



# SLOVENSKI STANDARD SIST EN 60335-2-72:2009

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Household and similar electrical appliances - Safety -- Part 2-72: Particular requirements for automatic machines for floor treatment for commercial and industrial use

## iTeh STANDARD PREVIEW

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke -- Teil 2-72: Besondere Anforderungen für automatische Maschinen zur Bodenbehandlung für gewerbliche und industrielle Zwecke

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Appareils électrodomestiques et analogues - Sécurité -- Partie 2-72: Règles particulières pour les appareils automatiques de traitement des sols à usage industriel et commercial

**Ta slovenski standard je istoveten z: EN 60335-2-72:2009**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60335-2-72**

September 2009

ICS 97.080

Supersedes EN 60335-2-72:1998 + A1:2000

English version

**Household and similar electrical appliances -  
Safety -  
Part 2-72: Particular requirements for automatic machines  
for floor treatment for commercial use  
(IEC 60335-2-72:2002 + A1:2005, modified)**

Appareils électrodomestiques  
et analogues -  
Sécurité -  
Partie 2-72: Règles particulières  
pour les machines automatiques  
de traitements des sols  
à usage commercial  
(CEI 60335-2-72:2002 + A1:2005,  
modifiés)

Sicherheit elektrischer Geräte  
für den Hausgebrauch  
und ähnliche Zwecke -  
Teil 2-72: Besondere Anforderungen  
für automatische Maschinen  
zur Bodenbehandlung  
für den gewerblichen Gebrauch  
(IEC 60335-2-72:2002 + A1:2005,  
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This European Standard was approved by CENELEC on 2009-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of the International Standard IEC 60335-2-72:2002 and its amendment A1:2005, prepared by SC 61J, Electrical motor-operated cleaning appliances for commercial use, of IEC TC 61, Safety of household and similar electrical appliances, together with common modifications prepared by the Technical Committee CENELEC TC 61, Safety of household and similar electrical appliances, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60335-2-72 on 2009-09-01.

This European Standard supersedes EN 60335-2-72:1998 + A1:2000.

In this document, the modifications to the International Standard IEC 60335-2-72:2002 + A1:2005 are identified by a vertical line in the left margin.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2009-12-29
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-12-29

This Part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This Part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for automatic machines for floor treatment for commercial use.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies. When this standard states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives 98/37/EEC and 2006/42/EC. See Annex ZZ.

NOTE 1 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.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 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.

There are no special national conditions causing a deviation from this European Standard, other than those listed in Annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

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## Introduction

It has been assumed in the drafting of this European 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 machines.

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 machine is connected to the supply mains. However, national wiring rules may differ.

If a machine within the scope of this standard also incorporates functions that are covered by another Part 2 of EN 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.

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

A machine 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.

A machine 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.

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# Household and similar electrical appliances – Safety – Part 2-72: Particular requirements for automatic machines for floor treatment for commercial use

## 1 Scope

This clause of Part 1 is replaced by the following.

This European Standard deals with the safety of powered **ride-on** and **walk-behind machines** intended for commercial indoor or outdoor use for the following applications:

- sweeping,
- scrubbing,
- wet or dry pick-up,
- polishing,
- application of wax, sealing products and powder based detergents,
- shampooing

of floors with an artificial surface.

Their cleaning motion is more linear than lateral or periodic.

NOTE Z101 By contrast, the cleaning motion of machines covered by EN 60335-2-67 is more lateral or periodic than linear.

They may be equipped with a **traction drive** system. The following power systems are covered:

- internal combustion engines,
- 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 powered machines may be equipped with a built-in battery charger.

This Part 2 applies in conjunction with EN 60335-1:2002 and its amendments, which is referred to in this text as "Part 1". This Part 2 supplements or modifies the corresponding clauses of Part 1 as indicated in the text.

This standard does not apply to

- machines designed to be part of a production process;
- machines designed for use in corrosive or explosive environments (dust, vapour or gas);
- machines designed for use on **slopes** with a gradient exceeding 20 %;
- machines equipped with a power take-off (PTO);
- machines designed for picking up hazardous dusts as defined in EN 60335-2-69, inflammable substances, or aflame particles;
- floor treatment machines for commercial use as covered by EN 60335-2-67;
- spray extraction appliances;

NOTE Z102 EN 60335-2-68 covers spray extraction appliances for commercial use.

