

© Copyright SEK. Reproduction in any form without permission is prohibited.

## **Elektriska hushållsapparater och liknande bruksföremål – Säkerhet – Del 2-72: Särskilda fordringar på maskiner för golvbehandling för kommersiellt bruk**

*Household and similar electrical appliances –*

*Safety –*

*Part 2-72: Particular requirements for automatic machines for floor treatment for commercial use*

Som svensk standard gäller europastandarden EN 60335-2-72:2009. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60335-2-72:2009.

### **Nationellt förord**

Europastandarden EN 60335-2-72:2009

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60335-2-72, Second edition, 2002 - Household and similar electrical appliances - Safety - Part 2-72: Particular requirements for automatic machines for floor treatment for commercial use**

jämte

**Amendment No. 1, 2005**

utarbetad inom International Electrotechnical Commission, IEC.

Tillägget A1 är inarbetat i texten. Där texten i europastandarden avviker från texten i motsvarande avsnitt i IEC 60335-2-72, har detta markerats med ett lodrätt streck i marginalen.

Standarden ska användas tillsammans med SS-EN 60335-1, utgåva 4, 2002.

Tidigare fastställd svensk standard SS-EN 60335-2-72, utgåva 1, 1999 och SS-EN 60335-2-72/A1, utgåva 1, 2000, gäller ej fr o m 2009-12-29.

---

ICS 97.080

---

Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.  
Postadress: SEK, Box 1284, 164 29 KISTA  
Telefon: 08 - 444 14 00. Telefax: 08 - 444 14 30  
E-post: sek@elstandard.se. Internet: www.elstandard.se

---

### *Standarder underlättar utvecklingen och höjer elsäkerheten*

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

### *SEK är Sveriges röst i standardiseringsarbetet inom elområdet*

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

### *Stora delar av arbetet sker internationellt*

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

### *Var med och påverka!*

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

### **SEK Svensk Elstandard**

Box 1284  
164 29 Kista  
Tel 08-444 14 00  
[www.elstandard.se](http://www.elstandard.se)

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,  
modifiziert)

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.

---

## Contents

|                                                                                                                                 |        |
|---------------------------------------------------------------------------------------------------------------------------------|--------|
| Introduction .....                                                                                                              | 6      |
| 1 Scope .....                                                                                                                   | 7      |
| 2 Normative references .....                                                                                                    | 8      |
| 3 Definitions .....                                                                                                             | 9      |
| 4 General requirement .....                                                                                                     | 11     |
| 5 General conditions for the tests .....                                                                                        | 11     |
| 6 Classification .....                                                                                                          | 12     |
| 7 Marking and instructions .....                                                                                                | 12     |
| 8 Protection against access to live parts .....                                                                                 | 15     |
| 9 Starting of motor-operated appliances .....                                                                                   | 15     |
| 10 Power input and current .....                                                                                                | 15     |
| 11 Heating .....                                                                                                                | 15     |
| 12 Void .....                                                                                                                   | 16     |
| 13 Leakage current and electric strength at operating temperature .....                                                         | 16     |
| 14 Transient overvoltages .....                                                                                                 | 16     |
| 15 Moisture resistance .....                                                                                                    | 16     |
| 16 Leakage current and electric strength .....                                                                                  | 17     |
| 17 Overload protection of transformers and associated circuits .....                                                            | 17     |
| 18 Endurance .....                                                                                                              | 18     |
| 19 Abnormal operation .....                                                                                                     | 18     |
| 20 Stability and mechanical hazards .....                                                                                       | 19     |
| 21 Mechanical strength .....                                                                                                    | 24     |
| 22 Construction .....                                                                                                           | 26     |
| 23 Internal wiring .....                                                                                                        | 29     |
| 24 Components .....                                                                                                             | 29     |
| 25 Supply connection and external flexible cords .....                                                                          | 29     |
| 26 Terminals for external conductors .....                                                                                      | 30     |
| 27 Provisions for earthing .....                                                                                                | 30     |
| 28 Screws and connections .....                                                                                                 | 30     |
| 29 Clearances, creepage distances and solid insulation .....                                                                    | 30     |
| 30 Resistance to heat and fire .....                                                                                            | 31     |
| 31 Resistance to rusting .....                                                                                                  | 31     |
| 32 Radiation, toxicity and similar hazards .....                                                                                | 31     |
| <br>Annex B (normative) Appliances powered by rechargeable batteries .....                                                      | <br>36 |
| Annex AA (normative) Precast paving slabs .....                                                                                 | 37     |
| Annex BB (normative) Measurement of acoustical noise .....                                                                      | 38     |
| Annex CC (normative) Falling-object protective structures (FOPS) – Dynamic test and<br>performance requirements .....           | 41     |
| Annex ZAA (normative) Requirements for internal combustion engine powered machines using<br>liquefied petroleum gas (LPG) ..... | 44     |
| Annex ZC (normative) Normative references to international publications with their<br>corresponding European publications ..... | 47     |

|                                                                                                                       |        |
|-----------------------------------------------------------------------------------------------------------------------|--------|
| Annex ZE (informative) Specific additional requirements for appliances and machines intended for commercial use ..... | 49     |
| Annex ZZ (informative) Coverage of Essential Requirements of EC Directives .....                                      | 49     |
| Annex ZZA (informative) Coverage of Essential Requirements of Directive 98/37/EC .....                                | 49     |
| Annex ZZB (informative) Coverage of Essential Requirements of Directive 2006/42/EC .....                              | 49     |
| <br>Bibliography .....                                                                                                | <br>50 |
| <br>Figure 101 – Impact test apparatus .....                                                                          | <br>32 |
| Figure 102 – Apparatus for testing the abrasion resistance of current-carrying hoses .....                            | 33     |
| Figure 103 – Apparatus for testing the resistance to flexing of current-carrying hoses .....                          | 34     |
| Figure 104 – Configuration of the hose for the freezing treatment .....                                               | 34     |
| Figure 105 – Flexing positions for the hose after removal from the freezing cabinet .....                             | 35     |
| Figure CC.1 – Satisfactory protection by the overhead guard .....                                                     | 42     |
| Figure CC.2 – Admissible deformation when the overhead guard is supported at all sides .....                          | 43     |
| Figure CC.3 – Admissible deformation when the overhead guard is supported at one side .....                           | 43     |

## 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.

# 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*

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]