

BS EN 60335-2-72:2012



BSI Standards Publication

Household and similar electrical appliances — Safety

Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 60335-2-72:2012. It is derived from IEC 60335-2-72:2012. It supersedes BS EN 60335-2-72:2009 which will be withdrawn on 3 May 2015.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags **C** **C1**.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/10, Floor treatment machines (industrial).

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013. Published by BSI Standards Limited 2013

ISBN 978 0 580 70467 3

ICS 97.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2013.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

**Household and similar electrical appliances -
Safety -
Part 2-72: Particular requirements for floor treatment machines with or
without traction drive, for commercial use
(IEC 60335-2-72:2012, modified)**

Appareils électrodomestiques et
analogues -
Sécurité -
Partie 2-72: Exigences particulières pour
les machines de traitements des sols avec
ou sans commande de dispositif de
déplacement, à usage commercial
(CEI 60335-2-72:2012, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke -
Teil 2-72: Besondere Anforderungen für
Bodenbehandlungsmaschinen, mit oder
ohne Fahrtrieb, für den gewerblichen
Gebrauch
(IEC 60335-2-72:2012, modifiziert)

This European Standard was approved by CENELEC on 2012-05-03. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 61J/491/FDIS, future edition 3 of IEC 60335-2-72, prepared by SC 61J, "Electrical motor-operated cleaning appliances for commercial use", of IEC/TC 61, "Safety of household and similar electrical appliances" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60335-2-72:2012.

A draft amendment, which covers common modifications to IEC 60335-2-72, was prepared by CLC/TC 61, "Safety of household and similar electrical appliances" and approved by CENELEC.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-05-03
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-05-03

This document supersedes EN 60335-2-72:2009.

The principal changes in EN 60335-2-72:2012 as compared with EN 60335-2-72:2009 are as follows (minor changes are not listed):

- the title has been changed for better distinction with regard to EN 60335-2-67;
- the scope has been revised editorially to avoid misunderstandings;
- Clause 3 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;
- the markings and instructions (Clause 7) have been revised basically;
- a new Annex DD 'Emission of acoustical noise' was added; and
- a new Annex EE 'Emission of vibration' was added.

This part 2 is to be used in conjunction with the EN 60335-1:2012 and its amendments.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to EN 60335-1.

This part 2 supplements or modifies the corresponding clauses in EN 60335-1, so as to convert that publication into the European Standard: *Safety requirements for floor treatment machines with or without traction drive, 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.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60335-2-72:2012 are prefixed “Z”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60335-2-72:2012 was approved by CENELEC as a European Standard with agreed common modifications.

Modifications to Annexes Z

The annexes of Part 1 are applicable except as follows:

Add the following special national conditions to Annex ZA of EN 60335-1:2012:

Annex ZA (normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard / Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause Special national condition

7.12 **Finland**

If a polyvinyl chloride sheathed cord is fitted, the instructions shall state that the appliance is not to be used outdoors at low temperature.

Annex A **Germany**

The CO-emission of LPG driven machines, intended to be used indoors, has to comply with the value specified in Annex BB. The result shall be documented.

Annex BB **Germany**

For machines intended to be used indoors, except single cylinder engines, the exhaust gas shall not contain more than 0,1 % volume of carbon monoxide (CO). If adjustments are necessary, the adjusting means shall be easily accessible. The measurement shall be carried out with a warm engine, idling, using 98 % propane. The revolution speed of the engine shall be documented.

