

INTERNATIONAL STANDARD



Household and similar electrical appliances – Safety –
Part 2-68: Particular requirements for spray extraction machines, for
commercial use



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INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-68: Particular requirements for spray extraction machines, for
commercial use**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-68: Particular requirements for spray
extraction machines, for commercial use****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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-68:2012+AMD1:2016 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 60335-2-68 has been prepared by subcommittee 61J: Electrical motor-operated cleaning appliances for commercial use, of 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 2012 and its Amendment 1: 2016. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition (minor changes are not listed):

- editorial and technical alignment with IEC 60335-1:2020.

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

Draft	Report on voting
61J/736/CDV	61J/743A/RVC

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.

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 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 spray extraction machines for commercial use.

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.

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.

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 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.

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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.

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 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-68: Particular requirements for spray extraction machines, for commercial use

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrical portable, non-self-propelled motor-operated **spray extraction machines** with or without attachments and with or without electrical heating elements, intended for **commercial** indoor use.

NOTE 101 This standard applies to machines for **commercial use**. The following list, although not comprehensive, gives an indication of locations that are included in the scope:

- public use areas such as hotels, schools, hospitals;
- industrial locations, for example factories and manufacturing shops;
- retail outlets, for example shops and supermarkets;
- business premises, for example offices and banks;
- rental services for those machines;
- all uses other than normal housekeeping purposes.

These machines are not equipped with a traction drive.

NOTE 102 Machines for the same intended function but equipped with a traction drive are covered by IEC 60335-2-72.

The following power systems are covered:

- mains powered motors up to a **rated voltage** of 250 V for single-phase appliances and 480 V for other appliances,
- ~~– battery powered motors.~~
- **battery-operated machines.**

This standard applies to machines in which the pressure of the employed **cleaning agent** does not exceed 2,5 MPa, and in which the product of the pressure (in MPa) and the flow of **cleaning agent** (in litres per minute) does not exceed 100, and in which the temperature of the **cleaning agent** at the spray nozzle outlet does not exceed 85 °C.

This standard does not apply to

- vacuum cleaners and water-suction cleaning appliances for household use (IEC 60335-2-2);
- floor treatment machines for **commercial use** (IEC 60335-2-67, IEC 60335-2-72);
- wet and dry vacuum cleaners, including power brush, for **commercial use** (IEC 60335-2-69);

NOTE 103 IEC 60335-2-67 and IEC 60335-2-69 cover only machines without traction drive.

- hand-held and transportable motor-operated electric **tools** (IEC 60745 series, IEC 61029 series, IEC 62841 series).
- machines designed for use in corrosive or explosive environments (dust, vapour or gas);
- machines designed for picking up hazardous dusts (as defined in IEC 60335-2-69), inflammable substances, or glowing particles;

- machines designed to handle hazardous solvents, such as flammable or explosive liquids;

NOTE 102104 Attention is drawn to the fact that in many countries, additional requirements on the safe use of the equipment covered can be specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

~~IEC 60312-1, Vacuum cleaners for household use – Part 1: Dry vacuum cleaners – Methods for measuring the performance~~

IEC TS 62885-1, *Surface cleaning appliances - Part 1: General requirements on test material and test equipment*

ISO 6344-2, *Coated abrasives – Grain size analysis – Part 2: Determination of grain size distribution of macrogrits P12 to P220*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.9 ~~Replacement~~ Addition: normal operation

conditions under which the machine is operated in normal use, specified as follows:

The machine is operated with the spray extraction pump with the nozzle giving the highest load, the vacuum motor, the device for agitating the carpet pile (if any), the **cleaning agent heater** (if any) and the soiled water discharge pump (if any) all in use. Any marking of short time intermittent operation of the pumps is observed.

The **normal operation** P_m of the vacuum motor is obtained at the following power input:

$$P_m = 0,5 (P_f + P_i)$$

where

P_f is the input, in watts, when the machine has been operated for 3 min, fitted with the nozzle and hose giving the highest input;

P_i is the input, in watts, when the machine has been operated for 20 s with the nozzle sealed, immediately following the 3-minute-period with the nozzle open. Any valve or similar device used to ensure a flow of air to cool the motor in the event of a blockage of a main air inlet is rendered ineffective.

P_f and P_i are measured with the supply voltage adjusted to **rated voltage**, or to a voltage equal to the mean value of the **rated voltage range** if the difference between the limits of the **rated voltage range** does not exceed 10 % of the mean value of the range. If the difference between the limits of the **rated voltage range** exceeds 10 % of the mean value, the tests are carried out with the supply voltage set to the upper limit of the range.

The hose is laid out straight. If the machine is provided with a hose as an optional accessory, it is operated without the hose.

Electrically driven devices for agitating the carpet, if any, are in operation but are not in contact with the floor or any other surface or with the means used to seal the air inlet.

The adjustment of the air inlet is not altered when it is specified that the machine is operated under normal load, irrespective of the supply voltages specified in the test. Where optional filtration systems are supplied with the **spray extraction machine**, the filtration system giving the least air resistance (maximum flow) is fitted.

The normal load is equal to the mean load P_f for the electrically driven agitating device such as a motor driven brush is determined in accordance with the following:

- the agitating device operates on a carpet as specified in ~~IEC 60312-1~~ IEC TS 62885-1,
- the mean load P_f is determined when using the device in the following way:
 - after setting the device, the device is moved twice over a distance of 5 m in the direction giving the highest load;
- the motor responsible for the airflow operates under the same conditions as determining P_f , i. e. no airflow restrictions, and measurements are taken after 3 min;
- the device is adjusted to the carpet pile height;
- it is necessary to move the agitating device slowly across the carpet to avoid carpet damage.

Soiled water discharge pumps, if applicable, are operated as follows.

The pump delivers a continuous flow of water without any soiled water discharge hose attached to the soiled water outlet of the machines unless the discharge hose is permanently attached to the machine. The vacuum motor works during the test, unless an interlock device is provided to prevent combined operation of both motors.

~~Socket outlets for accessories are loaded with a resistive load in accordance with the marking.~~

3.101

cleaning agent pre-heater

electric heating element which is intended to raise the temperature of the **cleaning agent** to operating temperature before the cleaning operation

3.102

cleaning agent heater

electric heater which is intended to maintain the **cleaning agent** at the correct temperature for effective operation

3.103

cleaning agent

water with or without the addition of soluble or miscible detergent

3.104

spray extraction machine

machine with or without heating elements and with or without attachments, by which a **cleaning agent** under pressure is sprayed into or onto the surface to be cleaned and the remaining soiled **cleaning agent** is removed by suction

3.105

maximum rated operating pressure

maximum pressure generated by the pump when operated at **rated voltage**

3.106

water-suction cleaning machine

machine for applying and extracting a **cleaning agent**

3.107**motorized cleaning head**

hand-held or hand-guided cleaning device connected to the machine, with an integrated electrical motor

Note 1 to entry: The permanently attached main cleaning head is not regarded as a **motorized cleaning head**.

3.108**operator**

person installing, operating, adjusting, cleaning, moving, or performing user maintenance on the machine

3.109**test solution**

solution which consists of 20 g of NaCl and 1 ml of a solution of 28 % by mass of dodecyl sodium sulphate in each 8 l of water

Note 1 to entry: The chemical designation formula of for dodecyl sodium sulphate is $C_{12}H_{25}NaSO_4$.

3.110**commercial use**

intended use of machines covered by this standard, i.e. not intended for normal housekeeping purposes by private persons but which may be a source of danger to the public

I.e. in particular that

- the machines may be used by cleaning contractors, cleaning staff, etc.;
- they are used in commercial or public premises (i.e. offices, shops, hotels, hospitals, schools, etc.) or in industrial (plants, etc.) and light industrial (workshops, etc.) environments.

Note 1 to entry: **Commercial use** is also called professional use.

4 General requirement

This clause of Part 1 is applicable except as follows.

Replacement of the first paragraph by the following text:

Machines shall be constructed so that they function safely so as to cause no danger to persons or surroundings during normal use, even in the event of carelessness, and during installation, adjusting, maintenance, cleaning, repairing or transportation.

Addition:

For the purpose of this standard, the term 'appliance' as used in Part 1 is to be read as 'machine'.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.101 *The **test solution** is to be stored in a cool atmosphere and used within seven days after its preparation.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

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

- class I,
- class II, or
- class III.

Compliance is checked by inspection and by the relevant tests.

6.2 Addition:

Spray extraction machines shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Modification:

Replace the fourth dashed item as follows:

- the business name and address of the manufacturer and, if applicable, his authorized representative; any address shall be sufficient to ensure postal contact;

Addition:

Machines shall be marked in addition with the following:

- serial number, if any;
- designation of the machine and series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers;

NOTE 101 Designation of machine, series or type includes the model or type reference as required in Part 1.

- year of construction, i.e. the year in which the manufacturing process is completed;

NOTE 102 The year of construction can be part of the serial number.

- **maximum rated operating pressure** in MPa or bar;
- maximum outlet temperature of the spraying liquid in °C, if above 50 °C;
- machines shall be marked with the mass of the most usual configuration in kg.

The tank for the **cleaning agent** shall be marked on the tank, its cover or nearby, with the maximum temperature of the **cleaning agent** filled into the tank in °C.

If the machine is designed to be filled with **cleaning agent** exceeding 60 °C, the following warning shall be placed near the filling opening:

WARNING Hot. Do not touch.

The height of the lettering shall be not less than 4 mm. This wording may be replaced by symbol IEC 60417-5041 (2002-10).

7.1.101 Motorized cleaning heads shall be marked with

- **rated voltage** or **rated voltage range** in volts;
- **rated power input** in watts;
- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- mass of the most usual configuration in kg.

Motorized cleaning heads for water-suction cleaning appliances, except those of **class III construction** having a **working voltage** up to 24 V shall be marked with symbol IEC 60417-5935 (2012-09).

NOTE This symbol is an information sign and, except for the colours, the rules of ISO 3864-1 apply.

Compliance is checked by inspection.

~~7.1.102 Socket outlets for accessories shall be marked with the maximum load in watts on the socket outlet or close to it.~~

~~Compliance is checked by inspection.~~

7.6 Addition:



[symbol IEC 60417-5935
(2012-09)]

motorized cleaning head for
water-suction cleaning



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

caution, hot surface

7.12 Modification:

Delete the first paragraph and the first warning.

Add after the NOTE the following new text:

NOTE 101 Alternative requirements for instructions in hard copy form are available in 7.12.9

Addition:

The front cover of the instructions shall include the substance of the following warning:

CAUTION Read the instructions before using the machine.

This wording may be replaced by symbols ISO 7000-0434A (2004-01) and ISO 7000-0790 (2004-01).

The instructions shall contain at least the following:

- the business name and full address of the manufacturer and, if applicable, his authorized representative;
- designation of series or type of the machine as marked on the machine itself, except for the serial number;

NOTE 101102 The designation of series or type can be abstracted, as long as the identification of the product is ensured.

- the general description of the machine;
- the intended use of the machine and the auxiliary equipment as covered by the scope of this standard;

NOTE 102103 Examples of auxiliary equipment are **motorized cleaning heads** and lights.

- the meaning of the symbols used on the machine and in the instructions;
- drawings, diagrams, descriptions and explanations necessary for the safe use, maintenance and repair of the machine and for checking its correct functioning;
- technical data including the markings on the machine;
- information regarding putting into service, safe operation, handling, transportation, and storage of the machine taking into account its weight;
- instructions to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;
- the conditions in which the machine meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;
- the procedure to be followed to prevent unsafe situations in the event of accident (e.g. contact with or spillage of detergents, battery acid, fuel or oil) or equipment breakdown;
- the substance of the following:

This machine is intended for commercial use, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses.

The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation, including preventive maintenance measures. They shall, if applicable, give the specifications of the spare parts if they affect the health and safety of the **operator**, e.g. filter elements.

In addition, the instructions shall give the following information, if applicable:

- for battery powered machines, instructions regarding the precautions to be taken for safe charging;
- precautions to be taken when changing brushes or other attachments;
- information on the detergents or other liquids that may be used including the choice and use of personal protective equipment (PPE);
- essential characteristics of auxiliary equipment which may be fitted to the machine;
- information regarding safe disposal of batteries.

7.12.9 Add the following text after the second paragraph:

Instead of hard copy, electronic form can be used if the following conditions are met:

- instructions for unpacking, installation and enabling access to the complete safety instructions on a suitable reading device shall be provided on paper or marked on the machine,
- the suitable reading device shall be provided with the machine or be necessary to operate the machine, and
- the content of the electronic instructions shall be provided with the machine.

For non-safety related functional use, the operational manual may be provided in electronic form either:

- on a suitable electronic display incorporated in the appliance, or
- on a separate electronic device provided with the appliance, or
- from a provided link to a website, where they may be viewed and/or downloaded.

7.12.101 The instructions shall include warnings concerning ways in which the machine shall not be used, which in the experience of the manufacturer are likely to occur. At least, it shall include the substance of the following warnings, if applicable.

- **WARNING** Operators shall be adequately instructed on the use of these machines.
- **CAUTION** This machine is for indoor use only.
- **CAUTION** This machine shall be stored indoors only.
- A warning that the machine shall be disconnected from its power source during cleaning or maintenance and when replacing parts or converting the machine to another function:
 - for mains operated machines, by removing the plug from the socket-outlet;
 - for battery powered machines, by safely disconnecting at least the B+ or B- pole of the battery or by an equivalent method (disconnecting device); for non-SELV, both poles must be disconnected.

Instructions for mains operated machines shall also include the substance of the following:

- **WARNING** Do not allow the supply cord to come into contact with the rotating brushes.

Instructions for machines having a current-carrying hose for dry suction, operating at other than **safety extra-low voltage**, shall also include the substance of the following:

- **WARNING** This hose contains electrical connections: do not use it to collect water and do not immerse in water for cleaning.

Compliance is checked by inspection.

7.12.102 Information on noise

NOTE The instructions ~~can~~ provide information on airborne noise emission as indicated in AA.2.7.

7.12.103 Information on vibration

NOTE The instructions can provide information on the vibration total value as indicated in Clause BB.2.

7.13 Addition:

The words “Original instructions” shall appear on the language version(s) verified by the manufacturer.

7.14 Addition: can

The height of symbol IEC 60417-5935 (2012-09) shall be at least 15 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 Addition:

Water and water-borne **cleaning agents** are considered conductive.

8.1.1 Add the following text after the sixth paragraph:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

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.

11.7 Addition:

Machines are operated until steady conditions are established.

11.8 Add the following to Table 3, at the end of footnote a.

Motors which are hermetically sealed are considered to be airtight.

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

This clause of Part 1 is applicable.

13 Leakage current and dielectric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 Addition:

*For **class I appliances** where several motors operate at the same time, the leakage current shall not exceed 3,5 mA.*

14 Transient overvoltages

This clause of Part 1 is applicable.

15 ~~Moisture~~ resistance

This clause of Part 1 is applicable except as follows.

15.1.2 Addition:

*Machines are operated for 10 min on a level surface wetted by the **test solution**.*

In practice, the pick-up consists largely of air such that there is no overloading of the suction motor; the input load should be observed to avoid overloading.

15.2 Replacement:

Machines shall be so constructed that

- spillage of liquid due to **normal operation**,
- filling including overfilling, and
- overturning of unstable machines

does not affect their electrical insulation.

Tanks for the following liquids are excluded from the tests:

- hydraulic oil,
- coolant,
- fuel (diesel, gasoline, LPG).

Compliance is checked by the following tests:

The machine is placed on a support inclined at an angle of 10° to the horizontal, the liquid container being filled to half the level indicated in the instructions. A machine is considered to be unstable if it overturns when a force of 180 N is applied to the top of the machine in the most unfavourable horizontal direction.

Machines provided with an appliance inlet are fitted with an appropriate connector and flexible cable or cord; machines with **type X attachment** are fitted with the lightest cross-sectional area specified in Table 11. Other machines are tested as delivered.

The liquid container of the machine is completely filled with a saline solution of water containing approximately 1 % NaCl and 0,6 % **non-ionic** rinsing agent and a further quantity, equal to 15 % of the capacity of the container or 0,25 l, whichever is the greater, is poured in steadily over a period of 1 min.

Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:

- ~~viscosity = 17 mPa·s,~~
- ~~pH = 2,2 (1 % in water).~~

~~and its composition shall be~~

Substance	Parts by mass %
Plurafac ® LF 221¹	15,0
Cumene sulfonate (40 % solution)	11,5
Citric acid (anhydrous)	3,0
Deionized water	70,5
¹ Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product.	

- viscosity, 17 mPa s;
- pH 2,2 (1 % in water)
- and its composition shall comprise the following substances
- Plurafac ® LF 221¹

15,0 % parts by mass

¹ Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.

– Cumene sulfonate (40 % solution)	11,5 % parts by mass
– Citric acid (anhydrous)	3,0 % parts by mass
– Deionized water	70,5 % parts by mass

Machines which are unstable are then, with the container completely filled and with the cover or lid in place, overturned from the most unfavourable of the normal positions of use, and are left in that position for 5 min unless the machine returns automatically to its normal position of use.

Nozzles and **motorized cleaning heads** of **water-suction cleaning machines** are placed in a tray, the base of which is level with the surface supporting the machine. The tray is filled with the **test solution** to a level of 5 mm above its base, this level being maintained throughout the test. The machine including the **motorized cleaning head** is operated until its liquid container is completely full and afterwards for a further 5 min.

After each of these tests, the machine shall withstand the electric strength test of 16.3.

