

# INTERNATIONAL STANDARD



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

IEC 60335-2-69:2012

<https://standards.iteh.ai/catalog/standards/sist/54035e0d-9cc0-447f-81c0-c5c5365e64bb/iec-60335-2-69-2012>



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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use

#### FOREWORD

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International Standard IEC 60335-2-69 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.

This fourth edition cancels and replaces the third edition published in 2002 and its Amendments 1 (2004) and 2 (2007). It constitutes a technical revision.

The principal changes in this edition as compared with the third edition of IEC 60335-2-69 are as follows (minor changes are not listed):

- the scope has been revised editorially to avoid misunderstandings;
- terms and definitions has been revised with regard to the requirements revised;
- the standard has been revised in general and updated regarding state-of-the-art, as far as necessary, in particular some changes have been made to Clauses 15, 22 and 25;

- Annex AA was revised and restructured;
- Annex CC was made informative;
- a new Annex EE 'Emission of acoustical noise' was added; and
- a new Annex FF 'Emission of vibration' was added.

The text of this standard is based on the following documents:

FDIS	Report on voting
61J/481/FDIS	61J/494/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 fifth edition (2010) of that standard.

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for wet and dry vacuum cleaners, including power brush, 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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

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

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Withd



## 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 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electrical motor-operated vacuum cleaners, including **back-pack vacuum cleaners**, and **dust extractors**, for wet suction, dry suction, or wet and dry suction, intended for commercial indoor or outdoor use with or without attachments.

It also deals with the safety of **centrally-sited vacuum cleaners**, excluding the installation of the system.

NOTE 101 Attention is drawn to the fact that additional requirements on the safe installation of **centrally-sited vacuum cleaners** are not addressed by this standard but need to be taken into account.

NOTE 102 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;
- all uses other than normal housekeeping purposes.

They are not equipped with a traction drive. 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.

This standard also applies to machines handling **hazardous dust**, such as asbestos.

NOTE 103 Additional requirements for machines handling **hazardous dust** are given in Annex AA. Attention is drawn to the fact that in many countries additional requirements on hazardous substances might apply.

NOTE 104 Radioactive substances are not covered by definition of **hazardous dust** for the purposes of this standard.

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);
- spray extraction machines for **commercial use** (IEC 60335-2-68);
- hand-held mains-operated electrical garden blowers, vacuums and blower vacuums (IEC 60335-2-100);
- hand-held and transportable motor-operated electric tools (IEC 60745 series, IEC 61029 series);
- appliances for medical purposes (IEC 60601-1);

- machines designed for use in corrosive environments;
- machines designed for picking up liquids with a flash point below 55 °C;
- machines designed for use in explosive environments (dust, vapour or gas), except those designed for use in **zone 22**.

NOTE 104 Additional requirements for vacuum cleaners designed for collecting **combustible dust** in **zone 22** are given in Annex CC.

NOTE 105 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 – Methods for measuring the performance*

ISO 2602, *Statistical interpretation of test results – Estimation of the mean – Confidence interval*

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

ISO 7731, *Ergonomics – Danger signals for public and work areas – Auditory danger signals*

ISO 11428, *Ergonomics – Visual danger signals – General requirements, design and testing*

## 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

### 3.1.9 Replacement: normal operation

conditions under which the machine is operated in normal use, obtained at the following power input  $P_m$  of the vacuum motor:

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

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 measurements are made with the machine fitted with a clean dust bag and filter and with the water container, if any, empty. If the machine is intended for use only with a hose, detachable nozzles are removed and 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, 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 normal load is equal to the mean load  $P_r$  for the electrically driven agitating device such as a motor driven brush determined in accordance with the following:

- the agitating device operates on a carpet as specified in IEC 60312-1;
- 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 for 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.

**3.101**  
**water-suction cleaning machine**  
machine for sucking up a water-based cleaning solution

**3.102**  
**back-pack vacuum cleaner**  
vacuum cleaner designed to have the power source and collector carried on the **operator's** back by means of a supporting device

**3.103**  
**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**.

**3.104**  
**hazardous dust**  
non-radioactive dust which is hazardous to health if inhaled, ingested or in contact with the skin

Note 1 to entry: EC Directive 79/831/EEC amending 67/548/EEC lists dusts for which the general indication of nature of risk is specified as very toxic, harmful, corrosive or irritant; some dusts can be subject to an exposure limit in the country of use; micro-organisms can be considered as dusts creating a hazard to the health of a person.

Note 2 to entry: Requirements for machines intended to pick up **hazardous dust** are specified in Annex AA.

**3.105**  
**combustible dust**  
dust with a particle size below 1 mm, able to undergo an exothermic reaction with air when ignited

**3.106****explosive atmosphere (dust)**

atmosphere where the dust will explode when simultaneously subjected to the following conditions:

- the dust must be combustible;
- the dust must be in suspension in the atmosphere which must contain sufficient oxygen to support combustion;
- the dust must have a particle size distribution that will propagate flame;
- the dust concentration in the suspension must be within the explosive range;
- the dust suspension must be in contact with an ignition source of sufficient energy.

Note 1 to entry: Minimum ignition energy values for common dusts can be found in Annex BB.

Note 2 to entry: Requirements for machines intended to pick up **combustible dust** in an **explosive atmosphere** are specified in Annex CC.

**3.107****ESD protected area****EPA**

area with a minimum risk for electrostatic discharge that could damage electronic devices, and in which people present in that area are not subjected to any additional risk

Note 1 to entry: Requirements for machines intended to pick up dust in **ESD protected areas** are specified in Annex DD.

**3.108****dust extractor**

stationary or portable equipment specifically designed to be connected to dust-generating machines

Note 1 to entry: A vacuum cleaner is designed to pick up already settled dust.

**3.109****centrally-sited vacuum cleaner**

vacuum cleaner that is connected to a ducting system installed in the building

Note 1 to entry: During use, the nozzle and its associated hose are connected to one of the suction inlets of the ducting system.

**3.110****guard**

part of the machine specifically designed to provide protection by means of a physical barrier, such as, for example, a casing, a shield, a cover, a screen, a door, an enclosure or a fence; other parts of the machine that fulfil a primarily operational function, such as, for example, the frame of the machine, may also fulfil a protective function but are not referred to as **guards**

Note 1 to entry: Three main kinds of **guards** can be distinguished: fixed **guards**, interlocking moveable **guards** and adjustable **guards**. Interlocking movable **guards** are required where frequent access is envisaged, while fixed **guards** can be used where frequent access is not envisaged.

**3.111****operator**

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

**3.112****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 of dodecyl sodium sulphate is  $C_{12}H_{25}NaSO_4$ .

### 3.113

#### 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:*

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:

Vacuum cleaners and their attachments shall be of one of the following classes with respect to the protection against electric shock:

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

Metal parts that may continuously contact the body shall be considered as handles for which 22.36 applies.

*Compliance is checked by inspection and by the relevant tests.*

**6.2 Addition:**

Water suction cleaning machines shall be at least IPX4.

**7 Marking and instructions**

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

**7.1 Replacement of the 4th 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.

- machines equipped with wheels and other mobile machinery shall be marked with the mass of the most usual configuration in kg.

**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 (2002-10).

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 (2002-10)]

**motorized cleaning head** for  
water-suction cleaning