance by a hose.

3.6 Definitions relating to parts of an appliance

3.6.101

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 steam output, but not the surfaces of a boiler or heated reservoir.

3.6.102

adjacent surface

surface that is within 25 mm of a **functional surface** and which can become hot due to the proximity to the **functional surface**

Note 1 to entry: Examples of **adjacent surfaces** are the surface of the enclosure within 25 mm of the steam output, water inlet and boiler service opening.

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:

A new hose is used for each of the tests of 21.101 to 21.105.

5.101 *Appliances incorporating heating elements are tested as **heating appliances** even if they incorporate motors.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

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

6.2 Addition:

Class I and class II hand-held appliances dispensing liquids shall be at least IPX7. Other appliances shall be at least IPX4. **Class III appliances** not exceeding 24 V can be IPX0.

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** in watts.

Addition:

Appliances intended to be connected to the water mains shall be marked with their maximum permissible water pressure, in megapascals.

Steam cleaners, wallpaper strippers and appliances dispensing liquids having a temperature exceeding 50 °C shall be marked with symbol IEC 60417-5597 (~~2002-10~~2014-06) or with the following:

WARNING: Danger of scalding.

NOTE 101 This symbol is a warning sign and the rules of ISO 3864-1 apply.

~~Appliance outlets for accessories shall be marked with their maximum load, in watts.~~

~~NOTE 102—This marking may be on the appliance close to the appliance outlet.~~ **5**

The sum of the **rated power input** and the maximum load of the appliance outlet shall also be marked on the appliance.

If appliances have external **accessible surfaces**, for which the provisions of footnote b to Table 101 apply, then the appliance shall be marked with symbol IEC 60417-5041 (2002-10) or with the substance of the following:

CAUTION: Hot surfaces. **6**

7.6 Addition:



[symbol IEC 60417-5597
(~~2002-10~~2014-06)]

steam



[symbol IEC 60417-5041
(2002-10)]

caution, hot surface

7.12 Addition:

The instructions shall state that the liquid or steam must not be directed towards equipment containing electrical components, such as the interior of ovens.

For **pressurised appliances**, the instructions shall state that the filling aperture must not be opened during use. Instructions for ~~the safe~~ refilling of the water container shall be given.

The instructions shall state that the appliance ~~has to~~ must be unplugged after use and before carrying out **user maintenance** on the appliance.

The instructions for appliances intended to clean swimming pools shall include the substance of the following:

Do not use in swimming pools containing water.

If symbol IEC 60417-5597 (2014-06) or symbol IEC 60417-5041 (2002-10) is used, its meaning shall be explained.

7.14 Addition:

The height of the symbol IEC 60417-5597 (2014-06) and the height of the triangle in symbol IEC 60417-5041 (2002-10) shall be at least 10 mm. **7**

7.15 Addition:

The marking specified for external **accessible surfaces** shall be visible when the appliance is operated as in normal use, including when actuating any switch, adjusting any control or opening a lid or door. It shall not be placed on a **functional surface** or **adjacent surface**. **8**

8 Protection against access to live parts

This clause of Part 1 is 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.

11.3 Addition: 9

*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.

11.4 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 ~~Replacement~~ Modification: 10

Appliances are operated until steady conditions are established.

NOTE 101 Water is added as necessary to maintain the emission of liquid or steam.

Appliances generating steam are also operated without emission of steam.

Appliances incorporating an automatic cord reel are operated with one-third of the total length of the cord unreeled for 30 min, after which the cord is completely unreeled.

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. 11

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

Surface	Temperature rise of accessible external surfaces ^{a, b}	
	Surfaces of portable appliances situated on the floor ^f	Surfaces of hand-held appliances and other appliances ^g
Bare metal	38	42
Coated metal ^c	42	49
Glass and ceramic	51	56
Plastic and plastic coating > 0,4 mm ^{d, e}	58	62

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

- ^a Temperature rises are not measured on
- **functional surfaces and adjacent surfaces;**
 - the underside of appliances intended to be used on a working surface or floor where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end applied with a force of 1 N;
 - the rear surface of **stationary appliances** which, according to the instructions, shall be placed against a wall and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end applied with a force of 1 N.
- ^b The temperature rise on external **accessible surfaces** up to a distance of 100 mm from **adjacent surfaces** of the appliance may exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text. The temperature rise of accessible external surfaces that enclose boilers or heated reservoirs may also exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text.
- ^c Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel or non-substantially plastic coating is used.
- ^d The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.
- ^e 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.
- ^f Within 25 mm from air outlets, the above values can be increased by 10 K.
- ^g Within 25 mm from air outlets, the above values can be increased by 5 K.

Addition:

Temperature rises of **accessible surfaces** of hoses that supply steam to parts held in the hand 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**.

NOTE 101 The pressure in **pressurised appliances** is measured so that the test of 22.7 can be carried out.

12 ~~Void~~ Charging of metal-ion batteries 12

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.