There shall be no trace of liquid on insulation that reduces the **clearances** or **creepage distances** below the values specified in Clause 29.

15.3 Modification:

The relative humidity shall be $(93 \pm 6) \%$.

15.101 Motorized cleaning heads of water suction cleaning machines shall be resistant to liquids that may come into contact with them during normal use.

The following test is not applicable to **motorized cleaning heads** of **class III construction** having a **working voltage** up to 24 V.

Compliance is checked by the following four tests.

The **motorized cleaning head** is subjected to an impact test as described in IEC 60068-2-75, the value of the impact being 2 J. The **motorized cleaning head** is rigidly supported and three blows are applied to every point of the enclosure that is likely to be weak.

It is then subjected to the free fall test procedure 1 of IEC 60068-2-31. It is dropped 4 000 times from a height of 100 mm onto a steel plate having a thickness of not less than 15 mm. It is dropped

- 1 000 times on its right side;
- 1 000 times on its left side;
- 1 000 times on its front face;
- 1 000 times on its cleaning surface.

The **motorized cleaning head** is then subjected to the test described in IEC 60529:1989, 14.2.4, as amended by IEC 60529:1989/AMD2:2013 using the **test solution**.

The **motorized cleaning head** is to be operated in a flat-bottomed vessel filled with a saline solution of water containing approximately 1 % NaCl so that a depth of 3,0 mm of water is maintained. The vessel is to be a size such that the **motorized cleaning head** moves about freely; and is to be operated:

- without connection to the **spray extraction machine** for 15 min, if applicable; and
- connected to the **spray extraction machine** until the machine has picked up as much water as its capacity holds or for 5 min, whichever occurs sooner.

The **motorized cleaning head** shall then withstand the electric strength test of 16.3, the voltage being applied between the **live parts** and the **test solution**. There shall be no trace of saline solution on insulation that reduces the **clearances** or **creepage distances** below the values specified in Clause 29.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.3 Addition:

Current-carrying hoses, except for their electrical connections, are immersed for 1 h in a saline solution of water containing approximately 1 % NaCl, at a temperature of $20\text{ °C} \pm 5\text{ °C}$. While the hose is still immersed, a voltage of 2 000 V is applied for 5 min between each conductor and all the other conductors connected together. A voltage of 3 000 V is then applied for 1 min between all the conductors and the saline solution.

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:

~~Machines are also subjected to the tests of 19.101 and 19.102.~~

Machines having containers provided with a shut-off device or valve are subjected to the test of 19.101.

Machines with appliance outlets, complying with the standard sheets in IEC 60320-3 and socket outlets are subjected to the test of 19.102.

Appliances with electronic speed control are also subjected to the test of 19.103.

19.2 Addition:

The machine is tested without liquid in the container.

NOTE 101 The term restricted heat dissipation of Part 1 means without liquid in the container.

The conditions of adequate heat dissipation are different for heaters and pre-heaters:

- for the **cleaning agent pre-heater**: the conditions that apply when the complete machine is at ambient temperature when the heating element is switched on for the first time;
- for the **cleaning agent heater**: the conditions that apply when the heating element is operated during normal use of the **spray extraction machine**.

19.5 Modification:

In the fourth paragraph, delete the following text:

“used in a system with polarized plugs intended for connection to polarized socket outlets”

19.7 Addition:

*Pressure pumps provided with a filter, fan blades of water suction systems, and agitating devices except those of **motorized cleaning heads**, are not regarded as parts liable to get blocked.*

Soiled water discharge pumps are liable to get blocked.

Motorized cleaning heads are tested with the rotating brush or similar device locked for 30 s.

19.9 Not applicable.

19.10 Addition:

For this test, the lowest possible load is obtained with the air inlet sealed.

In the case of agitating devices driving a brush or agitator, the belt is removed.

19.13 Modification:

In the second paragraph, add “and 22.104” after “20.2”.

19.101 *Machines having containers which are provided with shut-off device(s) or valve(s) are again subjected to the test of 15.2.*

Stop valves or other fluid shut-off devices shall be made inoperative. If two or more independent shut-off devices are provided, only one of them is made inoperative at a time, provided that they have passed the test of operating 3 000 times satisfactorily. Otherwise, all devices that failed shall be made inoperative.

Care should be taken to suck-up an air-liquid mixture to prevent overloading of the motor of the suction unit. The input power should be observed to avoid overloading.

*After this test, the machine shall be subjected to the electrical strength test of 16.3. Inspection shall show that water has not entered the machine to any dangerous extent. In particular, there shall be no trace of water on the electrical insulation that reduces the **clearance** or **creepage distances** below the limits specified in Clause 29.*

19.102 *Machines with appliance outlets, complying with the standard sheets in IEC 60320-3 and socket outlets shall be operated under conditions of **normal operation**, except the appliance outlet or socket outlet is loaded with the maximum load corresponding to its configuration in accordance with IEC 60320-3 or IEC TR 60083, respectively. Machines with more than one appliance outlet or socket outlet are tested with each outlet loaded one at the time.*

However, this test is not applied for machines with appliance outlets or socket outlets

- intended only to supply accessories supplied with the machine,*
- inaccessible to the user, or*
- provided with a **protective device** as specified in 22.61.*

19.103 *An appliance with an electronic speed control shall be operated for 5 minutes under the fault conditions specified in 19.11.2, trying to achieve the highest motor speed.*

During the test, parts shall not be ejected from the appliance. After the test, the appliance shall comply with 20.2.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 Addition:

Motorized cleaning heads are not subjected to this test.

20.2 Add the following text after the second paragraph of the test specification:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Replacement of the first paragraph by the following text:

Machines and their components and fittings shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the machine.

Modification:

In the third paragraph, the impact value is increased to $1,0 \text{ J} \pm 0,04 \text{ J}$.

21.101 Those parts of the machine that are subjected to impact in normal use are tested as follows.

*If failure of the part subject to impact would cause a failure to comply with this specification, any spot of the machine which may be exposed during **normal operation** to impacts or blows shall be subjected to a single blow with an impact energy of 6,75 Nm. The impact stress on the free-standing machines shall be exerted by a steel sphere with a diameter of 50,8 mm and a mass of 0,535 kg dropped from a height of 1,3 m or hanging on a string acting as a pendulum, falling from a height of 1,3 m.*

21.102 Current-carrying hoses shall be resistant to crushing.

Compliance is checked by the following test.

The hose is placed between two parallel steel plates each having a length of 100 mm, a width of 50 mm and the edges of the longer sides rounded with a radius of 1 mm. The axis of the hose is positioned at right angles to the longer sides of the plates. The plates are placed at a distance of approximately 350 mm from one end of the hose.

The steel plates are pressed together at a rate of $50 \text{ mm/min} \pm 5 \text{ mm/min}$ until the applied force is 1,5 kN. The force is then released and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.103 Current-carrying hoses shall be resistant to abrasion.

Compliance is checked by the following test.

One end of the hose is attached to the connecting rod of the crank mechanism shown in Figure 102. The crank rotates at 30 revolutions per minute resulting in the end of the hose moving horizontally backwards and forwards over a distance of 300 mm.

The hose is supported by a rotating smooth roller over which a belt of abrasive cloth moves at a speed of 0,1 m/min. The abrasive is corundum grit size P100, as specified in ISO 6344-2.

A mass of 1 kg is suspended from the other end of the hose, which is guided to avoid rotation.

In the lowest position, the mass has a maximum distance of 600 mm from the centre of the roller.

The test is carried out for 100 revolutions of the crank.

After the test, **basic insulation** shall not be exposed and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.104 Current-carrying hoses shall be resistant to flexing.

Compliance is checked by the following test.

The end of the hose intended to be connected to the **motorized cleaning head** is attached to the pivoting arm of the test equipment shown in Figure 103. The distance between the pivot axis of the arm and the point where the hose enters the rigid part is $300 \text{ mm} \pm 5 \text{ mm}$. The arm can be raised from the horizontal position by an angle of $40^\circ \pm 1^\circ$. A mass of 5 kg is suspended from the other end of the hose or from a convenient point along the hose so that when the arm is in the horizontal position, the mass is supported and there is no tension on the hose.

NOTE It can be necessary to reposition the mass during the test.

The mass slides against an inclined plate so that the maximum deflection of the hose is 3° .

The arm is raised and lowered by means of a crank that rotates at a speed of $(10 \pm 1) \text{ r/min}$.

The test is carried out for 2 500 revolutions of the crank after which the fixed end of the hose is turned through 90° and the test continued for a further 2 500 revolutions. The test is repeated in each of the other two 90° positions.

After 10 000 revolutions, the hose shall withstand the electric strength test of 16.3.

If the hose ruptures before 10 000 revolutions are achieved, the flexing test is terminated. The hose shall still withstand the electric strength test of 16.3.

21.105 Current-carrying hoses shall be resistant to torsion.

Compliance is checked by the following test.

One end of the hose is held in a horizontal position with the remainder of the hose freely suspended. The free end is rotated in cycles, each cycle consisting of five turns in one direction and five turns in the opposite direction, at a rate of 10 ~~turns~~ **revolutions** per minute.

The test is carried out for 2 000 cycles.

After the test, the hose shall withstand the electric strength test of 16.3 and shall not be damaged to such an extent that compliance with this standard is impaired.

21.106 Current-carrying hoses shall be resistant to cold conditions.

Compliance is checked by the following test.

A 600 mm length of hose is bent as shown in Figure 104 and the ends are tied together over a length of 25 mm. The hose is then placed for 2 h in a cabinet having a temperature of $-15\text{ °C} \pm 2\text{ °C}$. Immediately after the hose is removed from the cabinet it is flexed three times, as shown in Figure 105, at a rate of one flexing per second.

The test is carried out three times.

There shall be no cracks or breaks in the hose and it shall withstand the electric strength test of 16.3. Any colour change of the hose is not considered as a failure.

21.107 Cleaning agent pumps, pipes and hoses, hose connectors and couplers, valves and other components of **spray extraction machines** shall be designed to withstand any mechanical, chemical or thermal stresses that may occur during normal use.

Compliance is checked by the following test:

*Pipes and hoses, hose connectors and couplers, valves and other components which are subjected to the operating pressure of the **cleaning agent** shall be filled with the **cleaning agent** recommended by the manufacturer at the normal dilution and aged for 10 days (240 h) freely suspended in a heating cabinet with natural circulation.*

The temperature shall be maintained:

- at $(70 \pm 2)\text{ °C}$, if the temperature of the **cleaning agent** solution does not exceed 50 °C during conditions of **normal operation**, or
- at $(90 \pm 2)\text{ °C}$, if the temperature of the **cleaning agent** exceeds 50 °C during conditions of **normal operation**.

Immediately afterwards, the parts, or the entire assembly of these parts, shall be put into a water bath with a temperature of:

- $(50 \pm 3)\text{ °C}$, if the temperature of the **cleaning agent** does not exceed 50 °C during conditions of **normal operation**, or
- $(85 \pm 3)\text{ °C}$, if the temperature of the **cleaning agent** exceeds 50 °C during conditions of **normal operation**.

*While the parts are in the water bath, they shall be subjected to a pressure test at 1,5 times the **maximum rated operating pressure** of the machine for 30 min. **Cleaning agent** shall be used as a test liquid. No damage that could impair safety shall occur to any of the parts during the test. Pressure operated switches for the control of cleaning solution pumps shall be subjected to pressure obtained during the appropriate test of Clause 19. Pressure operated switches shall also be inspected for effectiveness in avoiding **cleaning agent** coming into contact with insulation and a pin hole shall be made in any polymer diaphragm that is flexed in use to ensure that this does not pass the **cleaning agent** which would result in the reduction of **clearances** or **creepage distances** below the limits specified in Clause 29.*

A switch or an unloading device that remains in a functioning mode shall be further tested by allowing the pressure to build up until it operates. The pressure so created is then regarded as the normal pressure for that part of the system.

Further testing at 1,5 times this (elevated) normal pressure is then done on the part of the system sustaining this pressure. There shall be no failure within the meaning of this standard.

21.108 Polymeric tanks designed to be filled with liquids exceeding a temperature of 50 °C shall be of adequate strength.

Compliance is checked as follows:

Fill the container with the maximum specified liquid quantity, at the highest specified temperature. Maintain this temperature during 5 periods of 8 h. Replenish the liquid at the beginning of each period.

During the test, the container shall remain fully functional and shall show no critical deformations or cracks which may impair compliance with this standard.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 Addition:

Machines shall be constructed that neither water nor foam from detergents can penetrate into the motor or come in contact with **live parts**.

22.35 Addition:

These parts are subject to the hammer test of 21.1. If this insulation does not meet the requirement of 29.3, these are subject to the following impact test.

*A sample of the covered part is conditioned at a temperature of 70 °C ± 2 °C for seven days (168 h). After conditioning, the sample is allowed to attain approximately **room temperature**.*

Inspection shall show that the covering has not shrunk to such an extent that the required insulation is no longer given or that the covering has not peeled off, so that it may move longitudinally.

After this, the sample is maintained for 4 h at a temperature of –10 °C ± 2 °C.

While still at this temperature, the sample is then subjected to impact by means of the apparatus shown in Figure 101. The weight "A", having a mass of 0,3 kg, falls from a height of 350 mm on to the chisel "B" of hardened steel, the edge of which is placed on the sample.

*One impact is applied to each place where the insulation is likely to be weak or damaged in **normal operation**, the distance between the points of impact being at least 10 mm.*

After this test, it shall show that the insulation has not peeled off and an electric strength test as specified in 16.3 is made between metal parts and metal foil wrapped round the insulation in the required area.

22.61 Add the following at the end:

The **protective device** is not necessary for appliances for which 30.2.2 is applicable, fitted with a supply cord or cord set, having a plug of the identical maximum current rating as the socket-outlet or appliance outlet integrated into the appliance.

22.101 Machines shall be constructed so as to prevent the penetration of objects from the floor, which may impair the safety of the machine.

Live parts shall be at least 30 mm distance from the surface of the floor, measured in vertical direction through existing holes. This requirement does not apply to **motorized cleaning heads**.

Compliance is checked by inspection and measurements.

22.102 Class I appliances or class II appliances shall be equipped with a mains isolating switch that ensures **all-pole disconnection** according to overvoltage category III conditions.

For built-in battery chargers, this **all-pole disconnection** can be realised by pulling the plug.

Other switches may be of single pole construction.

The following circuits need not be disconnected by the supply disconnecting device:

- plug and socket-outlets;
- undervoltage protection circuits that are only provided for automatic tripping in the event of supply failure;
- phase rotating indicators;
- control circuits for interlocking.

It is recommended, however, that such circuits be provided with their own disconnecting device.

Compliance is checked by inspection.

22.103 For machines where the **operator** is required to use personal protective equipment (PPE), controls shall be designed in such a way that they can be operated safely.

Compliance is checked by inspection and by functional test.

22.104 If machines are provided with shut-off devices, the devices shall prevent the liquid level from exceeding the maximum allowed level.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

The main switch shall be tested for 50 000 cycles of operations.

24.7 Not applicable.

24.101 Machines with motors provided with **self-resetting thermal cut-outs** shall work reliably under overvoltage conditions.

Compliance is checked by the following test.

*The machine is supplied at a voltage equal to 1,1 times **rated voltage**, under locked rotor conditions so as to cause the **thermal cut-out** to operate within a few minutes, until the **thermal cut-out** has performed 200 cycles of operation. The test shall be carried out with a **cleaning agent** that has not been heated, and with heating elements, if any, out of circuit.*

After the test, the machine shall withstand the tests of Clause 16.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Addition:

Machines classified as IPX7 shall not be provided with an appliance inlet.

Machines classified as IPX4, IPX5 or IPX6 shall not be provided with an appliance inlet, unless both inlet and connector have the same classification as the machine when coupled or separated, or unless inlet and connector can only be separated by the use of a **tool** and have the same classification as the machine when coupled.

Machines provided with an appliance inlet shall also be provided with an appropriate cord set.

25.7 Replacement:

Supply cords shall be one of the following types:

- Rubber sheathed

Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53);

NOTE 101 These cords are not suitable for machines intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.

- Polychloroprene sheathed

Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57);

NOTE 102 These cords are suitable for machines intended to be used in low temperature applications.

- Polyvinyl chloride sheathed

These cords shall not be used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of Clause 11. Their properties shall be at least those of ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53), for other machines;

- Heat-resistant polyvinyl chloride sheathed

These cords shall not be used for **type X attachment** other than specially prepared cords. Their properties shall be at least those of

- heat-resistant light polyvinyl chloride sheathed cord (code designation 60227 IEC 56), for machines having a mass not exceeding 3 kg;
- heat-resistant polyvinyl chloride sheathed cord (code designation 60227 IEC 57), for other machines.

- Halogen-free, low smoke, thermoplastic insulated and sheathed

Their properties should at least be those of ordinary duty halogen-free free, low smoke flexible cable (code designation 62821 IEC 102 for circular cable).

Compliance is checked by inspection.

25.14 Addition:

For machines incorporating a **type X attachment** or **type Y attachment**, the number of flexings is 20 000.

25.15 Modification:

Replace Table 12 by the following:

Table 12 – Pull force and torque

Mass of machine kg	Pull force N	Torque Nm
≤ 1	30	0,1
$> 1 \text{ and } \leq 4$	60	0,25
> 4	125	0,40

Addition:

The test is also applied to the cord in the cord set for machines classified as IPX4 or higher that are provided with an appliance inlet. The cord set is fitted to the appliance inlet prior to the commencement of the test.

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 due to normal use of the machine.

30 Resistance to heat and fire

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

30.2.3 Not applicable.

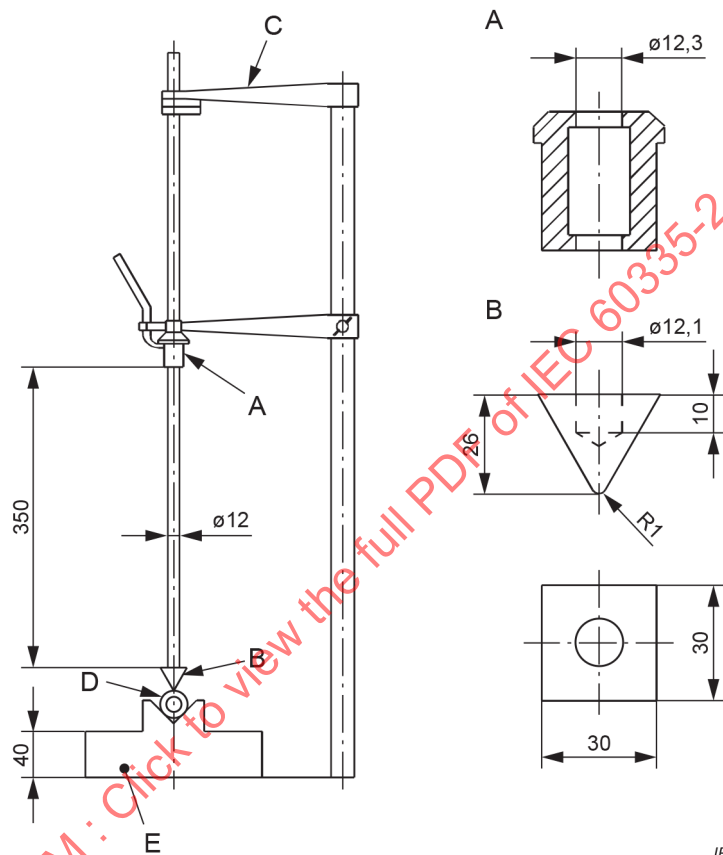
31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Dimensions in millimetres

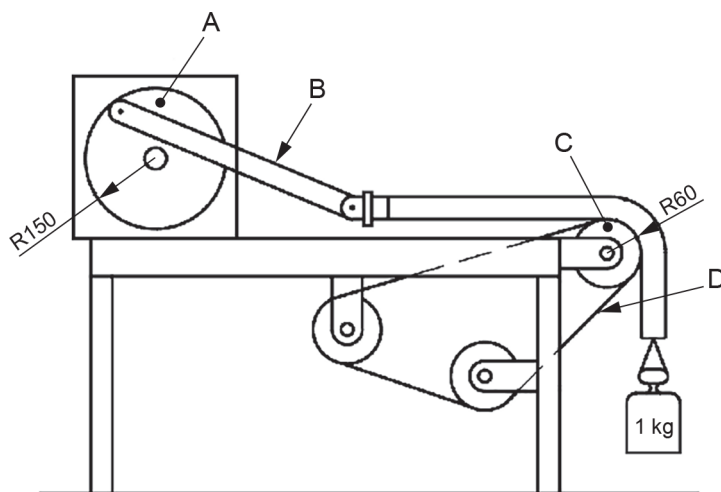


Key

- A weight
- B chisel
- C fixing arm
- D sample
- E base having mass of 10 kg

Figure 101 – Impact test apparatus

Dimensions in millimetres

**Key**

- A crank mechanism
- B connecting rod
- C roller, diameter 120 mm
- D abrasive cloth belt

Figure 102 – Apparatus for testing the abrasion resistance of current-carrying hoses

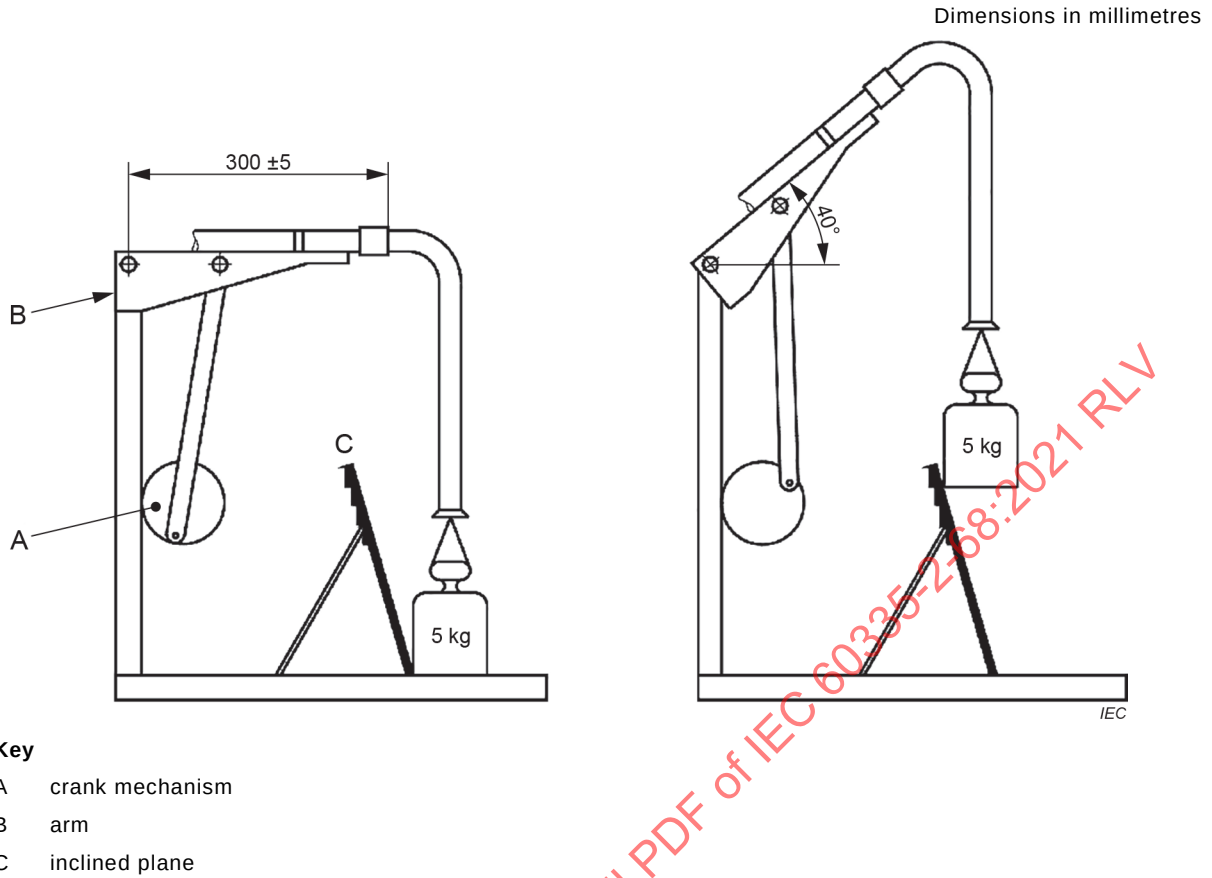


Figure 103 – Apparatus for testing the resistance to flexing of current-carrying hoses

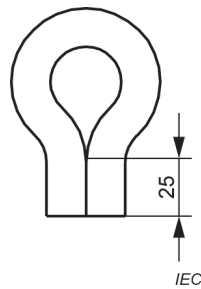
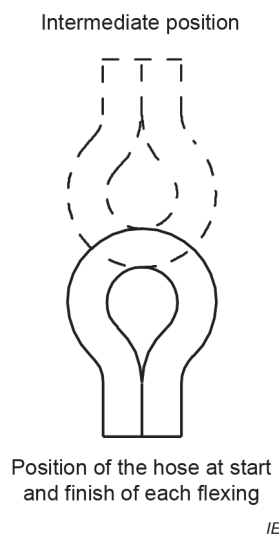


Figure 104 – Configuration of the hose for the freezing treatment



**Figure 105 – Flexing positions for the hose
after removal from the freezing cabinet**

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Annexes

The annexes of Part 1 are applicable except as follows.

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~~Annex B~~
~~(normative)~~

**~~Appliances powered by rechargeable batteries
that are recharged in the appliance~~**

~~Annex B of Part 1 is applicable except as follows.~~

~~7 Marking and instructions~~

~~7.1 Delete the last paragraph.~~

~~7.12 Replace the last two paragraphs by:~~

~~For machines intending to be supplied from a detachable supply unit or a battery charger for the purposes of recharging the battery, the type reference of the detachable supply unit or battery charger shall be stated.~~

~~7.15 Delete the last paragraph.~~

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~~Annex S~~
~~(normative)~~

**~~Battery-operated appliances powered by batteries that are
non-rechargeable or not recharged in the appliance~~**

~~Annex S of Part 1 is applicable except as follows.~~

~~7 Marking and instructions~~

~~7.1 Add to the last sentence at the beginning: "If relevant and".~~

~~19 Abnormal operation~~

~~19.S.102 This clause is not applicable for machines with hardwired battery sets.~~

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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:

7 Markings and instructions

7.1 Modification:

Add at the end of the fourth paragraph ("If appliances use more than one **battery**,"): "except for machines with hardwired **battery** sets."

19 Abnormal operation

B.19.2 Addition:

This clause is not applicable for machines with hardwired **battery** sets.

22 Construction

B.22.3 Modification:

Add the following text after the sixth paragraph of the test specification:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

NOTE 102 During this test, two test probes are applied simultaneously.

B.22.4 Modification:

Add the following text after the fifth paragraph of the test specification:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

NOTE 102 During this test, two test probes are applied simultaneously.

Annex AA (informative)

Emission of acoustical noise

AA.1 Noise reduction

Noise reduction at **spray extraction machines** is an integral part of the design process and shall be achieved by particularly applying measures at source to control noise, see for example ISO TR 11688-1. The success of the applied noise reduction measures is assessed on the basis of the actual noise emission values in relation to other machines of the same type with comparable non-acoustical technical data.

The major sound sources of **spray extraction machines** are: motors and fans.

AA.2 Noise test code

AA.2.1 Emission sound pressure level determination

The emission sound pressure level is determined in accordance with ISO 11203:1995 applying the method described in 6.2.3 d) with the measurement distance $d = 1$ m.

NOTE In this case, the emission sound pressure level is equal to the surface sound pressure level used for calculating the sound power level according to ISO 3744 when applying a rectangular parallelepiped measurement surface at a distance of 1 m from the reference box.

AA.2.2 Sound power level determination

The sound power level is measured in accordance with ISO 3744, or with ISO 3743-1 if a suitable hard-walled test room is available, or with ISO 9614-2. The direction of the x-axis in Figures AA.1a and AA.1b ~~must~~ shall be the same as the x-axis defined for the microphone configurations in ISO 3744.

AA.2.3 Operating and mounting conditions

The operating condition shall be identical for the determination for both sound power and emission sound pressure level at the specified positions.

In addition to **normal operation** in accordance with 3.1.9, the following requirements shall be taken into account.

Before starting the measurement procedure, the suction nozzle shall be adjusted correctly in accordance with the manufacturer's instructions for cleaning carpets.

If the machine is equipped with a **motorized cleaning head**, the cleaning head shall be adjusted so that the bristles of rotating brushes or other retractable parts go beyond the theoretical supporting plane of the cleaning head on a hard floor from $(2^{+0,2}_{-0})$ mm or, if not possible, from at least 2 mm.

The **spray extraction machine** shall be fixed directly without any resilient means on the Wilton carpet (according to ~~IEC 60312-1~~ IEC TS 62885-1) of a size 2 m × 1 m, placed on the floor of the test room. In case the measurement is done in a reverberation test room or a hard-walled test room, a minimum **clearance** of 1 m between any part of the machine or attachments and the nearest wall shall be observed. The machine shall be positioned in accordance with Figure AA.1.

The hose and connecting tube(s) or the handles of hand-supported machines shall be resiliently suspended or supported in normal position of use (middle of the handles at (80 ± 5) cm above the carpet, if possible), the suction nozzle or cleaning head being in full contact with the carpet.

If necessary, the cleaning head shall be resiliently fastened to prevent self-propulsion.

Sound radiation due to possible vibrations of the standard test carpet should be prevented.

The test carpet is considered to be a part of the machine to be tested and its possible influence on the acoustical characteristics of the test environment, for example of the hard reflecting plane, or on the absorption (reverberation time) of the reverberant test room or hard-walled room should not be taken into account.

The measurement time shall at least be 15 s.

AA.2.4 Measurement uncertainties

A standard deviation of reproducibility σ_{RO} of less than 1,5 dB is expected for both the A-weighted emission sound pressure level according to ISO 11203 and the A-weighted sound power level determined according to ISO 3744 or ISO 3743-1.

AA.2.5 Information to be recorded

The information to be recorded covers all of the technical requirements of this noise test code. Any deviations from this noise test code or from the basic standards upon which it is based are to be recorded together with the technical justification for such deviations.

AA.2.6 Information to be reported

The information to be included in the test report is at least that which the manufacturer requires for a noise emission declaration or the user requires to verify the declared values.

AA.2.7 Declaration and verification of noise emission values

The declaration of the emission sound pressure level shall be made as a dual-number noise emission declaration according to ISO 4871, where it exceeds 70 dB(A). Where the emission sound pressure level does not exceed 70 dB(A), this fact may be stated in place of the emission value and uncertainty, e.g. by declaring $L_{pA} \leq 70$ dB(A).

It shall declare the noise emission value L_{pA} and separately the respective uncertainty K_{pA} .

The sound power level shall be given as a dual-number noise emission declaration according to ISO 4871, where the emission sound pressure level exceeds 80 dB(A).

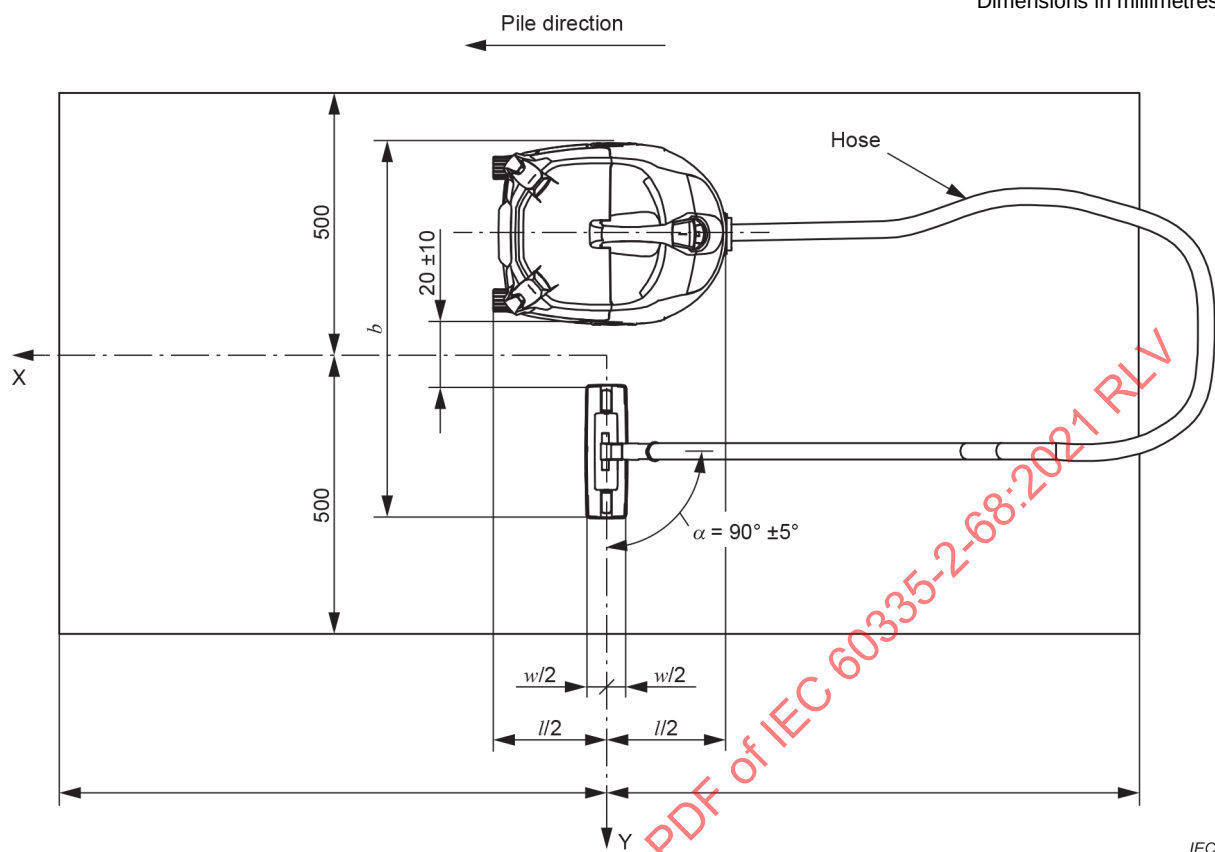
It shall declare the noise emission value L_{WA} and separately the respective uncertainty K_{WA} .

NOTE K_{pA} and K_{WA} are expected to be 2 dB.

The noise declaration shall state that the noise emission values have been obtained according to this noise test code. If this statement is not true, the noise declaration shall indicate clearly what the deviations from this standard, and from the basic standards, are.

If undertaken, verification shall be conducted according to ISO 4871 by using the same mounting, installation and operating conditions as those used for the initial determination of the noise emission values.

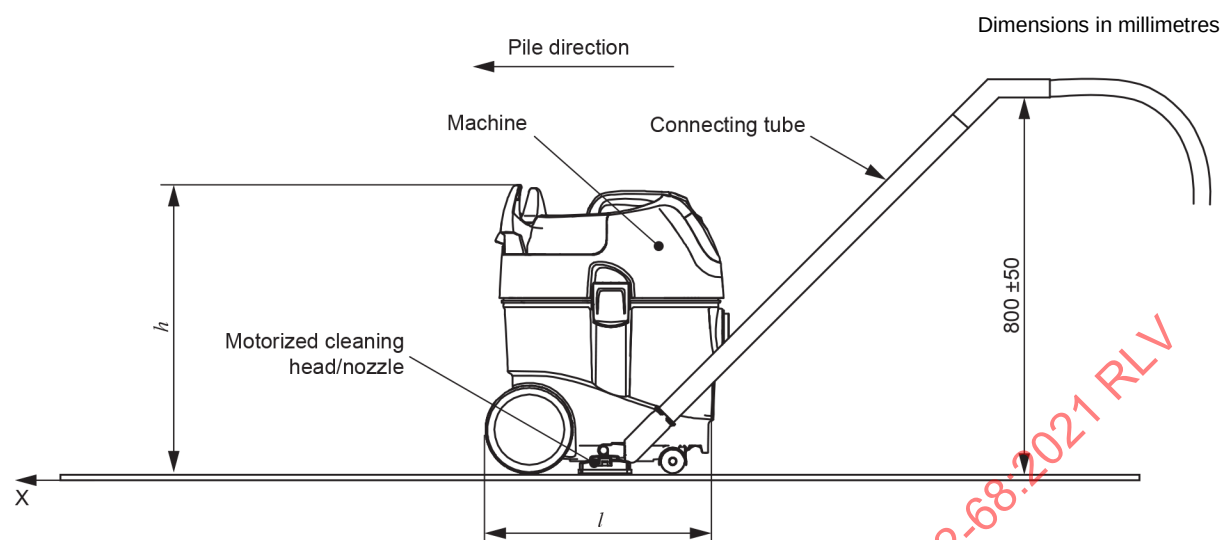
Dimensions in millimetres



Key

- w depth of the motorized cleaning head/nozzle
- l length of the machine
- b width of machine including nozzle

**a) Machine with cleaning head
connected by hose and connecting tube – Top view**

**Key** l length of the machine h height of the machine

b) Machine with cleaning head
connected by hose and connecting tube – Side view

**Figure AA.1 – Machine with cleaning head
connected by hose and connecting tube**

Annex BB (informative)

Emission of vibration

BB.1 Reduction of vibration

The machine shall be designed and constructed in such a way that risks resulting from vibrations produced by the machine are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source.

The handles shall be designed and constructed in such a way as to reduce the vibrations transmitted to the upper limbs of the **operator** to the lowest level that is reasonably possible.

BB.2 Information on vibration emission

The instructions for hand-held and walk-behind machines and hand-held parts of other machines shall give the following information:

- the vibration total value to which the hand-arm system is subjected, measured in accordance with ISO 5349-1 for arm vibrations, the machine being supplied at **rated voltage** or at the maximum **rated voltage** for machines with a range of voltages, if the vibration total value exceeds $2,5 \text{ m/s}^2$. Where this value does not exceed $2,5 \text{ m/s}^2$, this fact may be stated in place of the emission value and uncertainty, e.g. by declaring $a_h \leq 2,5 \text{ m/s}^2$;
- the uncertainty surrounding these values, in accordance with the above given standards.

These values shall be either those actually measured for the machine in question or those established on the basis of measurements taken for a technically comparable machine which is representative of the machine being produced.

Regarding operating conditions during measurement and the methods used for measurement, the reference of the standard applied (IEC 60335-2-68) ~~must~~ shall be specified.

NOTE Experience has shown that for these machines, the magnitude of hand-arm vibration is in general significantly below $2,5 \text{ m/s}^2$. Therefore, unless the equipment concerned has a technical specification that renders this experience inapplicable, it is sufficient to mention that the emission value is below $2,5 \text{ m/s}^2$.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-2, *Household and similar electrical appliances – Safety – Part 2-2: Particular requirements for vacuum cleaners and water suction cleaning appliances*

IEC 60335-2-67, *Household and similar electrical appliances – Safety – Part 2-67: Particular requirements for floor treatment machines, for commercial use*

IEC 60335-2-69, *Household and similar electrical appliances – Safety – Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use*

IEC 60335-2-72, *Household and similar electrical appliances – Safety – Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use*

~~IEC 60745 (all parts), *Hand-held motor-operated electric tools*~~

~~IEC 61029 (all parts), *Safety of transportable motor-operated electric tools*~~

~~IEC 62841 (all parts), *Electric motor-operated hand-held, transportable tools and lawn and garden machinery – Safety*~~

ISO 3743-1, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

ISO 3744, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 4871, *Acoustics – Declaration and verification of noise emission values of machinery and equipment*

ISO 5349-1, *Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1: General requirements*

ISO 9614-2, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 2: Measurement by scanning*

ISO 11203:1995, *Acoustics – Noise emitted by machinery and equipment – Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*

ISO/TR 11688-1, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning*

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –
Part 2-68: Particular requirements for spray extraction machines, for
commercial use**

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-68: Exigences particulières pour les machines de nettoyage par
pulvérisation et aspiration, à usage commercial**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-68: Particular requirements for spray
extraction machines, for commercial use**

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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- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-68 has been prepared by subcommittee 61J: Electrical motor-operated cleaning appliances for commercial use, of 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 2012 and its Amendment 1: 2016. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition (minor changes are not listed):

- editorial and technical alignment with IEC 60335-1:2020.

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

Draft	Report on voting
61J/736/CDV	61J/743A/RVC

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.

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 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 spray extraction machines for commercial use.

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.

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.

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 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.

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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.

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 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-68: Particular requirements for spray extraction machines, for commercial use

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrical portable, non-self-propelled motor-operated **spray extraction machines** with or without attachments and with or without electrical heating elements, intended for **commercial indoor use**.

NOTE 101 This standard applies to machines for **commercial use**. The following list, although not comprehensive, gives an indication of locations that are included in the scope:

- public use areas such as hotels, schools, hospitals;
- industrial locations, for example factories and manufacturing shops;
- retail outlets, for example shops and supermarkets;
- business premises, for example offices and banks;
- rental services for those machines;
- all uses other than normal housekeeping purposes.

These machines are not equipped with a traction drive.

NOTE 102 Machines for the same intended function but equipped with a traction drive are covered by IEC 60335-2-72.

The following power systems are covered:

- mains powered motors up to a **rated voltage** of 250 V for single-phase appliances and 480 V for other appliances,
- **battery-operated machines**.

This standard applies to machines in which the pressure of the employed **cleaning agent** does not exceed 2,5 MPa, and in which the product of the pressure (in MPa) and the flow of **cleaning agent** (in litres per minute) does not exceed 100, and in which the temperature of the **cleaning agent** at the spray nozzle outlet does not exceed 85 °C.

This standard does not apply to

- vacuum cleaners and water-suction cleaning appliances for household use (IEC 60335-2-2);
- floor treatment machines for **commercial use** (IEC 60335-2-67, IEC 60335-2-72);
- wet and dry vacuum cleaners, including power brush, for **commercial use** (IEC 60335-2-69);

NOTE 103 IEC 60335-2-67 and IEC 60335-2-69 cover only machines without traction drive.

- hand-held and transportable motor-operated electric **tools** (IEC 60745 series, IEC 61029 series, IEC 62841 series).
- machines designed for use in corrosive or explosive environments (dust, vapour or gas);
- machines designed for picking up hazardous dusts (as defined in IEC 60335-2-69), inflammable substances, or glowing particles;

- machines designed to handle hazardous solvents, such as flammable or explosive liquids;

NOTE 104 Attention is drawn to the fact that in many countries, additional requirements on the safe use of the equipment covered can be specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC TS 62885-1, *Surface cleaning appliances - Part 1: General requirements on test material and test equipment*

ISO 6344-2, *Coated abrasives – Grain size analysis – Part 2: Determination of grain size distribution of macrogrits P12 to P220*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Addition:

normal operation

conditions under which the machine is operated in normal use, specified as follows:

The machine is operated with the spray extraction pump with the nozzle giving the highest load, the vacuum motor, the device for agitating the carpet pile (if any), the **cleaning agent heater** (if any) and the soiled water discharge pump (if any) all in use. Any marking of short time intermittent operation of the pumps is observed.

The **normal operation** P_m of the vacuum motor is obtained at the following power input:

$$P_m = 0,5 (P_f + P_i)$$

where

P_f is the input, in watts, when the machine has been operated for 3 min, fitted with the nozzle and hose giving the highest input;

P_i is the input, in watts, when the machine has been operated for 20 s with the nozzle sealed, immediately following the 3-minute-period with the nozzle open. Any valve or similar device used to ensure a flow of air to cool the motor in the event of a blockage of a main air inlet is rendered ineffective.

P_f and P_i are measured with the supply voltage adjusted to **rated voltage**, or to a voltage equal to the mean value of the **rated voltage range** if the difference between the limits of the **rated voltage range** does not exceed 10 % of the mean value of the range. If the difference between the limits of the **rated voltage range** exceeds 10 % of the mean value, the tests are carried out with the supply voltage set to the upper limit of the range.

The hose is laid out straight. If the machine is provided with a hose as an optional accessory, it is operated without the hose.

Electrically driven devices for agitating the carpet, if any, are in operation but are not in contact with the floor or any other surface or with the means used to seal the air inlet.

The adjustment of the air inlet is not altered when it is specified that the machine is operated under normal load, irrespective of the supply voltages specified in the test. Where optional filtration systems are supplied with the **spray extraction machine**, the filtration system giving the least air resistance (maximum flow) is fitted.

The normal load is equal to the mean load P_r for the electrically driven agitating device such as a motor driven brush is determined in accordance with the following:

- the agitating device operates on a carpet as specified in IEC TS 62885-1;
- the mean load P_r is determined when using the device in the following way:
after setting the device, the device is moved twice over a distance of 5 m in the direction giving the highest load;
- the motor responsible for the airflow operates under the same conditions as determining P_r , i. e. no airflow restrictions, and measurements are taken after 3 min;
- the device is adjusted to the carpet pile height;
- it is necessary to move the agitating device slowly across the carpet to avoid carpet damage.

Soiled water discharge pumps, if applicable, are operated as follows.

The pump delivers a continuous flow of water without any soiled water discharge hose attached to the soiled water outlet of the machines unless the discharge hose is permanently attached to the machine. The vacuum motor works during the test, unless an interlock device is provided to prevent combined operation of both motors.

3.101

cleaning agent pre-heater

electric heating element which is intended to raise the temperature of the **cleaning agent** to operating temperature before the cleaning operation

3.102

cleaning agent heater

electric heater which is intended to maintain the **cleaning agent** at the correct temperature for effective operation

3.103

cleaning agent

water with or without the addition of soluble or miscible detergent

3.104

spray extraction machine

machine with or without heating elements and with or without attachments, by which a **cleaning agent** under pressure is sprayed into or onto the surface to be cleaned and the remaining soiled **cleaning agent** is removed by suction

3.105

maximum rated operating pressure

maximum pressure generated by the pump when operated at **rated voltage**

3.106

water-suction cleaning machine

machine for applying and extracting a **cleaning agent**

3.107**motorized cleaning head**

hand-held or hand-guided cleaning device connected to the machine, with an integrated electrical motor

Note 1 to entry: The permanently attached main cleaning head is not regarded as a **motorized cleaning head**.

3.108**operator**

person installing, operating, adjusting, cleaning, moving, or performing user maintenance on the machine

3.109**test solution**

solution which consists of 20 g of NaCl and 1 ml of a solution of 28 % by mass of dodecyl sodium sulphate in each 8 l of water

Note 1 to entry: The chemical designation formula of for dodecyl sodium sulphate is $C_{12}H_{25}NaSO_4$.

3.110**commercial use**

intended use of machines covered by this standard, i.e. not intended for normal housekeeping purposes by private persons but which may be a source of danger to the public

I.e. in particular that

- the machines may be used by cleaning contractors, cleaning staff, etc.;
- they are used in commercial or public premises (i.e. offices, shops, hotels, hospitals, schools, etc.) or in industrial (plants, etc.) and light industrial (workshops, etc.) environments.

Note 1 to entry: **Commercial use** is also called professional use.

4 General requirement

This clause of Part 1 is applicable except as follows.

Replacement of the first paragraph by the following text:

Machines shall be constructed so that they function safely so as to cause no danger to persons or surroundings during normal use, even in the event of carelessness, and during installation, adjusting, maintenance, cleaning, repairing or transportation.

Addition:

For the purpose of this standard, the term 'appliance' as used in Part 1 is to be read as 'machine'.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.101 The **test solution** is to be stored in a cool atmosphere and used within seven days after its preparation.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

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

- class I,
- class II, or
- class III.

Compliance is checked by inspection and by the relevant tests.

6.2 Addition:

Spray extraction machines shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Modification:

Replace the fourth dashed item as follows:

- the business name and address of the manufacturer and, if applicable, his authorized representative; any address shall be sufficient to ensure postal contact;

Addition:

Machines shall be marked in addition with the following:

- serial number, if any;
- designation of the machine and series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers;

NOTE 101 Designation of machine, series or type includes the model or type reference as required in Part 1.

- year of construction, i.e. the year in which the manufacturing process is completed;

NOTE 102 The year of construction can be part of the serial number.

- **maximum rated operating pressure** in MPa or bar;
- maximum outlet temperature of the spraying liquid in °C, if above 50 °C;
- machines shall be marked with the mass of the most usual configuration in kg.

The tank for the **cleaning agent** shall be marked on the tank, its cover or nearby, with the maximum temperature of the **cleaning agent** filled into the tank in °C.

If the machine is designed to be filled with **cleaning agent** exceeding 60 °C, the following warning shall be placed near the filling opening:

WARNING Hot. Do not touch.

The height of the lettering shall be not less than 4 mm. This wording may be replaced by symbol IEC 60417-5041 (2002-10).

7.1.101 Motorized cleaning heads shall be marked with

- **rated voltage** or **rated voltage range** in volts;
- **rated power input** in watts;
- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- mass of the most usual configuration in kg.

Motorized cleaning heads for water-suction cleaning appliances, except those of **class III construction** having a **working voltage** up to 24 V shall be marked with symbol IEC 60417-5935 (2012-09).

NOTE This symbol is an information sign and, except for the colours, the rules of ISO 3864-1 apply.

Compliance is checked by inspection.

7.6 Addition:



[symbol IEC 60417-5935
(2012-09)]

motorized cleaning head for
water-suction cleaning



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

caution, hot surface

7.12 Modification:

Delete the first paragraph and the first warning.

Add after the NOTE the following new text:

NOTE 101 Alternative requirements for instructions in hard copy form are available in 7.12.9

Addition:

The front cover of the instructions shall include the substance of the following warning:

CAUTION Read the instructions before using the machine.

This wording may be replaced by symbols ISO 7000-0434A (2004-01) and ISO 7000-0790 (2004-01).

The instructions shall contain at least the following:

- the business name and full address of the manufacturer and, if applicable, his authorized representative;
- designation of series or type of the machine as marked on the machine itself, except for the serial number;

NOTE 102 The designation of series or type can be abstracted, as long as the identification of the product is ensured.

- the general description of the machine;
- the intended use of the machine and the auxiliary equipment as covered by the scope of this standard;

NOTE 103 Examples of auxiliary equipment are **motorized cleaning heads** and lights.

- the meaning of the symbols used on the machine and in the instructions;
- drawings, diagrams, descriptions and explanations necessary for the safe use, maintenance and repair of the machine and for checking its correct functioning;
- technical data including the markings on the machine;
- information regarding putting into service, safe operation, handling, transportation, and storage of the machine taking into account its weight;
- instructions to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;
- the conditions in which the machine meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;
- the procedure to be followed to prevent unsafe situations in the event of accident (e.g. contact with or spillage of detergents, battery acid, fuel or oil) or equipment breakdown;
- the substance of the following:

This machine is intended for commercial use, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses.

The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation, including preventive maintenance measures. They shall, if applicable, give the specifications of the spare parts if they affect the health and safety of the **operator**, e.g. filter elements.

In addition, the instructions shall give the following information, if applicable:

- for battery powered machines, instructions regarding the precautions to be taken for safe charging;
- precautions to be taken when changing brushes or other attachments;
- information on the detergents or other liquids that may be used including the choice and use of personal protective equipment (PPE);
- essential characteristics of auxiliary equipment which may be fitted to the machine;
- information regarding safe disposal of batteries.

7.12.9 Add the following text after the second paragraph:

Instead of hard copy, electronic form can be used if the following conditions are met:

- instructions for unpacking, installation and enabling access to the complete safety instructions on a suitable reading device shall be provided on paper or marked on the machine,
- the suitable reading device shall be provided with the machine or be necessary to operate the machine, and
- the content of the electronic instructions shall be provided with the machine.

For non-safety related functional use, the operational manual may be provided in electronic form either:

- on a suitable electronic display incorporated in the appliance, or
- on a separate electronic device provided with the appliance, or
- from a provided link to a website, where they may be viewed and/or downloaded.

7.12.101 The instructions shall include warnings concerning ways in which the machine shall not be used, which in the experience of the manufacturer are likely to occur. At least, it shall include the substance of the following warnings, if applicable.

- **WARNING** Operators shall be adequately instructed on the use of these machines.
- **CAUTION** This machine is for indoor use only.
- **CAUTION** This machine shall be stored indoors only.
- A warning that the machine shall be disconnected from its power source during cleaning or maintenance and when replacing parts or converting the machine to another function:
 - for mains operated machines, by removing the plug from the socket-outlet;
 - for battery powered machines, by safely disconnecting at least the B+ or B- pole of the battery or by an equivalent method (disconnecting device); for non-SELV, both poles must be disconnected.

Instructions for mains operated machines shall also include the substance of the following:

- **WARNING** Do not allow the supply cord to come into contact with the rotating brushes.

Instructions for machines having a current-carrying hose for dry suction, operating at other than **safety extra-low voltage**, shall also include the substance of the following:

- **WARNING** This hose contains electrical connections: do not use it to collect water and do not immerse in water for cleaning.

Compliance is checked by inspection.

7.12.102 Information on noise

NOTE The instructions provide information on airborne noise emission as indicated in AA.2.7.

7.12.103 Information on vibration

NOTE The instructions can provide information on the vibration total value as indicated in Clause BB.2.

7.13 Addition:

The words “Original instructions” shall appear on the language version(s) verified by the manufacturer.

7.14 Addition: can

The height of symbol IEC 60417-5935 (2012-09) shall be at least 15 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 Addition:

Water and water-borne **cleaning agents** are considered conductive.

8.1.1 Add the following text after the sixth paragraph:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

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.

11.7 Addition:

Machines are operated until steady conditions are established.

11.8 Add the following to Table 3, at the end of footnote a.

Motors which are hermetically sealed are considered to be airtight.

12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and dielectric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 Addition:

*For **class I appliances** where several motors operate at the same time, the leakage current shall not exceed 3,5 mA.*

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.2 Addition:

*Machines are operated for 10 min on a level surface wetted by the **test solution**.*

In practice, the pick-up consists largely of air such that there is no overloading of the suction motor; the input load should be observed to avoid overloading.

15.2 Replacement:

Machines shall be so constructed that

- spillage of liquid due to **normal operation**,
- filling including overfilling, and
- overturning of unstable machines

does not affect their electrical insulation.

Tanks for the following liquids are excluded from the tests:

- hydraulic oil,
- coolant,
- fuel (diesel, gasoline, LPG).

Compliance is checked by the following tests:

The machine is placed on a support inclined at an angle of 10° to the horizontal, the liquid container being filled to half the level indicated in the instructions. A machine is considered to be unstable if it overturns when a force of 180 N is applied to the top of the machine in the most unfavourable horizontal direction.

*Machines provided with an appliance inlet are fitted with an appropriate connector and flexible cable or cord; machines with **type X attachment** are fitted with the lightest cross-sectional area specified in Table 11. Other machines are tested as delivered.*

The liquid container of the machine is completely filled with a saline solution of water containing approximately 1 % NaCl and 0,6 % non-ionic rinsing agent and a further quantity, equal to 15 % of the capacity of the container or 0,25 l, whichever is the greater, is poured in steadily over a period of 1 min.

Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:

- | | |
|---|----------------------|
| – viscosity, 17 mPa s; | |
| – pH 2,2 (1 % in water) | |
| – and its composition shall comprise the following substances | |
| – Plurafac ® LF 221 ¹ | 15,0 % parts by mass |
| – Cumene sulfonate (40 % solution) | 11,5 % parts by mass |
| – Citric acid (anhydrous) | 3,0 % parts by mass |
| – Deionized water | 70,5 % parts by mass |

Machines which are unstable are then, with the container completely filled and with the cover or lid in place, overturned from the most unfavourable of the normal positions of use, and are left in that position for 5 min unless the machine returns automatically to its normal position of use.

*Nozzles and **motorized cleaning heads of water-suction cleaning machines** are placed in a tray, the base of which is level with the surface supporting the machine. The tray is filled with the **test solution** to a level of 5 mm above its base, this level being maintained throughout the test. The machine including the **motorized cleaning head** is operated until its liquid container is completely full and afterwards for a further 5 min.*

¹ Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.

After each of these tests, the machine shall withstand the electric strength test of 16.3.

There shall be no trace of liquid on insulation that reduces the **clearances** or **creepage distances** below the values specified in Clause 29.

15.3 Modification:

The relative humidity shall be $(93 \pm 6) \%$.

15.101 Motorized cleaning heads of water suction cleaning machines shall be resistant to liquids that may come into contact with them during normal use.

The following test is not applicable to **motorized cleaning heads** of **class III construction** having a **working voltage** up to 24 V.

Compliance is checked by the following four tests.

The **motorized cleaning head** is subjected to an impact test as described in IEC 60068-2-75, the value of the impact being 2 J. The **motorized cleaning head** is rigidly supported and three blows are applied to every point of the enclosure that is likely to be weak.

It is then subjected to the free fall test procedure 1 of IEC 60068-2-31. It is dropped 4 000 times from a height of 100 mm onto a steel plate having a thickness of not less than 15 mm. It is dropped

- 1 000 times on its right side;
- 1 000 times on its left side;
- 1 000 times on its front face;
- 1 000 times on its cleaning surface.

The **motorized cleaning head** is then subjected to the test described in IEC 60529:1989, 14.2.4, as amended by IEC 60529:1989/AMD2:2013 using the **test solution**.

The **motorized cleaning head** is to be operated in a flat-bottomed vessel filled with a saline solution of water containing approximately 1 % NaCl so that a depth of 3,0 mm of water is maintained. The vessel is to be a size such that the **motorized cleaning head** moves about freely; and is to be operated:

- without connection to the **spray extraction machine** for 15 min, if applicable; and
- connected to the **spray extraction machine** until the machine has picked up as much water as its capacity holds or for 5 min, whichever occurs sooner.

The **motorized cleaning head** shall then withstand the electric strength test of 16.3, the voltage being applied between the **live parts** and the **test solution**. There shall be no trace of saline solution on insulation that reduces the **clearances** or **creepage distances** below the values specified in Clause 29.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.3 Addition:

Current-carrying hoses, except for their electrical connections, are immersed for 1 h in a saline solution of water containing approximately 1 % NaCl, at a temperature of $20^\circ\text{C} \pm 5^\circ\text{C}$. While the hose is still immersed, a voltage of 2 000 V is applied for 5 min between each

conductor and all the other conductors connected together. A voltage of 3 000 V is then applied for 1 min between all the conductors and the saline solution.

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:

Machines having containers provided with a shut-off device or valve are subjected to the test of 19.101.

Machines with appliance outlets, complying with the standard sheets in IEC 60320-3 and socket outlets are subjected to the test of 19.102.

Appliances with electronic speed control are also subjected to the test of 19.103.

19.2 Addition:

The machine is tested without liquid in the container.

NOTE 101 The term restricted heat dissipation of Part 1 means without liquid in the container.

The conditions of adequate heat dissipation are different for heaters and pre-heaters:

- for the **cleaning agent pre-heater**: the conditions that apply when the complete machine is at ambient temperature when the heating element is switched on for the first time;
- for the **cleaning agent heater**: the conditions that apply when the heating element is operated during normal use of the **spray extraction machine**.

19.5 Modification:

In the fourth paragraph, delete the following text:

“used in a system with polarized plugs intended for connection to polarized socket outlets”

19.7 Addition:

*Pressure pumps provided with a filter, fan blades of water suction systems, and agitating devices except those of **motorized cleaning heads**, are not regarded as parts liable to get blocked.*

Soiled water discharge pumps are liable to get blocked.

***Motorized cleaning heads** are tested with the rotating brush or similar device locked for 30 s.*

19.9 Not applicable.

19.10 Addition:

For this test, the lowest possible load is obtained with the air inlet sealed.

In the case of agitating devices driving a brush or agitator, the belt is removed.

19.13 Modification:

In the second paragraph, add “and 22.104” after “20.2”.

19.101 *Machines having containers which are provided with shut-off device(s) or valve(s) are again subjected to the test of 15.2.*

Stop valves or other fluid shut-off devices shall be made inoperative. If two or more independent shut-off devices are provided, only one of them is made inoperative at a time, provided that they have passed the test of operating 3 000 times satisfactorily. Otherwise, all devices that failed shall be made inoperative.

Care should be taken to suck-up an air-liquid mixture to prevent overloading of the motor of the suction unit. The input power should be observed to avoid overloading.

*After this test, the machine shall be subjected to the electrical strength test of 16.3. Inspection shall show that water has not entered the machine to any dangerous extent. In particular, there shall be no trace of water on the electrical insulation that reduces the **clearance** or **creepage distances** below the limits specified in Clause 29.*

19.102 *Machines with appliance outlets, complying with the standard sheets in IEC 60320-3 and socket outlets shall be operated under conditions of **normal operation**, except the appliance outlet or socket outlet is loaded with the maximum load corresponding to its configuration in accordance with IEC 60320-3 or IEC TR 60083, respectively. Machines with more than one appliance outlet or socket outlet are tested with each outlet loaded one at the time.*

However, this test is not applied for machines with appliance outlets or socket outlets

- intended only to supply accessories supplied with the machine,*
- inaccessible to the user, or*
- provided with a **protective device** as specified in 22.61.*

19.103 *An appliance with an electronic speed control shall be operated for 5 minutes under the fault conditions specified in 19.11.2, trying to achieve the highest motor speed.*

During the test, parts shall not be ejected from the appliance. After the test, the appliance shall comply with 20.2.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 Addition:

Motorized cleaning heads are not subjected to this test.

20.2 *Add the following text after the second paragraph of the test specification:*

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Replacement of the first paragraph by the following text:

Machines and their components and fittings shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the machine.

Modification:

In the third paragraph, the impact value is increased to $1,0 \text{ J} \pm 0,04 \text{ J}$.

21.101 Those parts of the machine that are subjected to impact in normal use are tested as follows.

*If failure of the part subject to impact would cause a failure to comply with this specification, any spot of the machine which may be exposed during **normal operation** to impacts or blows shall be subjected to a single blow with an impact energy of 6,75 Nm. The impact stress on the free-standing machines shall be exerted by a steel sphere with a diameter of 50,8 mm and a mass of 0,535 kg dropped from a height of 1,3 m or hanging on a string acting as a pendulum, falling from a height of 1,3 m.*

21.102 Current-carrying hoses shall be resistant to crushing.

Compliance is checked by the following test.

The hose is placed between two parallel steel plates each having a length of 100 mm, a width of 50 mm and the edges of the longer sides rounded with a radius of 1 mm. The axis of the hose is positioned at right angles to the longer sides of the plates. The plates are placed at a distance of approximately 350 mm from one end of the hose.

The steel plates are pressed together at a rate of $50 \text{ mm/min} \pm 5 \text{ mm/min}$ until the applied force is 1,5 kN. The force is then released and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.103 Current-carrying hoses shall be resistant to abrasion.

Compliance is checked by the following test.

One end of the hose is attached to the connecting rod of the crank mechanism shown in Figure 102. The crank rotates at 30 revolutions per minute resulting in the end of the hose moving horizontally backwards and forwards over a distance of 300 mm.

The hose is supported by a rotating smooth roller over which a belt of abrasive cloth moves at a speed of 0,1 m/min. The abrasive is corundum grit size P100, as specified in ISO 6344-2.

A mass of 1 kg is suspended from the other end of the hose, which is guided to avoid rotation.

In the lowest position, the mass has a maximum distance of 600 mm from the centre of the roller.

The test is carried out for 100 revolutions of the crank.

After the test, **basic insulation** shall not be exposed and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.104 Current-carrying hoses shall be resistant to flexing.

Compliance is checked by the following test.

The end of the hose intended to be connected to the **motorized cleaning head** is attached to the pivoting arm of the test equipment shown in Figure 103. The distance between the pivot axis of the arm and the point where the hose enters the rigid part is $300 \text{ mm} \pm 5 \text{ mm}$. The arm can be raised from the horizontal position by an angle of $40^\circ \pm 1^\circ$. A mass of 5 kg is suspended from the other end of the hose or from a convenient point along the hose so that when the arm is in the horizontal position, the mass is supported and there is no tension on the hose.

NOTE It can be necessary to reposition the mass during the test.

The mass slides against an inclined plate so that the maximum deflection of the hose is 3° .

The arm is raised and lowered by means of a crank that rotates at a speed of $(10 \pm 1) \text{ r/min}$.

The test is carried out for 2 500 revolutions of the crank after which the fixed end of the hose is turned through 90° and the test continued for a further 2 500 revolutions. The test is repeated in each of the other two 90° positions.

After 10 000 revolutions, the hose shall withstand the electric strength test of 16.3.

If the hose ruptures before 10 000 revolutions are achieved, the flexing test is terminated. The hose shall still withstand the electric strength test of 16.3.

21.105 Current-carrying hoses shall be resistant to torsion.

Compliance is checked by the following test.

One end of the hose is held in a horizontal position with the remainder of the hose freely suspended. The free end is rotated in cycles, each cycle consisting of five turns in one direction and five turns in the opposite direction, at a rate of 10 revolutions per minute.

The test is carried out for 2 000 cycles.

After the test, the hose shall withstand the electric strength test of 16.3 and shall not be damaged to such an extent that compliance with this standard is impaired.

21.106 Current-carrying hoses shall be resistant to cold conditions.

Compliance is checked by the following test.

A 600 mm length of hose is bent as shown in Figure 104 and the ends are tied together over a length of 25 mm. The hose is then placed for 2 h in a cabinet having a temperature of $-15^\circ \text{C} \pm 2^\circ \text{C}$. Immediately after the hose is removed from the cabinet it is flexed three times, as shown in Figure 105, at a rate of one flexing per second.

The test is carried out three times.

There shall be no cracks or breaks in the hose and it shall withstand the electric strength test of 16.3. Any colour change of the hose is not considered as a failure.

21.107 Cleaning agent pumps, pipes and hoses, hose connectors and couplers, valves and other components of **spray extraction machines** shall be designed to withstand any mechanical, chemical or thermal stresses that may occur during normal use.

Compliance is checked by the following test:

*Pipes and hoses, hose connectors and couplers, valves and other components which are subjected to the operating pressure of the **cleaning agent** shall be filled with the **cleaning agent** recommended by the manufacturer at the normal dilution and aged for 10 days (240 h) freely suspended in a heating cabinet with natural circulation.*

The temperature shall be maintained:

- *at (70 ± 2) °C, if the temperature of the **cleaning agent** solution does not exceed 50 °C during conditions of **normal operation**, or*
- *at (90 ± 2) °C, if the temperature of the **cleaning agent** exceeds 50 °C during conditions of **normal operation**.*

Immediately afterwards, the parts, or the entire assembly of these parts, shall be put into a water bath with a temperature of:

- *(50 ± 3) °C, if the temperature of the **cleaning agent** does not exceed 50 °C during conditions of **normal operation**, or*
- *(85 ± 3) °C, if the temperature of the **cleaning agent** exceeds 50 °C during conditions of **normal operation**.*

*While the parts are in the water bath, they shall be subjected to a pressure test at 1,5 times the **maximum rated operating pressure** of the machine for 30 min. **Cleaning agent** shall be used as a test liquid. No damage that could impair safety shall occur to any of the parts during the test. Pressure operated switches for the control of cleaning solution pumps shall be subjected to pressure obtained during the appropriate test of Clause 19. Pressure operated switches shall also be inspected for effectiveness in avoiding **cleaning agent** coming into contact with insulation and a pin hole shall be made in any polymer diaphragm that is flexed in use to ensure that this does not pass the **cleaning agent** which would result in the reduction of **clearances** or **creepage distances** below the limits specified in Clause 29.*

A switch or an unloading device that remains in a functioning mode shall be further tested by allowing the pressure to build up until it operates. The pressure so created is then regarded as the normal pressure for that part of the system.

Further testing at 1,5 times this (elevated) normal pressure is then done on the part of the system sustaining this pressure. There shall be no failure within the meaning of this standard.

21.108 Polymeric tanks designed to be filled with liquids exceeding a temperature of 50 °C shall be of adequate strength.

Compliance is checked as follows:

Fill the container with the maximum specified liquid quantity, at the highest specified temperature. Maintain this temperature during 5 periods of 8 h. Replenish the liquid at the beginning of each period.

During the test, the container shall remain fully functional and shall show no critical deformations or cracks which may impair compliance with this standard.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 Addition:

Machines shall be constructed that neither water nor foam from detergents can penetrate into the motor or come in contact with **live parts**.

22.35 Addition:

These parts are subject to the hammer test of 21.1. If this insulation does not meet the requirement of 29.3, these are subject to the following impact test.

*A sample of the covered part is conditioned at a temperature of $70\text{ °C} \pm 2\text{ °C}$ for seven days (168 h). After conditioning, the sample is allowed to attain approximately **room temperature**.*

Inspection shall show that the covering has not shrunk to such an extent that the required insulation is no longer given or that the covering has not peeled off, so that it may move longitudinally.

After this, the sample is maintained for 4 h at a temperature of $-10\text{ °C} \pm 2\text{ °C}$.

While still at this temperature, the sample is then subjected to impact by means of the apparatus shown in Figure 101. The weight "A", having a mass of 0,3 kg, falls from a height of 350 mm on to the chisel "B" of hardened steel, the edge of which is placed on the sample.

*One impact is applied to each place where the insulation is likely to be weak or damaged in **normal operation**, the distance between the points of impact being at least 10 mm.*

After this test, it shall show that the insulation has not peeled off and an electric strength test as specified in 16.3 is made between metal parts and metal foil wrapped round the insulation in the required area.

