IEC 60335-2-10

Edition 6.0 2021-12
COMMENTED VERSION

INTERNATIONAL STANDARD

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Household and similar electrical appliances – Safety – Part 2-10: Particular requirements for floor treatment machines and wet scrubbing machines

IEC 60335-2-10:2021-12 CMV(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-10: Particular requirements for floor treatment machines and wet scrubbing machines

FOREWORD

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This commented version (CMV) of the official standard IEC 60335-2-10:2021 edition 6.0 allows the user to identify the changes made to the previous IEC 60335-2-10:2002 +AMD1:2008 CSV edition 5.1. Futhermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes.

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.

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IEC 60335-2-10 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This sixth edition cancels and replaces the fifth edition published in 2002 and Amendment 1:2008. 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, 19.10, 20.1, 20.2, 22.101);
c) introductions of limits on the temperature rise of external accessible surfaces (Clause 11);
d) relocation of cord reel modification from 11.7 to 11.2 to align with Part 1;
e) modification of the resistance to moisture test (15.2);
f) clarification of the stability test (20.1).

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

Draft	Report on voting
61/6382/FDIS	61/6432/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 floor treatment machines and wet scrubbing machines.

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:

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– 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.

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.

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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 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. 1

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-10: Particular requirements for floor treatment machines and wet scrubbing machines

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric floor treatment and wet scrubbing machines intended for household and similar purposes, their **rated voltage** being not more than 250 V, including direct current (DC) supplied appliances and **battery-operated appliances**. 1

~~NOTE 101~~ Examples of floor treatment machines that this standard is applicable to are

– floor buffers;
– floor polishers;
– floor waxers.

~~NOTE 102~~ Examples of wet scrubbing machines that this standard is applicable to are

– floor scrubbers;
– rug shampooers;
– upholstery shampooers.

Appliances not intended for normal household use but that nevertheless ~~may~~ can be a source of danger to the public, such as appliances intended to be used by laymen in shops, hotels, offices, schools, hospitals and similar premises, in light industry and on farms, are within the scope of this standard.

~~NOTE 103 Examples of such appliances are appliances intended to be used in hotels, offices, schools, hospitals and similar premises.~~

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

  prevents them from using the appliance safely without supervision or instruction;
– children playing with the appliance.

~~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~~ 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 105~~ This standard does not apply to

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– vacuum cleaners and water suction cleaning appliances (IEC 60335-2-2);
– appliances intended 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);
– floor sanding machines;
– floor treatment machines for commercial use (IEC 60335-2-67, IEC 60335-2-72).

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:* **2**

~~**normal operation**~~
operation of the appliance under the following conditions:

Floor treatment machines are operated while being moved backwards and forwards at a rate of 15 cycles per minute on a polished steel plate over a distance of 1 m. The appliance is fitted with brushes for hard-surface floors in accordance with the instructions.

Note 101 to entry: Heating of the steel plate is to be prevented. Forced cooling may be used but care is to be taken to ensure that the air movement does not affect the temperature rises to be determined.

Floor scrubbers are operated on untreated smooth pine-wood boards, 25 mm thick and approximately 100 mm wide, fastened inside the bottom of a metal pan. The pan is filled with water to a level approximately 1 mm above the surface of the boards. The scrubber is moved backwards and forwards at a rate of 10 cycles per minute over a distance of 1 m.

Rug shampooers are operated on a carpet that is fastened inside the bottom of a metal pan that is filled with water to a level approximately 3 mm below the surface of the carpet. The carpet is made of nylon fibres having a pile height of approximately 6 mm. The shampooer is moved backwards and forwards at a rate of 10 cycles per minute over a distance of 1 m.

If the floor scrubber or rug shampooer has a liquid dispensing system, the pan is not filled with water but the liquid dispensing system is in operation.

Upholstery shampooers are operated without their rotating brushes or similar devices being in contact with upholstery or any other surface. Suction hoses are laid out straight with the inlet unobstructed. Liquid dispensing systems are operated with the liquid container empty.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

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6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12 *Addition:*

The instructions for appliances with rotating brushes shall state that a hazard may occur if the appliance runs over the supply cord.

The instructions for appliances with a liquid dispensing system shall specify the amount and type of the liquid to be used.

The instructions shall state that the plug must be removed from the socket-outlet before cleaning or maintaining the appliance.

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.

11.2 *Modification:*

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. **3**

11.3 *Addition:*

Where the external ***accessible surfaces*** *are suitably flat and access permits, then the test probe of Figure 101 is used to measure the temperature rises of external* ***accessible surfaces*** *specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used. **4**

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11.7 ~~*Replacement*~~ *Addition:* **5**

Appliances are operated until steady conditions are established.