Apply the following changes to Annex ZC of EN 60335-1:2012:

Annex ZC
(normative)

Normative references to international publications
with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
<i>Add:</i>				
IEC 60312-1	-	Vacuum cleaners for household use - Part 1: Dry vacuum cleaners - Methods for measuring the performance	EN 60312-1	-
IEC 62061	-	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	-
ISO 3411	-	Earth-moving machinery - Human physical dimensions of operators and minimum operator space envelope	EN ISO 3411	-
ISO 5353	-	Earth-moving machinery, and tractors and machinery for agriculture and forestry - Seat index point	EN ISO 5353	-
ISO 6344-2	-	Coated abrasives - Grain size analysis - Part 2: Determination of grain size distribution of macrogrits P12 to P220	-	-
ISO 13849-1	-	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1	-
ISO 13857	-	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs	EN ISO 13857	-
ISO 25119	Series	Tractors and machinery for agriculture and forestry - Safety-related parts of control systems	-	-
<i>Replace:</i>				
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2001

Annex ZE
(informative)

**Specific additional requirements for appliances and machines intended
for commercial use**

This annex is not applicable.

Annex ZZ
(informative)

Coverage of Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex I of the EU Directive 2006/42/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

CONTENTS

INTRODUCTION.....	4
1 Scope.....	5
2 Normative references	6
3 Terms and definitions	7
4 General requirement.....	10
5 General conditions for the tests	10
6 Classification.....	10
7 Marking and instructions.....	11
8 Protection against access to live parts.....	15
9 Starting of motor-operated appliances	16
10 Power input and current	16
11 Heating	16
12 Void.....	17
13 Leakage current and electric strength at operating temperature.....	17
14 Transient overvoltages	17
15 Moisture resistance	17
16 Leakage current and electric strength.....	18
17 Overload protection of transformers and associated circuits	19
18 Endurance.....	19
19 Abnormal operation	19
20 Stability and mechanical hazards	20
21 Mechanical strength	25
22 Construction	27
23 Internal wiring.....	32
24 Components	32
25 Supply connection and external flexible cords	32
26 Terminals for external conductors.....	33
27 Provision for earthing	34
28 Screws and connections.....	34
29 Clearances, creepage distances and solid insulation	34
30 Resistance to heat and fire.....	34
31 Resistance to rusting.....	34
32 Radiation, toxicity and similar hazards.....	34
Annexes	39
Annex B (normative) Appliances powered by rechargeable batteries.....	40
Annex AA (normative) Precast paving slabs.....	46
Annex BB (normative) Requirements for internal combustion engine powered machines using liquefied petroleum gas (LPG)	47
Annex CC (normative) Falling-object protective structures (FOPS) – Dynamic test and performance requirements	50

Annex DD (normative) Emission of acoustical noise	53
Annex EE (normative)	56
Bibliography.....	57
Figure 101 – Impact test apparatus.....	35
Figure 102 – Apparatus for testing the abrasion resistance of current-carrying hoses	36
Figure 103 – Apparatus for testing the resistance to flexing of current-carrying hoses	37
Figure 104 – Configuration of the hose for the freezing treatment	37
Figure 105 – Flexing positions for the hose after removal from the freezing cabinet.....	38
Figure 106 – Warning symbol: Do not inhale exhaust fumes	38
Figure B.101 – Forms of constructions for cleaning machines covered by Annex B.....	41
Figure B.102 – Circuit for testing battery chargers (taken from IEC 60335-2-29).....	45
Figure CC.1 – Satisfactory protection by the overhead guard.....	51
Figure CC.2 – Admissible deformation when the overhead guard is supported at all sides.....	52
Figure CC.3 – Admissible deformation when the overhead guard is supported at one side	52
Table 12 – Pull force and torque	33
Table DD.1 – Determination of uncertainty.....	55

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 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of powered ride-on and powered **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 101 By contrast, the cleaning motion of machines covered by IEC 60335-2-67 is more lateral or periodic than linear.

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 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 standard deals with the reasonably foreseeable hazards presented by machines that are encountered by all persons.

However, in general, it does not take into account:

- **children** playing with the machine;
- the use of the machine by **children**;
- the use of the machine by **vulnerable people** or **very vulnerable people**. Ⓒ

This standard does not apply to

- floor treatment appliances for household use according to IEC 60335-2-10;
- floor treatment machines for **commercial use** according to IEC 60335-2-67;
- spray extraction machines for **commercial use** (IEC 60335-2-68);