22.61 Add the following at the end:

The **protective device** is not necessary for appliances for which 30.2.2 is applicable, fitted with a supply cord or cord set, having a plug of the identical maximum current rating as the socket-outlet or appliance outlet integrated into the appliance.

22.101 Machines shall be constructed so as to prevent the penetration of objects from the floor, which may impair the safety of the machine.

Live parts shall be at least 30 mm distance from the surface of the floor, measured in vertical direction through existing holes. This requirement does not apply to **motorized cleaning heads**.

Compliance is checked by inspection and measurements.

22.102 Class I appliances or class II appliances shall be equipped with a mains isolating switch that ensures **all-pole disconnection** according to overvoltage category III conditions.

For built-in battery chargers, this **all-pole disconnection** can be realised by pulling the plug.

Other switches may be of single pole construction.

The following circuits need not be disconnected by the supply disconnecting device:

- plug and socket-outlets;
- undervoltage protection circuits that are only provided for automatic tripping in the event of supply failure;
- phase rotating indicators;
- control circuits for interlocking.

It is recommended, however, that such circuits be provided with their own disconnecting device.

Compliance is checked by inspection.

22.103 For machines where the **operator** is required to use personal protective equipment (PPE), controls shall be designed in such a way that they can be operated safely.

Compliance is checked by inspection and by functional test.

22.104 If machines are provided with shut-off devices, the devices shall prevent the liquid level from exceeding the maximum allowed level.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

The main switch shall be tested for 50 000 cycles of operations.

24.7 Not applicable.

24.101 Machines with motors provided with **self-resetting thermal cut-outs** shall work reliably under overvoltage conditions.

Compliance is checked by the following test.

*The machine is supplied at a voltage equal to 1,1 times **rated voltage**, under locked rotor conditions so as to cause the **thermal cut-out** to operate within a few minutes, until the **thermal cut-out** has performed 200 cycles of operation. The test shall be carried out with a **cleaning agent** that has not been heated, and with heating elements, if any, out of circuit.*

After the test, the machine shall withstand the tests of Clause 16.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Addition:

Machines classified as IPX7 shall not be provided with an appliance inlet.

Machines classified as IPX4, IPX5 or IPX6 shall not be provided with an appliance inlet, unless both inlet and connector have the same classification as the machine when coupled or separated, or unless inlet and connector can only be separated by the use of a **tool** and have the same classification as the machine when coupled.

Machines provided with an appliance inlet shall also be provided with an appropriate cord set.

25.7 Replacement:

Supply cords shall be one of the following types:

- Rubber sheathed

Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53);

NOTE 101 These cords are not suitable for machines intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.

- Polychloroprene sheathed

Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57);

NOTE 102 These cords are suitable for machines intended to be used in low temperature applications.

- Polyvinyl chloride sheathed

These cords shall not be used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of Clause 11. Their properties shall be at least those of ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53), for other machines;

- Heat-resistant polyvinyl chloride sheathed

These cords shall not be used for **type X attachment** other than specially prepared cords. Their properties shall be at least those of

- heat-resistant light polyvinyl chloride sheathed cord (code designation 60227 IEC 56), for machines having a mass not exceeding 3 kg;
- heat-resistant polyvinyl chloride sheathed cord (code designation 60227 IEC 57), for other machines.

- Halogen-free, low smoke, thermoplastic insulated and sheathed

Their properties should at least be those of ordinary duty halogen-free free, low smoke flexible cable (code designation 62821 IEC 102 for circular cable).

Compliance is checked by inspection.

25.14 Addition:

*For machines incorporating a **type X attachment** or **type Y attachment**, the number of flexings is 20 000.*

25.15 Modification:

Replace Table 12 by the following:

Table 12 – Pull force and torque

Mass of machine <i>kg</i>	Pull force <i>N</i>	Torque <i>Nm</i>
≤ 1	30	0,1
$> 1 \text{ and } \leq 4$	60	0,25
> 4	125	0,40

Addition:

The test is also applied to the cord in the cord set for machines classified as IPX4 or higher that are provided with an appliance inlet. The cord set is fitted to the appliance inlet prior to the commencement of the test.

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 due to normal use of the machine.

30 Resistance to heat and fire

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

30.2.3 Not applicable.

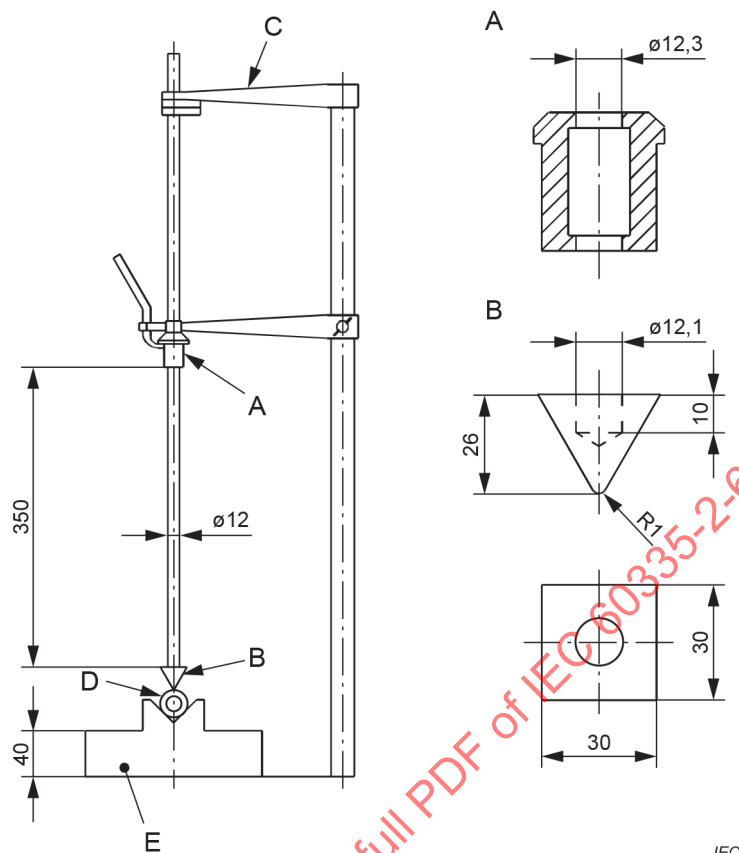
31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Dimensions in millimetres



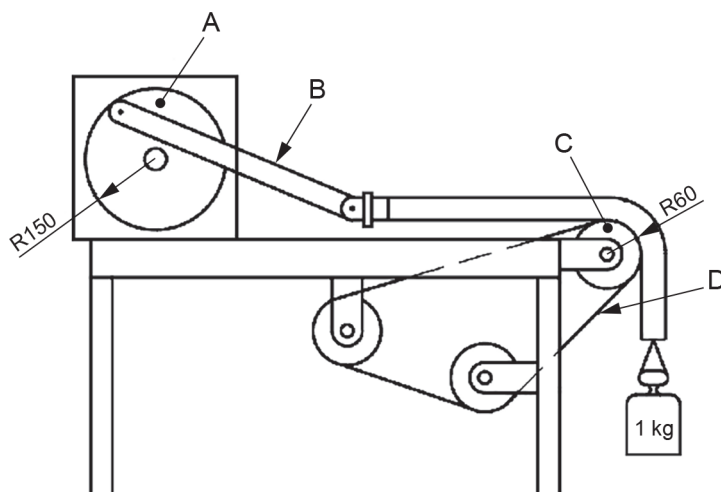
IEC

Key

- A weight
- B chisel
- C fixing arm
- D sample
- E base having mass of 10 kg

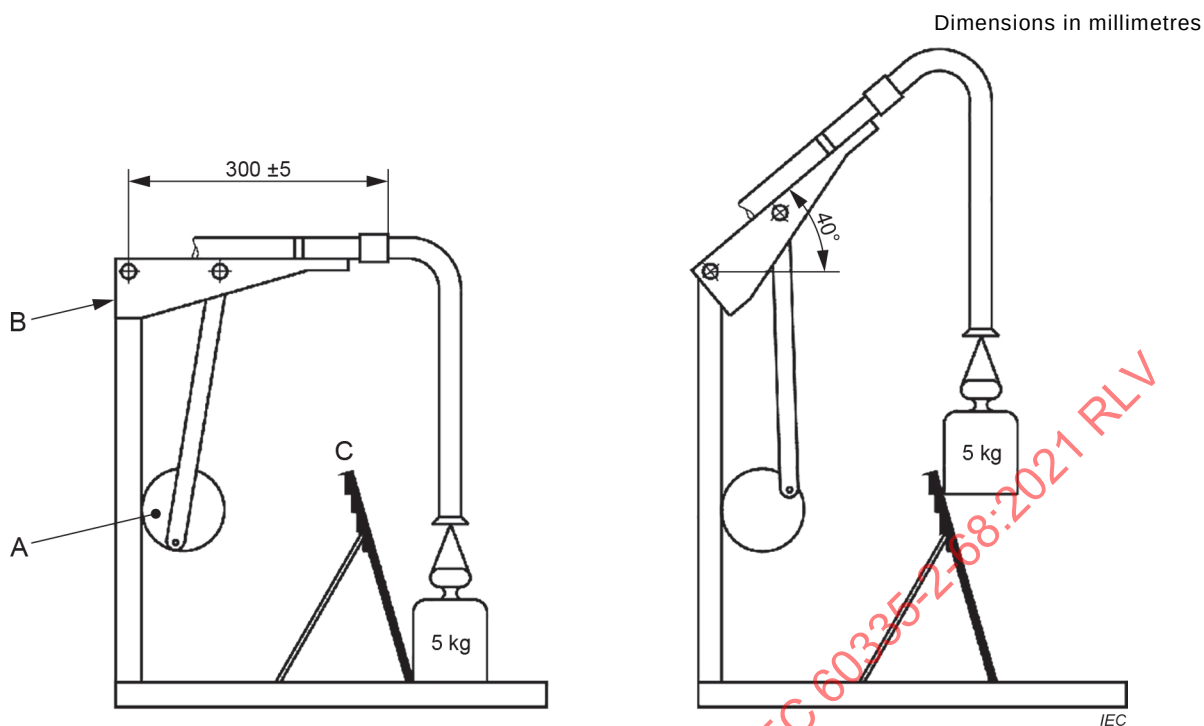
Figure 101 – Impact test apparatus

Dimensions in millimetres

**Key**

- A crank mechanism
- B connecting rod
- C roller, diameter 120 mm
- D abrasive cloth belt

Figure 102 – Apparatus for testing the abrasion resistance of current-carrying hoses



Key

- A crank mechanism
- B arm
- C inclined plane

Figure 103 – Apparatus for testing the resistance to flexing of current-carrying hoses

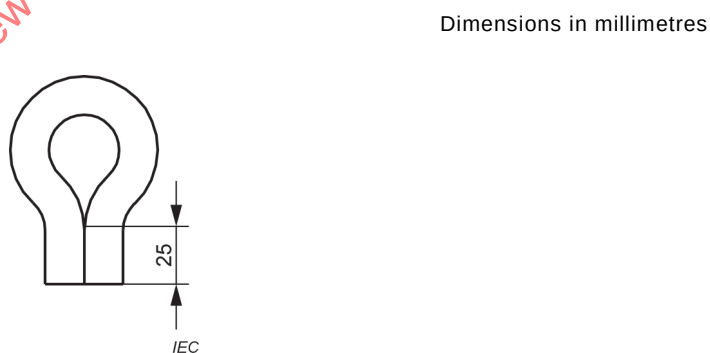
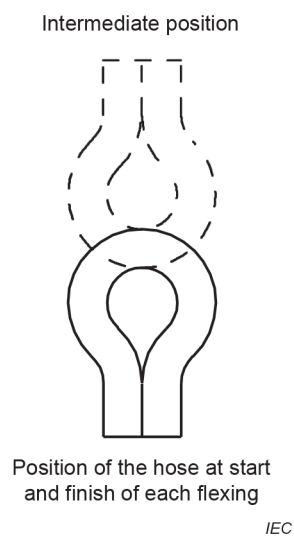


Figure 104 – Configuration of the hose for the freezing treatment



**Figure 105 – Flexing positions for the hose
after removal from the freezing cabinet**

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Annexes

The annexes of Part 1 are applicable except as follows.

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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:

7 Markings and instructions

7.1 Modification:

Add at the end of the fourth paragraph ("If appliances use more than one **battery**,"): "except for machines with hardwired **battery** sets."

19 Abnormal operation

B.19.2 Addition:

This clause is not applicable for machines with hardwired **battery** sets.

22 Construction

B.22.3 Modification:

Add the following text after the sixth paragraph of the test specification:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

NOTE 102 During this test, two test probes are applied simultaneously.

B.22.4 Modification:

Add the following text after the fifth paragraph of the test specification:

NOTE 101 Appliances according to this standard are not regarded as being intended to be installed in an area open to the public.

NOTE 102 During this test, two test probes are applied simultaneously.

Annex AA (informative)

Emission of acoustical noise

AA.1 Noise reduction

Noise reduction at **spray extraction machines** is an integral part of the design process and shall be achieved by particularly applying measures at source to control noise, see for example ISO TR 11688-1. The success of the applied noise reduction measures is assessed on the basis of the actual noise emission values in relation to other machines of the same type with comparable non-acoustical technical data.

The major sound sources of **spray extraction machines** are: motors and fans.

AA.2 Noise test code

AA.2.1 Emission sound pressure level determination

The emission sound pressure level is determined in accordance with ISO 11203:1995 applying the method described in 6.2.3 d) with the measurement distance $d = 1$ m.

NOTE In this case, the emission sound pressure level is equal to the surface sound pressure level used for calculating the sound power level according to ISO 3744 when applying a rectangular parallelepiped measurement surface at a distance of 1 m from the reference box.

AA.2.2 Sound power level determination

The sound power level is measured in accordance with ISO 3744, or with ISO 3743-1 if a suitable hard-walled test room is available, or with ISO 9614-2. The direction of the x-axis in Figures AA.1a and AA.1b shall be the same as the x-axis defined for the microphone configurations in ISO 3744.

AA.2.3 Operating and mounting conditions

The operating condition shall be identical for the determination for both sound power and emission sound pressure level at the specified positions.

In addition to **normal operation** in accordance with 3.1.9, the following requirements shall be taken into account.

Before starting the measurement procedure, the suction nozzle shall be adjusted correctly in accordance with the manufacturer's instructions for cleaning carpets.

If the machine is equipped with a **motorized cleaning head**, the cleaning head shall be adjusted so that the bristles of rotating brushes or other retractable parts go beyond the theoretical supporting plane of the cleaning head on a hard floor from $(2_{-0}^{+0,2})$ mm or, if not possible, from at least 2 mm.

The **spray extraction machine** shall be fixed directly without any resilient means on the Wilton carpet (according to IEC TS 62885-1) of a size $2\text{ m} \times 1\text{ m}$, placed on the floor of the test room. In case the measurement is done in a reverberation test room or a hard-walled test room, a minimum **clearance** of 1 m between any part of the machine or attachments and the nearest wall shall be observed. The machine shall be positioned in accordance with Figure AA.1.

The hose and connecting tube(s) or the handles of hand-supported machines shall be resiliently suspended or supported in normal position of use (middle of the handles at (80 ± 5) cm above the carpet, if possible), the suction nozzle or cleaning head being in full contact with the carpet.

If necessary, the cleaning head shall be resiliently fastened to prevent self-propulsion.

Sound radiation due to possible vibrations of the standard test carpet should be prevented.

The test carpet is considered to be a part of the machine to be tested and its possible influence on the acoustical characteristics of the test environment, for example of the hard reflecting plane, or on the absorption (reverberation time) of the reverberant test room or hard-walled room should not be taken into account.

The measurement time shall at least be 15 s.

AA.2.4 Measurement uncertainties

A standard deviation of reproducibility σ_{RO} of less than 1,5 dB is expected for both the A-weighted emission sound pressure level according to ISO 11203 and the A-weighted sound power level determined according to ISO 3744 or ISO 3743-1.

AA.2.5 Information to be recorded

The information to be recorded covers all of the technical requirements of this noise test code. Any deviations from this noise test code or from the basic standards upon which it is based are to be recorded together with the technical justification for such deviations.

AA.2.6 Information to be reported

The information to be included in the test report is at least that which the manufacturer requires for a noise emission declaration or the user requires to verify the declared values.

AA.2.7 Declaration and verification of noise emission values

The declaration of the emission sound pressure level shall be made as a dual-number noise emission declaration according to ISO 4871, where it exceeds 70 dB(A). Where the emission sound pressure level does not exceed 70 dB(A), this fact may be stated in place of the emission value and uncertainty, e.g. by declaring $L_{pA} \leq 70$ dB(A).

It shall declare the noise emission value L_{pA} and separately the respective uncertainty K_{pA} .

The sound power level shall be given as a dual-number noise emission declaration according to ISO 4871, where the emission sound pressure level exceeds 80 dB(A).

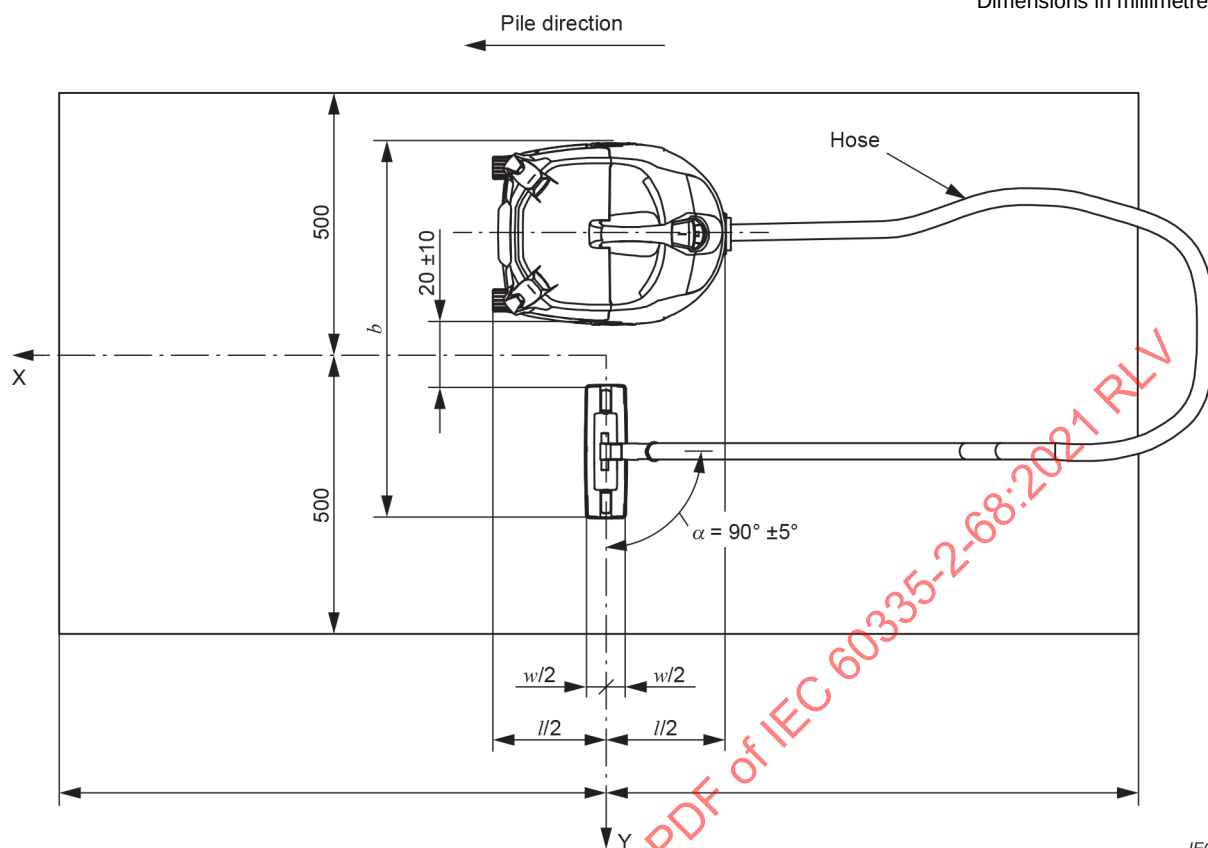
It shall declare the noise emission value L_{WA} and separately the respective uncertainty K_{WA} .

NOTE K_{pA} and K_{WA} are expected to be 2 dB.

The noise declaration shall state that the noise emission values have been obtained according to this noise test code. If this statement is not true, the noise declaration shall indicate clearly what the deviations from this standard, and from the basic standards, are.

If undertaken, verification shall be conducted according to ISO 4871 by using the same mounting, installation and operating conditions as those used for the initial determination of the noise emission values.

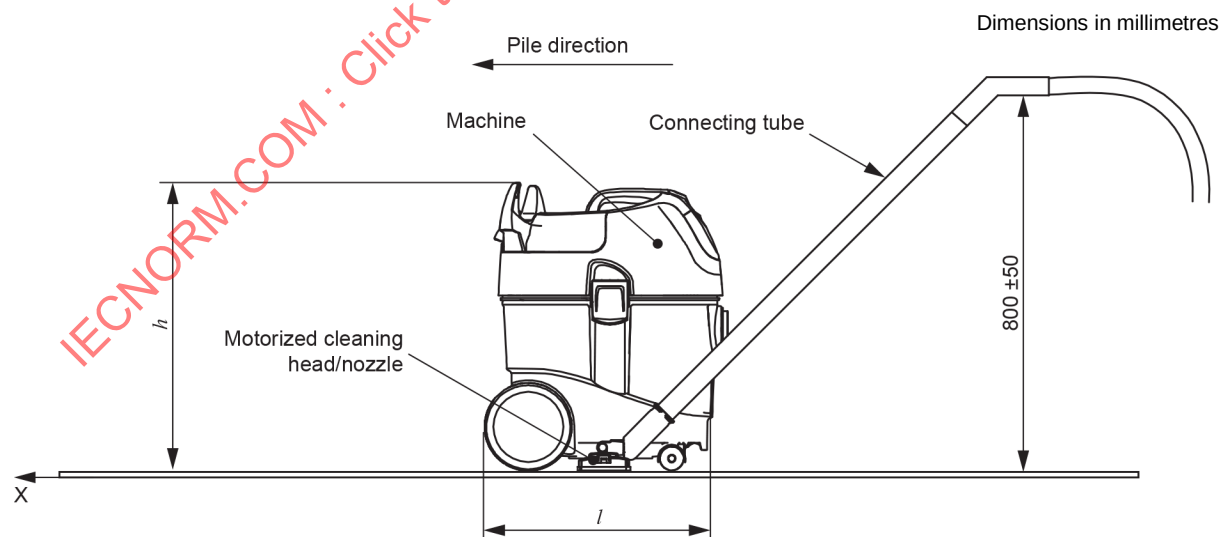
Dimensions in millimetres



Key

- w depth of the motorized cleaning head/nozzle
- l length of the machine
- b width of machine including nozzle

a) Machine with cleaning head connected by hose and connecting tube – Top view



Key

- l length of the machine
- h height of the machine

b) Machine with cleaning head connected by hose and connecting tube – Side view

Figure AA.1 – Machine with cleaning head connected by hose and connecting tube

Annex BB (informative)

Emission of vibration

BB.1 Reduction of vibration

The machine shall be designed and constructed in such a way that risks resulting from vibrations produced by the machine are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source.

The handles shall be designed and constructed in such a way as to reduce the vibrations transmitted to the upper limbs of the **operator** to the lowest level that is reasonably possible.

BB.2 Information on vibration emission

The instructions for hand-held and walk-behind machines and hand-held parts of other machines shall give the following information:

- the vibration total value to which the hand-arm system is subjected, measured in accordance with ISO 5349-1 for arm vibrations, the machine being supplied at **rated voltage** or at the maximum **rated voltage** for machines with a range of voltages, if the vibration total value exceeds $2,5 \text{ m/s}^2$. Where this value does not exceed $2,5 \text{ m/s}^2$, this fact may be stated in place of the emission value and uncertainty, e.g. by declaring $a_h \leq 2,5 \text{ m/s}^2$;
- the uncertainty surrounding these values, in accordance with the above given standards.

These values shall be either those actually measured for the machine in question or those established on the basis of measurements taken for a technically comparable machine which is representative of the machine being produced.

Regarding operating conditions during measurement and the methods used for measurement, the reference of the standard applied (IEC 60335-2-68) shall be specified.

NOTE Experience has shown that for these machines, the magnitude of hand-arm vibration is in general significantly below $2,5 \text{ m/s}^2$. Therefore, unless the equipment concerned has a technical specification that renders this experience inapplicable, it is sufficient to mention that the emission value is below $2,5 \text{ m/s}^2$.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-2, *Household and similar electrical appliances – Safety – Part 2-2: Particular requirements for vacuum cleaners and water suction cleaning appliances*

IEC 60335-2-67, *Household and similar electrical appliances – Safety – Part 2-67: Particular requirements for floor treatment machines, for commercial use*

IEC 60335-2-69, *Household and similar electrical appliances – Safety – Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use*

IEC 60335-2-72, *Household and similar electrical appliances – Safety – Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use*

ISO 3743-1, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

ISO 3744, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 4871, *Acoustics – Declaration and verification of noise emission values of machinery and equipment*

ISO 5349-1, *Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1: General requirements*

ISO 9614-2, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 2: Measurement by scanning*

ISO 11203:1995, *Acoustics – Noise emitted by machinery and equipment – Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*

ISO/TR 11688-1, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-68: Exigences particulières pour les machines de nettoyage par pulvérisation et aspiration, à usage commercial

AVANT-PROPOS

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- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments du présent document de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-68 a été établie par le sous-comité 61J: Appareils de nettoyage à moteur électrique pour usage commercial, du comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2012 et son Amendement 1:2016. Elle constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- alignement rédactionnel et technique sur l'IEC 60335-1:2020.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
61J/736/CDV	61J/743A/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

La présente partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les machines de nettoyage par pulvérisation et aspiration, à usage commercial.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

- les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;
- à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;
- les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

- exigences: caractères romains;
- modalités d'essais: *caractères italiques*;
- notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit entériné au niveau national au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

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INTRODUCTION

Il a été considéré en établissant cette Norme internationale que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

Cette norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre partie 2 de l'IEC 60335, la partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les risques traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

Cette norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les normes horizontales et génériques couvrant un risque ne sont pas applicables parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335. Par exemple, dans le cas des exigences de température de surface pour de nombreux appareils, des normes génériques, comme l'ISO 13732-1 pour les surfaces chaudes, ne sont pas applicables en plus de la Partie 1 ou des parties 2.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de cette norme peut être examiné et essayé en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la norme.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-68: Exigences particulières pour les machines de nettoyage par pulvérisation et aspiration, à usage commercial

1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des **machines de nettoyage par pulvérisation et aspiration** électriques portables à moteur non autopropulsées, avec ou sans accessoires et avec ou sans éléments électriques chauffants, destinées à un **usage commercial** en intérieur.

NOTE 101 La présente norme s'applique aux machines à **usage commercial**. La liste suivante, bien que non exhaustive, donne une indication des endroits inclus dans le domaine d'application:

- zones ouvertes au public, telles que les hôtels, les écoles, les hôpitaux;
- sites industriels, par exemple usines et ateliers de fabrication;
- commerces de détail, par exemple magasins et supermarchés;
- locaux commerciaux, par exemples bureaux et banques;
- services de location de ce type de machines;
- tous les usages autres que l'utilisation domestique normale.

Ces machines ne sont pas équipées d'une commande de dispositif de déplacement.

NOTE 102 Les machines conçues pour la même fonction prévue, mais équipées d'une commande de dispositif de déplacement sont couvertes par l'IEC 60335-2-72.

Les systèmes d'alimentation suivants sont couverts:

- moteurs alimentés par le réseau de **tension assignée** inférieure ou égale à 250 V pour les appareils monophasés et à 480 V pour les autres appareils,
- **machines alimentées par batteries**.

La présente norme s'applique aux machines dans lesquelles la pression de l'**agent nettoyant** employé ne dépasse pas 2,5 MPa, dans lesquelles le produit de la pression (en MPa) et du débit de l'**agent nettoyant** (en litres par minutes) ne dépasse pas 100, et dans lesquelles la température de l'**agent nettoyant** à la sortie de la buse de pulvérisation ne dépasse pas 85 °C.

La présente norme ne s'applique pas

- aux aspirateurs et aux appareils de nettoyage à aspiration d'eau à usage domestique (IEC 60335-2-2);
- aux machines de traitement des sols à **usage commercial** (IEC 60335-2-67, IEC 60335-2-72);
- aux aspirateurs qui fonctionnent en présence d'eau ou à sec, y compris les brosses motorisées, à **usage commercial** (IEC 60335-2-69);

NOTE 103 L'IEC 60335-2-67 et l'IEC 60335-2-69 couvrent uniquement les machines sans commande de dispositif de déplacement.

- aux **outils** électroportatifs et portables à moteur (série IEC 60745, série IEC 61029, série IEC 62841);

- aux machines destinées à être utilisées dans des environnements corrosifs ou explosifs (poussière, vapeur ou gaz);
- aux machines destinées à aspirer de la poussière dangereuse (comme défini dans l'IEC 60335-2-69), des substances inflammables ou des particules incandescentes;
- aux machines destinées à l'utilisation de solvants dangereux, tels que des liquides inflammables ou explosifs.

NOTE 104 L'attention est attirée sur le fait que, dans de nombreux pays, des exigences supplémentaires relatives à l'utilisation en toute sécurité de l'équipement couvert peuvent être spécifiées par les organismes sanitaires nationaux, par les organismes nationaux responsables de la protection des travailleurs, par les organismes nationaux responsables de l'alimentation en eau et par des organismes similaires.

2 Références normatives

L'article de la Partie 1 est applicable avec l'exception suivante.

Addition:

IEC TS 62885-1, *Surface cleaning appliances – Part 1: General requirements on test material and test equipment* (disponible en anglais seulement)

ISO 6344-2, *Abrasifs appliqués – Granulométrie – Partie 2: Détermination de la distribution granulométrique des macrograins P12 à P220*

3 Termes et définitions

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

3.1.9 *Addition:*

conditions de fonctionnement normal

conditions dans lesquelles la machine est mise en fonctionnement en usage normal, spécifiées comme suit:

La machine est mise en fonctionnement équipée de la pompe de pulvérisation et d'aspiration avec la buse qui donne la charge la plus élevée, le moteur d'aspiration, le dispositif utilisé pour agiter les poils du tapis (le cas échéant), le **dispositif de chauffage de l'agent nettoyant** (le cas échéant) et la pompe de vidange des eaux usées (le cas échéant) étant tous en fonctionnement. Tout marquage qui indique un fonctionnement intermittent de courte durée des pompes est respecté.

Les **conditions de fonctionnement normal** P_m du moteur d'aspiration sont obtenues à la puissance suivante:

$$P_m = 0,5 (P_f + P_i)$$

où

P_f est la puissance, en watts, de la machine après avoir fonctionné pendant 3 min, équipée de la buse et du tuyau qui donnent la puissance la plus élevée;

P_i est la puissance, en watts, de la machine après avoir fonctionné pendant 20 s avec la buse fermée, immédiatement après la période de 3 min avec la buse ouverte. Toute soupape ou tout dispositif similaire utilisé(e) pour assurer une circulation d'air pour refroidir le moteur en cas d'obstruction de l'ouverture principale d'aspiration est rendu(e) inopérant(e).

P_f et P_i sont mesurées avec la tension d'alimentation réglée à la **tension assignée**, ou à une tension égale à la valeur moyenne de la **plage assignée de tensions**, si la différence entre les limites de celle-ci ne dépasse pas 10 % de la valeur moyenne de la plage. Si la différence

entre les limites de la **plage assignée de tensions** dépasse 10 % de la valeur moyenne, les essais sont effectués avec la tension d'alimentation réglée à la limite supérieure de la plage.

Le tuyau est étendu droit. Si la machine est fournie avec un flexible comme accessoire facultatif, elle est mise en fonctionnement sans le flexible.

Les dispositifs à commande électrique utilisés pour agiter le tapis, le cas échéant, sont en fonctionnement, mais sans être en contact avec le sol ou toute autre surface ni avec les dispositifs utilisés pour fermer l'ouverture d'aspiration.

Le réglage de l'ouverture d'aspiration n'est pas modifié lorsqu'il est spécifié que la machine est mise en fonctionnement sous charge normale, quelles que soient les tensions spécifiées pour l'essai. Lorsque des systèmes de filtration facultatifs sont fournis avec la **machine de nettoyage par pulvérisation et aspiration**, le système de filtration qui oppose le moins de résistance à l'air (qui donne le débit maximal) est utilisé.

La charge normale est égale à la charge moyenne P_r du dispositif d'agitation à commande électrique, par exemple une brosse à moteur, déterminée comme suit:

- le dispositif d'agitation fonctionne sur un tapis tel que spécifié dans l'IEC TS 62885-1;
- la charge moyenne P_r est déterminée lorsque le dispositif est utilisé comme suit:
après avoir réglé le dispositif, celui-ci est déplacé deux fois sur une distance de 5 m dans la direction qui donne la charge la plus élevée;
- le moteur responsable du flux d'air fonctionne dans les mêmes conditions que pour la détermination de P_r , c'est-à-dire sans restriction du flux d'air, et les mesurages sont effectués après 3 min;
- le dispositif est réglé à la hauteur des poils du tapis;
- il est nécessaire de déplacer doucement le dispositif d'agitation sur le tapis afin d'éviter d'endommager celui-ci.

Les pompes de vidange des eaux usées, le cas échéant, sont mises en fonctionnement comme suit.

La pompe assure un flux d'eau continu sans aucun tuyau de vidange des eaux usées raccordé à la sortie d'eau usée des machines, à moins que le tuyau de vidange ne soit raccordé de façon permanente à la machine. Le moteur d'aspiration fonctionne au cours de l'essai, à moins qu'un dispositif de verrouillage ne soit prévu pour empêcher le fonctionnement simultané des deux moteurs

3.101

dispositif de préchauffage de l'agent nettoyant

élément électrique chauffant destiné à augmenter la température de l'**agent nettoyant** jusqu'à la température de fonctionnement avant l'opération de nettoyage

3.102

dispositif de chauffage de l'agent nettoyant

dispositif de chauffage électrique destiné à maintenir l'**agent nettoyant** à la température nécessaire au bon fonctionnement

3.103

agent nettoyant

eau avec ou sans ajout de détergent soluble ou miscible

3.104

machine de nettoyage par pulvérisation et aspiration

machine avec ou sans éléments chauffants et avec ou sans accessoires, qui permet de pulvériser un **agent nettoyant** sous pression dans ou sur la surface à nettoyer et d'éliminer par aspiration le résidu d'**agent nettoyant** usé

3.105**pression de fonctionnement assignée maximale**

pression maximale générée par la pompe en fonctionnement à la **tension assignée**

3.106**machine de nettoyage à aspiration d'eau**

machine destinée à l'application et à l'extraction d'un **agent nettoyant**

3.107**tête de nettoyage motorisée**

dispositif de nettoyage tenu ou guidé à la main, relié à la machine et équipé d'un moteur électrique intégré

Note 1 à l'article: La tête de nettoyage principale fixée de manière permanente n'est pas considérée comme une **tête de nettoyage motorisée**.

3.108**opérateur**

personne chargée de l'installation, du fonctionnement, du réglage, du nettoyage, du déplacement ou de l'entretien par l'utilisateur sur la machine

3.109**solution d'essai**

solution composée de 20 g de NaCl et de 1 ml d'une solution de 28 % par masse de dodécylsulfate de sodium pour 8 l d'eau

Note 1 à l'article: La formule chimique du dodécylsulfate de sodium est $C_{12}H_{25}NaSO_4$.

3.110**usage commercial**

usage prévu des machines couvertes par la présente norme, c'est-à-dire des machines non destinées à une utilisation domestique normale par des personnes privées, mais qui peuvent représenter un danger pour le public

Cela signifie en particulier

- que les machines peuvent être utilisées par le personnel des entreprises de nettoyage, le personnel d'entretien, etc.;
- qu'elles sont utilisées dans des locaux commerciaux ou publics (c'est-à-dire les bureaux, les magasins, les hôtels, les hôpitaux, les écoles, etc.) ou dans les environnements industriels (usines, etc.) et dans l'industrie légère (ateliers, etc.)

Note 1 à l'article: L'**usage commercial** est également appelé utilisation professionnelle.

4 Exigences générales

L'article de la Partie 1 est applicable avec les exceptions suivantes.

Remplacement du premier alinéa par le texte suivant:

Les machines doivent être construites de telle façon qu'elles fonctionnent en toute sécurité et qu'elles ne présentent aucun danger pour les personnes ou leur environnement en usage normal, même en cas de négligence, et durant l'installation, le réglage, l'entretien, le nettoyage, le dépannage ou le transport.

Addition:

Pour les besoins de la présente norme, le terme "appareil" utilisé dans la Partie 1 doit être compris comme "machine".

5 Conditions générales d'essais

L'article de la Partie 1 est applicable, avec l'exception suivante.

5.101 La **solution d'essai** doit être stockée dans une atmosphère fraîche et utilisée dans un délai de sept jours après sa préparation.

6 Classification

L'article de la Partie 1 est applicable avec les exceptions suivantes.

6.1 Remplacement:

Les machines doivent appartenir à l'une des classes suivantes d'après la protection contre les chocs électriques:

- classe I,
- classe II, ou
- classe III.

La vérification est effectuée par examen et par les essais applicables.

6.2 Addition:

Les **machines de nettoyage par pulvérisation et aspiration** doivent être au moins de classe IPX4.

7 Marquages et instructions

L'article de la Partie 1 est applicable avec les exceptions suivantes.

7.1 Modification:

Remplacer le quatrième tiret comme suit:

- le nom commercial et l'adresse du fabricant et, le cas échéant, ceux de son mandataire; toute adresse doit être suffisamment complète pour permettre une communication par courrier;

Addition:

Les machines doivent également porter les marquages suivants:

- numéro de série, le cas échéant;
- désignation de la machine et série ou type, permettant ainsi l'identification technique du produit. Cela peut être réalisé par une combinaison de lettres et/ou de chiffres;

NOTE 101 La désignation de la machine, la série ou le type inclut la référence du modèle ou du type, comme exigé dans la Partie 1.

- année de construction, c'est-à-dire l'année durant laquelle a été achevé le processus de fabrication;

NOTE 102 L'année de construction peut faire partie du numéro de série.

- **pression de fonctionnement assignée maximale** en MPa ou en bar;

- température maximale de sortie du liquide de pulvérisation en °C, si elle est supérieure à 50 °C;
- les machines doivent porter le marquage de la masse de la configuration la plus courante en kg.

Le réservoir prévu pour l'**agent nettoyant** doit porter le marquage, sur le réservoir lui-même, sur son couvercle ou à proximité, de la température maximale de l'**agent nettoyant** en question en °C.

Si la machine est conçue pour être remplie avec un **agent nettoyant** qui dépasse 60 °C, la mise en garde suivante doit être placée à proximité de l'orifice de remplissage:

MISE EN GARDE Chaud. Ne pas toucher.

La hauteur des lettres doit être d'au moins 4 mm. Cette formulation peut être remplacée par le symbole IEC 60417-5041 (2002-10).

7.1.101 Les **têtes de nettoyage motorisées** doivent porter les marquages suivants:

- la **tension assignée** ou la **plage assignée de tensions** en volts;
- la **puissance d'entrée assignée** en watts;
- le nom, la marque commerciale ou la marque d'identification du fabricant ou du fournisseur agréé;
- la référence du modèle ou du type;
- la masse de la configuration la plus courante en kg.

Les **têtes de nettoyage motorisées** pour appareils de nettoyage à aspiration d'eau, à l'exception de celles de **construction de classe III** dont la tension de service ne dépasse pas 24 V, doivent être marquées du symbole IEC 60417-5935 (2012-09).

NOTE Ce symbole est un signal d'information et, excepté pour les couleurs, les règles de l'ISO 3864-1 s'appliquent.

La vérification est effectuée par examen.

7.6 Addition:



[symbole IEC 60417-5935
(2012-09)]

tête de nettoyage motorisée pour
nettoyage à aspiration d'eau



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

attention, surface très chaude

7.12 Modification:

Supprimer le premier alinéa et la première mise en garde.

Ajouter, après la NOTE, le nouveau texte suivant:

NOTE 101 D'autres exigences concernant les instructions en version papier sont disponibles en 7.12.9.

Addition:

La page de couverture de la notice d'instructions doit inclure, en substance, la mise en garde suivante:

AVERTISSEMENT Lire les instructions avant toute utilisation de la machine.

Cette formulation peut être remplacée par les symboles ISO 7000-0434A (2004-01) et ISO 7000-0790 (2004-01).

Les instructions doivent contenir au moins les informations suivantes:

- le nom commercial et l'adresse complète du fabricant et, le cas échéant, ceux de son mandataire;
- la désignation de la série ou du type de la machine, qui figurent sur la machine elle-même, à l'exception du numéro de série;

NOTE 102 La désignation de la série ou du type peut être absente, tant que l'identification du produit est assurée.

- la description générale de la machine;
- l'usage prévu de la machine et de l'équipement auxiliaire couverts par le domaine d'application de la présente norme;

NOTE 103 Les **têtes de nettoyage motorisées** et les lampes sont des exemples d'équipements auxiliaires.

- la signification des symboles utilisés sur la machine et dans les instructions;
- les dessins, schémas, descriptions et explications nécessaires à l'utilisation en toute sécurité, l'entretien et la réparation de la machine et afin d'en vérifier le fonctionnement correct;
- les données techniques, y compris les marquages apposés sur la machine;
- les informations relatives à la mise en service, au fonctionnement en toute sécurité, à la manipulation, au transport et au stockage de la machine, en tenant compte de son poids;
- les instructions qui permettent de réaliser le réglage et l'entretien en toute sécurité, y compris les mesures de protection qu'il convient de prendre pendant ces opérations;
- les conditions dans lesquelles la machine satisfait à l'exigence de stabilité pendant son utilisation, son transport, son assemblage, son démontage lorsqu'elle est hors service, pendant des essais ou des arrêts prévisibles;
- la procédure à suivre afin d'éviter des situations dangereuses en cas d'accident (par exemple, contact ou déversement de détergents, d'acide de batterie, de carburant ou d'huile) ou de panne de l'équipement;
- en substance, l'indication suivante:

Cette machine est destinée à un usage commercial, par exemple dans les hôtels, les écoles, les hôpitaux, les usines, les commerces, les bureaux et les entreprises de location.

Les instructions doivent indiquer le type et la fréquence des examens et de l'entretien exigés pour assurer une utilisation en toute sécurité, y compris les mesures d'entretien préventif. Elles doivent, le cas échéant, fournir les spécifications des pièces de rechange si elles compromettent la santé et la sécurité de l'**opérateur**, par exemple les éléments de filtre.

En outre, les instructions doivent fournir les informations suivantes, si cela est applicable:

- pour les machines qui fonctionnent sur batterie, des instructions concernant les précautions à prendre pour le chargement en toute sécurité;
- les précautions à prendre lors du remplacement des brosses ou d'autres accessoires;

- les informations relatives aux détergents ou autres liquides qui peuvent être utilisés, y compris le choix et l'utilisation d'un équipement de protection individuelle (EPI);
- les caractéristiques essentielles de l'équipement auxiliaire qui peut être installé sur la machine;
- les informations concernant la mise au rebut en toute sécurité des batteries.

7.12.9 *Ajouter le texte suivant après le deuxième alinéa:*

A la place d'une version papier, un format électronique peut être utilisé si les conditions suivantes sont respectées:

- les instructions de déballage, d'installation et d'accès à l'ensemble des instructions de sécurité sur un dispositif de lecture approprié doivent être fournies sur papier ou inscrites sur la machine;
- le dispositif de lecture approprié doit être fourni avec la machine ou être nécessaire pour faire fonctionner la machine; et
- le contenu des instructions électroniques doit être fourni avec la machine.

Pour l'utilisation fonctionnelle non relative à la sécurité, le manuel d'utilisation peut être fourni au format électronique:

- sur un affichage électronique adapté intégré à l'appareil, ou
- sur un dispositif électronique distinct fourni avec l'appareil, ou
- par le biais d'un lien vers un site web, où il peut être consulté et/ou téléchargé.

7.12.101 Les instructions doivent inclure des mises en garde sur les façons dont la machine ne doit pas être utilisée, et qui sont susceptibles de se produire selon l'expérience du fabricant. Elles doivent au moins inclure, en substance, si elles sont applicables, les mises en garde suivantes:

- **MISE EN GARDE** Les opérateurs doivent être formés de façon adaptée à l'utilisation de ces machines.
- **AVERTISSEMENT** Cette machine est uniquement destinée à une utilisation à l'intérieur.
- **AVERTISSEMENT** Cette machine doit uniquement être stockée à l'intérieur.
- Une mise en garde qui précise que la machine doit être déconnectée de sa source d'alimentation durant le nettoyage ou l'entretien et lors du remplacement de pièces ou de la conversion de la machine pour une autre fonction:
 - en retirant la fiche de prise de courant du socle de prise de courant pour les machines qui fonctionnent sur secteur;
 - en déconnectant de manière sécurisée au moins le pôle B+ ou B- de la batterie ou en utilisant une méthode équivalente (appareil de déconnexion) pour les machines qui fonctionnent sur batterie; pour les machines qui ne sont pas à TBTS, tous les pôles doivent être déconnectés.

Les instructions applicables aux machines qui fonctionnent sur secteur doivent également comprendre, en substance, la mise en garde suivante:

- **MISE EN GARDE** Ne pas laisser le câble d'alimentation entrer en contact avec les brosses rotatives.

Les instructions applicables aux machines qui comportent un flexible conducteur pour aspiration à sec et qui fonctionnent sous une tension autre que la **très basse tension de sécurité** doivent également comprendre, en substance, la mise en garde suivante:

- **MISE EN GARDE** Ce flexible comporte des raccordements électriques: ne pas l'utiliser pour recueillir de l'eau et ne pas l'immerger dans l'eau pour le nettoyage.

La vérification est effectuée par examen.

7.12.102 Informations relatives au bruit

NOTE Les instructions peuvent fournir des informations relatives aux émissions de bruit aérien, indiquées au AA.2.7.

7.12.103 Informations relatives aux vibrations

NOTE Les instructions peuvent fournir des informations relatives à la valeur totale des vibrations, indiquée à l'Article BB.2.

7.13 Addition:

Les termes "Instructions d'origine" doivent figurer dans la ou les langues vérifiées par le fabricant.

7.14 Addition:

La hauteur du symbole IEC 60417-5935 (2012-09) doit être d'au moins 15 mm.

La vérification est effectuée par mesurage.

8 Protection contre l'accès aux parties actives

L'article de la Partie 1 est applicable avec les exceptions suivantes.

8.1 Addition:

Les **agents de nettoyage** à base d'eau sont considérés comme conducteurs.

8.1.1 Ajouter le texte suivant après le sixième alinéa:

NOTE 101 Les appareils conformes à la présente norme ne sont pas considérés comme étant destinés à être installés dans une zone ouverte au public.

9 Démarrage des appareils à moteur

L'article de la Partie 1 n'est pas applicable.

10 Puissance et courant

L'article de la Partie 1 est applicable.

11 Echauffements

L'article de la Partie 1 est applicable avec les exceptions suivantes.

11.7 Addition:

Les machines sont mises en fonctionnement jusqu'à l'établissement des conditions de régime.

11.8 Ajouter ce qui suit à la note au Tableau 3, à la fin de la note de bas de tableau a.

Les moteurs hermétiquement clos sont considérés comme étanches.

12 Charge des batteries à ions métalliques

L'article de la Partie 1 est applicable.

13 Courant de fuite et rigidité diélectrique à la température de régime

L'article de la Partie 1 est applicable avec l'exception suivante.

13.2 Addition:

*Pour les **appareils de la classe I** dont plusieurs moteurs fonctionnent simultanément, le courant de fuite ne doit pas dépasser 3,5 mA.*

14 Surtensions transitoires

L'article de la Partie 1 est applicable.

15 Résistance à l'humidité

L'article de la Partie 1 est applicable avec les exceptions suivantes.

15.1.2 Addition:

*Les machines sont mises en fonctionnement pendant 10 min sur une surface horizontale arrosée de **solution d'essai**.*

En pratique, le contenu aspiré est principalement composé d'air, de sorte qu'il n'y ait pas de surcharge du moteur d'aspiration; il convient de respecter la charge d'entrée afin d'éviter toute surcharge.

15.2 Remplacement:

Les machines doivent être construites de telle sorte que

- le débordement de liquides dû aux **conditions de fonctionnement normal**,
- le remplissage incluant le remplissage excessif, et
- le renversement des machines qui ne sont pas stables

n'impactent pas leur isolation électrique.

Les réservoirs prévus pour les liquides suivants sont exclus des essais:

- huile hydraulique,
- liquide de refroidissement,
- carburant (diesel, essence, GPL).

La vérification est effectuée par les essais suivants:

La machine est placée sur un support incliné à un angle de 10° par rapport à l'horizontale, le réservoir de liquide étant rempli à la moitié du niveau indiqué dans les instructions. Une machine est considérée comme n'étant pas stable si elle se renverse lorsqu'une force de 180 N est appliquée au sommet de la machine, dans la direction horizontale la plus défavorable.

Les machines qui disposent d'un socle de connecteur sont équipées d'un connecteur et d'un câble souple appropriés; les machines qui disposent d'une **fixation du type X** sont équipées de la section la plus légère spécifiée dans le Tableau 11. Les autres machines sont soumises à l'essai dans l'état de livraison.

Le réservoir de liquide de la machine est complètement rempli d'une solution saline d'eau qui contient approximativement 1 % de NaCl et 0,6 % d'agent de rinçage non ionique, et une quantité supplémentaire de cette solution égale à 15 % de la capacité du réservoir ou 0,25 l, suivant la valeur la plus élevée, est alors versée régulièrement en 1 min.

Tout agent de rinçage disponible dans le commerce peut être utilisé, mais en cas de doute concernant les résultats d'essai, l'agent de rinçage doit présenter les propriétés suivantes:

- viscosité, 17 mPa s;
- pH, 2,2 (1 % dans l'eau)
- et sa composition doit comprendre les substances suivantes
- Plurafac ® LF 221¹ 15,0 % par masse
- Cumène sulfonate (solution à 40 %) 11,5 % par masse
- Acide citrique (anhydre) 3,0 % par masse
- Eau désionisée 70,5 % par masse

Les machines qui ne sont pas stables sont ensuite renversées, avec le réservoir entièrement rempli et le couvercle en place, à partir de la position normale d'utilisation la plus défavorable, puis laissées dans cette position pendant 5 min, sauf si la machine revient automatiquement à sa position normale d'utilisation.

Les suceurs et les **têtes de nettoyage motorisées** des machines de nettoyage à aspiration d'eau sont placés dans un bac dont la base est de niveau avec la surface de support de la machine. Le bac est rempli de **solution d'essai** jusqu'à 5 mm au-dessus de sa base, ce niveau étant maintenu tout au long de l'essai. La machine, incluant la **tête de nettoyage motorisée**, est mise en fonctionnement jusqu'à ce que son réservoir de liquide soit totalement plein, puis pendant 5 min supplémentaires.

Après chacun de ces essais, la machine doit satisfaire à l'essai de rigidité diélectrique décrit au 16.3.

Il ne doit pas y avoir de trace de liquide sur l'isolation qui réduise les **distances dans l'air** ou les **lignes de fuite** au-dessous des valeurs spécifiées à l'Article 29.

15.3 Modification:

L'humidité relative doit être de $(93 \pm 6) \%$.

15.101 Les **têtes de nettoyage motorisées** des machines de nettoyage à aspiration d'eau doivent résister aux liquides qui peuvent venir en contact avec elles en usage normal.

L'essai suivant n'est pas applicable aux **têtes de nettoyage motorisées** de **construction de classe III** et dont la **tension de service** ne dépasse pas 24 V.

¹ Plurafac ® LF 221 est l'appellation commerciale d'un produit distribué par BASF. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve l'emploi du produit ainsi désigné.