- wet and dry vacuum cleaners;

NOTE Z103 EN 60335-2-69 covers wet and dry vacuum cleaners for commercial use.

- road sweepers;

NOTE Z104 EN 15429-1 covers road sweepers.

- park, garden, and agricultural machines;

NOTE Z105 EN ISO 4254-1 covers agricultural machinery, EN 836 covers powered lawnmowers.

- machines designed for use in vehicles or on board of ships or aircraft.

NOTE Z106 Attention is drawn to the fact that

- in many countries additional requirements on the safe use of the equipment covered may be specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities;
- **ride-on machines** designed for transport over public roads may be subject to additional requirements (e.g. lighting, number plate etc.).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60312, *Vacuum cleaners for household use – Methods of measuring the performance*

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

NOTE Normative Annex AA of IEC 60335-2-69 contains particular requirements for vacuum cleaners, suction sweeping machines and dust extractors for the collection of dusts hazardous to health.

ISO 2631-1, *Mechanical vibration and shock – Evaluation of human exposure to whole-body vibration – Part 1: General requirements*

ISO 3411, *Earth moving machinery – Human physical dimensions of operators and minimum operator space envelope*

ISO 3471, *Earth-moving machinery – Roll-over protective structures – Laboratory tests and performance requirements*

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

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

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 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry – Seat index point*

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

ISO 7574-1, *Acoustics - Statistical methods for determining and verifying stated noise emission values of machinery and equipment; Part 1: General considerations and definitions*

ISO 7574-4, *Acoustics - statistical methods for determining and verifying stated noise emission values of machinery and equipment; Part 4: methods for stated values for batches of machines*

ISO 11201, *Acoustics – Noise emitted by machinery and equipment – Measurement of emission sound pressure levels at a work station and at other specified positions – Engineering method in an essentially free field over a reflecting plane*

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

ISO 13857, *Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs*

### 3 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, as intended by the manufacturer. It denotes the load corresponding to the **rated power input** or the highest obtainable load of all particular loads of the various functions that can be operated at the same time in accordance with the manufacturer's instructions. For machines provided with a seat or an **operator** platform, a mass of 75 kg secured in position at the appropriate height is used to simulate the **operator** in the most unfavourable position

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

Operational functions include all treatment and driving functions.

The **normal operation** related to the operational functions is specified in 3.1.9.101 to 3.1.9.Z103:

**3.1.9.101** Scrubbing and sweeping machines are operated on a surface of hydraulically pressed concrete paving slabs (see Annex AA) intermittently at least 30 min switched on, and for a period of 5 min switched off.

An alternative is a smooth concrete area of a surface consistency comparable with hydraulically pressed concrete paving slabs.

#### 3.1.9.102 Void

**3.1.9.103** Polishing and dry buffing machines are operated as follows.

PVC-surfaces are considered to be suitable for establishing **normal operation**. The peak of input occurring during the drying process of the chemical applied to treat the surface shall not be taken as **normal operation** but shall be averaged by extending measurements over a period of at least 10 min.

**3.1.9.104** Carpet shampooers are operated on a test surface consisting of a carpet, in accordance with EN 60312, the carpet being fastened to the floor.

Prior to testing, the brush of the shampooing machine is conditioned by operating it for 15 min on a clean, dry concrete surface. After running on the concrete surface the brush is immersed in a shampoo solution for at least 30 min.

The solution tank is filled and the machine is operated over a period of 10 min.

**3.1.9.Z101** Liquid containers of machines for wet scrubbing and shampooing are filled to the highest level indicated by the manufacturer.

**3.1.9.Z102** Additional weights delivered with the machine are fitted before operation.

**3.1.9.Z103** Machines that are designed to have a **sulky** are tested with the **sulky** including the weight of a standard **operator** (75 kg) or without the **sulky**, whichever is the most unfavourable condition.