~~*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. **4**

Addition:

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

Surface	*Temperature rise of external accessible surfaces*[a] *K*	
	Surfaces of portable appliances situated on the floor	*Surfaces of hand-held appliances and other appliances*
Bare metal	*38*	*42*
Coated metal[b]	*42*	*49*
Glass and ceramic	*51*	*56*
Plastic and plastic coating > 0,4 mm[c, d]	*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 surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end, applied with a force not exceeding 1 N.*

[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel or non-substantially plastic coating is used.*

[c] *The temperature rise limit applies also for plastic material having a metal finish of thickness less than 0,1 mm.*

[d] *When the thickness of plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal or glass and ceramic apply.*

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

This clause of Part 1 is applicable. **1**

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.

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15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 ~~*Modification:*~~

~~*Wet scrubbing machines are filled with a detergent solution specified in the instructions instead of the saline solution.*~~

Addition:

Liquid containers are filled with the spillage solution. **1** *If the container is in a hand-held part, the part is placed in the most unfavourable position. Other parts having containers are placed on a horizontal surface and overturned to the most unfavourable stable position. After 5 min the part is returned to its normal position.* **6**

Wet scrubbing machines are supplied at ***rated voltage*** *and operated for 10 min under* ***normal operation*** *except that*

– *the rate of movement is 15 cycles per minute;*
– *the water level is*
  - *approximately 1 mm below the surface of the carpet for rug shampooers;*
  - *approximately 5 mm above the surface of the wooden boards for floor scrubbers.*

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.

19.7 *Addition:*

Appliances are operated for 30 s.

19.10 *Addition:*

~~NOTE 101~~ *Appliances are operated without the brushes in contact with any surface.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

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20.1 ~~*Addition:*~~

~~NOTE 101 This requirement only applies to parts of appliances incorporating a liquid container.~~ 7

Modification:

Appliances intended to be held in the hand during normal use while also being supported by the cleaning surface, are not subjected to this test. 8

20.2 *Addition:*

~~NOTE 101~~ The requirement regarding moving parts does not apply to brushes and similar devices. It does not apply to moving parts such as shafts that become accessible when changing accessories and that only move when the brush or similar device is moving.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.101 Appliances with single-disc brushes and having a **rated power input** exceeding 300 W shall incorporate means to prevent starting in addition to the switch controlling the motor. Appliances incorporating a biased-off switch are considered to comply with this requirement if the switch:

– incorporates a self-resetting interlock, or
– is used in combination with an additional device that prevents
  - the appliance from being operated, or
  - the brush from being engaged with the motor when the handle is in the storage position.

Other appliances shall be constructed so that inadvertent operation is unlikely. Appliances where the actuating member of the switch controlling the motor is located in a recess are considered to comply with this requirement.

Compliance is checked by inspection, by manual test and by the following test.

The means to prevent starting is operated 6 000 times. It shall then be fit for further use and shall not be damaged to such an extent that compliance with this standard is impaired.

~~NOTE 1 The means to prevent starting is considered to be met by incorporating a biased-off switch that~~
~~– incorporates a self-resetting interlock, or~~
~~– is used in combination with an additional device that prevents~~
~~• the appliance from being operated, or~~
~~• the brush from being engaged with the motor when the handle is in the storage position.~~

~~NOTE 2 Inadvertent operation is considered to be unlikely if the actuating member of the switch is appropriately located, for example in a recess.~~

23 Internal wiring

This clause of Part 1 is applicable.

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24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

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 floor treatment machines and wet scrubbing machines, 30.2.2 is applicable.

~~**30.2.3** Not applicable.~~ **9**

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

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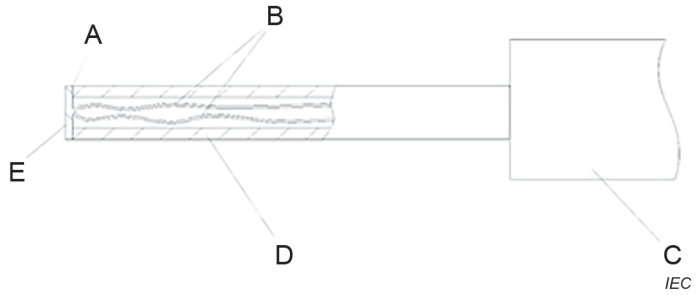

Key

A adhesive

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

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

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

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

Figure 101 – Probe for measuring surface temperatures

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