**3.Z101****wet cleaning machine**

machine for application and sucking up of cleaning liquids

**3.Z102****water-suction cleaning machine**

machine for applying and sucking up a water-based cleaning solution

**3.Z103****walk-behind machine**

machine with or without a **traction drive** designed to be controlled by the **operator** walking behind the machine. It may be equipped with a detachable **sulky**

**3.Z104****ride-on machine**

machine with a **traction drive** and with an **operator** seat or a platform on which the **operator** is sitting / standing during operation

**3.Z105****sulky [trailer]**

removable trailing seat or stand-on platform with wheels or skids designed to carry an operator in a sitting or standing position, while controlling a **walk-behind machine** with **traction drive**

**3.Z106****motorized cleaning head**

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

**3.Z107****hopper**

container to store picked up debris

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**3.Z108****traction drive**

means (system) used to transmit power from the power source to the ground drive means. Traction by the effect of rotating brushes is not included

**3.Z109****parking brake**

means, actuated by the **operator** in the normal operating position, to prevent a stationary machine from moving

**3.Z110****service brake**

means for decelerating and stopping a machine, with a traction drive, from its ground travel speed

**3.Z111****operator presence control (OPC)**

control device that automatically interrupts the power, e.g. to a drive or an engine, when the **operator's** actuating force is removed

NOTE Such devices may be, for example, continuous action controls ("hold-to-run" controls) or seat switches

**3.Z112****guard**

part of the machine specifically designed to provide protection by means of a physical barrier

**3.Z113****operator**

person installing, operating, adjusting, maintaining, cleaning or moving the machine

**3.Z114****gross vehicle weight (GVW)**

maximum allowable fully laden weight of the machine and its payload, as ready for use

**3.Z115****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 The chemical designation of dodecyl sodium sulphate is  $C_{12}H_{25}NaSO_4$ .

**3.Z116****level surface**

plane with a gradient up to and including 2 %

**3.Z117****slope**

inclined plane with a gradient greater than 2 % but not exceeding 20 %

**3.Z118****risk**

probability of being exposed to an injury or damage to health

**3.Z119****commercial use**

intended use of machines covered by this standard in a professional way

For the purpose of this standard **commercial use** may be read as not intended for domestic use

**4 General requirement**

This clause of Part 1 is applicable except as follows:

*Replace 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.

*Addition:*

**5.Z101** The **test solution** is to be stored in a cool atmosphere and used within seven days after its preparation.

**5.Z102** The **GVW** includes, if applicable, full clean water tanks, empty dirty water tanks (half full for recycling systems), empty dust bags, **hopper** loaded at rated capacity, largest recommended batteries, all options such as cords, hoses, wands, cleaning agents and brushes.

For **ride-on machines** the **GVW** includes a standard **operator**, weighing 75 kg.

## 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 contact with **live parts**:

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

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

### 6.2 Addition:

Mains supplied and battery powered machines for indoor use intended for dry cleaning only, shall be at least IPX0. Other machines shall be at least IPX3.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Replace the 4<sup>th</sup> 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:*

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Machines shall be marked in addition with the following:

- serial number, if any;
- designation of the machine, may be achieved by a combination of letters and/or numbers;
- designation of series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers and may be combined with the designation of machine;
- year of construction, i.e. the year in which the manufacturing process is completed;
- GVW of the machine, in kg.

**7.1.Z101 Motorized cleaning heads** shall be marked with their model or type reference.

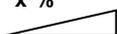
*Compliance is checked by inspection.*

**7.1.Z102** Power outlets for accessories shall be marked with the maximum load in watts on the power outlet or close to it.

*Compliance is checked by inspection.*

### 7.6 Addition:

x %



maximum gradient 'x' during normal use

**7.12 Addition:**

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

**WARNING** Read the instructions before using the machine.

This wording may be replaced by symbols 0434 and either 1641 or 0790 of ISO 7000.

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

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;
- the general description of the machine;
- the GVW of the machine in kilograms;
- the transportation weight of the machine in kilograms, which includes the batteries but excludes options (e.g. driver cabin, FOPS, second and third side broom, front mounted sweeping attachment for scrubbers), fresh water (in case of scrubbers or combined machines), and the weight of a standard operator (75 kg);
- the intended use of the machine and the auxiliary equipment as covered by the scope of this standard;
- 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 GVW;
- 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 operating method to be followed in the event of accident (e.g. contact with detergents) or breakdown (to prevent unsafe actions).

The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation, including preventive maintenance measures. They shall, if applicable, indicate the parts subject to wear and the criteria for replacement if they affect the health and safety of the **operator**.

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

- for battery operated 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;
- information on the seat adjustment and related parts.

For machines having a **traction drive** and a **GVW** exceeding 100 kg, the instructions shall also include the substance of the following: