UL 60335-2-72

STANDARD FOR SAFETY

Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use

Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use, UL 60335-2-72

First Edition, Dated September 15, 2017

Summary of Topics

This revision of ANSI/UL 60335-2-72 dated November 8, 2019 includes revisions to 20.104.DV3 and 25.1DV to align with the current IEC test procedure for parking breaks

UL 60335-2-72 is an adoption of IEC 60335-2-72, Safety Standard for Household and similar electrical appliances – Safety – Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use, (Edition 3.0, Issued by the IEC April, 2012). Please note that the national difference document incorporates all of the U.S. national differences for UL 60335-2-72.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated July 19, 2019.

No Text on This Page

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CAN/CSA-C22.2 No. 60335-2-72:17
First Edition
(IEC 60335-2-72:2012, MOD)

Underwriters Laboratories, Inc.
UL 60335-2-72
First Edition

Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use

September 15, 2017

(Title Page Reprinted: November 8, 2019)

This national standard is based on publication IEC 60335-2-72, Third Edition (2012).

ANSI/UL 60335-2-72-2019

Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (operating as "CSA Group") and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of CSA Group and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the First Edition including revisions through November 8, 2019. The most recent designation of ANSI/UL 60335-2-72 as an American National Standard (ANSI) occurred on November 8, 2019. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards. Any other portions of this ANSI/UL standard that were not processed in accordance with ANSI/UL requirements are noted at the beginning of the impacted sections.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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PREFACE

This is the harmonized CSA Group, and UL standard for particular requirements for floor treatment machines with or without traction drive, for commercial use. It is the first edition of CAN/CSA-C22.2 No. 60335-2-72, and the first edition of UL 60335-2-72. This harmonized standard has been jointly revised on November 8, 2019. For this purpose, CSA Group and UL are issuing revision pages dated November 8, 2019.

This harmonized standard is based on IEC Publication 60335-2-72: Third edition Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use, issued March 2012. IEC 60335-2-72 is copyrighted by the IEC.

At the time of this publication, IEC 60335-2-72:2012 is available from IEC in English only. CSA Group will publish the French version when it becomes available from the IEC.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Committee, 335K are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Subcommittee on Electrical Motor and Battery-Operated Cleaning Appliances for Industrial and Commercial Use, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

This CAN/CSA-C22.2 No. 60335-2-72, the Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use, is to be used in conjunction with the first edition of CAN/CSA-C22.2 No. 60335-1:11. The requirements for floor treatment machines, with or without traction drive, for commercial use, are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60335-1:11. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 60335-1:11. Where a particular subclause of CAN/CSA-C22.2 No. 60335-1:11 is not mentioned in CAN/CSA-C22.2 No. 60335-2-72, the CAN/CSA-C22.2 No. 60335-1:11 subclause applies.

This UL Standard 60335-2-72, the Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use, is to be used in conjunction with the fifth edition of UL 60335-1. Requirements of this Part 2 Standard, where stated, amend the requirements of UL 60335-1. Where a particular subclause of UL 60335-1 is not mentioned in UL 60335-2-72, the UL 60335-1 subclause applies.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

Differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 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, copyright 2012, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword and Introduction are not a part of the requirements of this standard but are included for information purposes only.

These materials are subject to copyright claims of IEC and UL. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of UL. All requests pertaining to the Household and Similar Electrical Appliances – Safety – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, for Commercial Use, UL 60335-2-72 Standard should be submitted to UL.

NATIONAL DIFFERENCES

GENERAL

In the CSA Group and UL publications of this standard, National Differences from the text of International Electrotechnical Commission (IEC) Publication 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, copyright 2012, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – Part 2-72: Particular Requirements for Floor Treatment Machines With or Without Traction Drive, 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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

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.

International Standard IEC 60335-2-72 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 third edition cancels and replaces the second edition published in 2002 and its Amendment 1 (2005). It constitutes a technical revision.

The principal changes in this edition as compared with the second edition of IEC 60335-2-72 are as follows (minor changes are not listed):

The standard has be revised completely and changed significantly, in particular with regard to the following clauses:

- the title has been changed for better distinction with regard to IEC 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.

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

FDIS	Report on voting
61J/491/FDIS	61J/500/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 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.

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 standard may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

101DV DE ***Modify Note 1 and the paragraphs immediately before and after Note 1 in the Part 2 Foreword by replacing it with the following:***

Note 1 When "Part 1" is mentioned in this standard, it refers to CSA C22.2 No. 60335-1-11 / UL 60335-1 (5th Ed.)

This part 2 supplements or modifies the corresponding clauses in CAN/CSA C22.2 No. 60335-1 Ed. 1: 2011-10-31 / UL 60335-1 Ed. 5: 2011-10-31 (based on IEC 60335-1 Ed. 4.2:2006), so as to convert that publication into the CSA/UL standard: Particular requirements for floor treatment machines with or without traction drive, for commercial use

102DV DE ***Modify the paragraph following Note 3 in the Part 2 Foreword by replacing it with the following:***

Words in SMALL ROMAN CAPS in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in SMALL ROMAN CAPS.

103DV DE ***Modify by adding the following text at the end of the Part 2 Foreword:***

The numbering system in this Standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

104DV D2 ***Modify by adding the following text to DV.2 of the Part 1 Foreword:***

Relevant requirements for components are listed in Annex 101.DVB.

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 electrical household and similar 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 so 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 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);

– wet and dry vacuum cleaners, including power brush, for COMMERCIAL USE (IEC 60335-2-69);

– road sweepers;

NOTE 103 In Europe, EN 13019 covers road sweepers.

– machines designed for use on SLOPES with a gradient exceeding 20 %;

– machines equipped with a power take-off (PTO);

– 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 for use in vehicles or on board of ships or aircraft.

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;

– RIDE-ON MACHINES designed for transport over public roads can be subject to additional requirements (e.g. lighting, license plate etc.).

1DV.1 DE *Modify by replacing the second sentence following Note 102 and the dashed list with the following:*

They include the following energy sources or power systems, or combinations of them:

– mains up to a rated voltage of 250 V for single-phase appliances and 480 V for other appliances,

– internal combustion engines;

– batteries supplying 150 V or less;

– double layer (ultra) capacitors;

– fuel cells.

Energy sources or power systems utilizing both BATTERY and mains are excluded.

1DV.2 DE *Modify the first four dashed items by replacing with the following:*

– floor treatment appliances for household use according to CAN/CSA-E60335-2-10 / CSA C22.2 No. 243 / UL 1017;

– floor treatment machines for COMMERCIAL USE according to CAN/CSA-E60335-2-67 / CSA C22.2 No. 10 / UL 561;

– spray extraction machines for COMMERCIAL USE (CAN/CSA-E60335-2-68 / CSA C22.2 No. 10 / UL 561);

– wet and dry vacuum cleaners, including power brush, for COMMERCIAL USE (CAN/CSA-E60335-2-69 / CSA C22.2 No. 243 / UL 1017;

1.101.DV DR *Add the following clause to the Part 1:*

Except as noted, powered cleaning machines covered by this standard, other than mains supplied machines, are those identified by NFPA 505 as Types E, EE, ES, CGH, CNS, G, GS, D, DS, LP, LPS, CN, G/LP, GS/LPS, G/CN, and GS/CNS. Not covered by this standard are NFPA 505 Types EX, DY, and DX.

NOTE Additional requirements applicable to machine designations that include the letters "EE" or "S" can be found in Annexes 101.DVD and 101.DVE.

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 62061, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

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

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 13849-1, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

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

ISO 25119 (all parts), *Tractors and machinery for agriculture and forestry – Safety-related parts of control systems*

Replacement:

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

2DV.1 DC *Modify by adding the following reference publications:*

CSA Group

C22.2 No. 10-1965 (R2013), Electric floor surfacing and cleaning machines

C22.2 No. 243-15, Vacuum cleaners, blower cleaners, and household floor finishing machines

CAN/CSA-E60335-2-10:15, Household and similar electrical appliances — Safety — Part 2-10: Particular requirements for floor treatment machines and wet scrubbing machines

CAN/CSA-E60335-2-69-01 (R2015), Safety of household and similar electrical appliances - Part 2: Particular requirements for wet and dry vacuum cleaners, including power brush, for industrial and commercial use

CAN/CSA-E730-2-2-94 (R2013), Automatic electrical controls for household and similar use - Part 2: Particular requirements for thermal motor protectors

UL

21 , Standard for LP-Gas Hose

62 , Flexible Cords and Cables

157 , Gaskets and Seals

561 , Standard for Floor-Finishing Machines

569 , Standard for Pigtails and Flexible Hose Connectors for LP-Gas

558 , Standard for Industrial Trucks, Internal Combustion Engine-Powered

583 , Standard for Electric-Battery-Powered Industrial Trucks

746C , Standard for Polymeric Materials - Use in Electrical Equipment Evaluations

969 , Standard for Marking and Labeling Systems

1004–1 , Standard for Rotating Electrical Machines - General

1004–3 , Standard for Thermally Protected Motors

1017 , Vacuum Cleaners, Blower Cleaners, and Household Floor Finishing Machines

1337 , Outline of Investigation for LP-Gas, Natural Gas, and Manufactured Gas Devices for Engine Fuel Systems

2003 , Outline of Investigation for LP-Gas Cylinder Assemblies

IEC

60216-6, Electrical insulating materials - Thermal endurance properties - Part 6: Determination of thermal endurance indices (TI and RTE) of an insulating material using the fixed time frame method

60695–10–3, Fire hazard testing - Part 10-3: Abnormal heat - Mould stress relief distortion test

60695-11-20:2015, Fire hazard testing - Part 11-20: Test flames - 500 W flame test method

62885-2, Surface cleaning appliances – Part 2: Dry vacuum cleaners for household or similar use – Methods for measuring the performance

ISO

3405, Petroleum products - Determination of distillation characteristics at atmospheric pressure

SAE

J30, Fuel and Oil Hoses

J1681, Recommended Practice for Gasoline, Alcohol, and Diesel Fuel Surrogates for Material Testing

J2044, Quick Connect Coupling Specification For Liquid Fuel and Vapor/Emissions Systems

J2045, Fuel System Tubing Assemblies

J2260, Nonmetallic Fuel System Tubing with One or More Layers

NFPA

NFPA 505, Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations

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, 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.

Socket-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 3.1.9.103:

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
Polishing and dry buffing machines are operated as follows.
PVC- or comparable flooring 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 is not taken as NORMAL OPERATION but is averaged by extending measurements over a period of at least 10 min.

3.1.9.103
Carpet shampooers are operated on a test surface consisting of a carpet, in accordance with IEC 60312-1, 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.

3.1.9.103DV DE *Replace the first paragraph with the following:*

Carpet shampooers are operated on a test surface consisting of a carpet, in accordance with IEC 60312-1 or IEC 62885-2, the carpet being fastened to the floor.

3.4.2DV D1 *Modification by replacing 3.4.2DV of the Part 1 with the following:*

SAFETY EXTRA-LOW VOLTAGE – voltage not exceeding 42,4 V peak a.c. or d.c. between conductors and between conductors and earth

3.101
TRACTION DRIVE – system used to propel the machine, e.g. by powered wheels
Traction by the effect of rotating brushes is not included.

3.102
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.

3.103
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

3.104
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

3.105
WET CLEANING MACHINE – machine for applying and sucking up liquids

3.106
WATER-SUCTION CLEANING MACHINE – machine for sucking up liquids

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 main cleaning head permanently attached is not regarded as a MOTORIZED CLEANING HEAD.

3.108
HOPPER – container to store picked up debris

3.109
PARKING BRAKE – means, actuated by the OPERATOR in the normal operating position, to prevent a stationary machine from moving

3.110
SERVICE BRAKE – means for decelerating and stopping a machine, with a TRACTION DRIVE, from its ground travel speed

3.111
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 1 to entry: Such devices can be, for example, continuous action controls (″hold-to-run″ controls) or seat switches.

3.112
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.

3.113
OPERATOR – person installing, operating, adjusting, cleaning, moving, or performing user maintenance on the machine

3.114
GROSS VEHICLE WEIGHT (GVW) – maximum allowable fully laden weight of the machine and its payload, as ready for use
Note 1 to entry: See 5.102 for further test conditions.

3.115
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 $C_{12}H_{25}NaSO_4$.

3.116
LEVEL SURFACE – plane with a gradient up to and including 2 %

3.117
SLOPE – inclined plane with a gradient greater than 2 % but not exceeding 20 %

3.118
MAXIMUM CLEANING GRADEABILITY – maximum gradient according to manufacturer's instruction and as indicated on the machine, on which the machine can be used safely for cleaning purposes

3.119
MAXIMUM TRANSPORT GRADEABILITY – maximum gradient according to manufacturer's instruction, on which the machine can be used safely for transport purposes

3.120
BUILT-IN CHARGER – charger mounted on or into the machine and designed to operate only on or into the machine.
Note 1 to entry: BUILT-IN CHARGERS can also be called on-board chargers.

3.121
BUILT-IN CHARGER WITH POWER SUPPLY FUNCTION – component intended to provide power for charging, operation or both

3.121DV DE *Delete Clause 3.121 of the Part 2:*

This definition does not apply.

3.122
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.

3.123DV D2 *Add the following definition to Clause 3 of the Part 2:*

LOW-VOLTAGE LIMITED-ENERGY (LVLE) CIRCUIT – a circuit involving an a.c. voltage of not more than 30 V r.m.s. or 42,4 V peak, or a d.c. voltage of 60 V and supplied by any of the following:

– a combination of a BATTERY source or an isolated transformer secondary winding and one or more resistors, or a regulating network complying with (a) – (c):

a) The maximum load current shall be drawn under any condition of loading, including short circuit, using a resistor. The current shall be measured 60 s after the application of the load. The resistor shall be continuously readjusted during this 1 min. period to maintain maximum load current. The measured load current shall not exceed the value listed in Table 3.123DV.

b) With reference to the specified voltage limit, measurement shall be made with the unit connected to the intended supply voltage and with all loading circuits disconnected.

c) The performance shall not be affected by malfunction of a single component, excluding resistors. The network shall comply with the value in Table 3.123DV; or

– a BATTERY with output current limited by overcurrent protection in accordance with Table 3.123DV.

NOTE: A LOW-VOLTAGE LIMITED-ENERGY CIRCUIT is also known as a LVLE CIRCUIT.

Table 3.123DV – Rating for secondary fuse or circuit protector

Circuit voltage (V r.m.s.)	Current (A)
20 or less	5
More than 20 but not greater than 60	100/V[a]
[a] V is the maximum output voltage, regardless of the load, with the primary energized.	

3.124DV D2 *Add the following definition to Clause 3 of the Part 2:*

BATTERY – one or more electrical cells, electrically connected so that the combination furnishes current as a unit.

There is one positive and one negative externally accessible connection, and there are no externally accessible inter-cell connections.

NOTE See IEV (IEC 60050) definition 482-01-04.

3.125DV D2 *Add the following definition to Clause 3 of the Part 2:*

BATTERY ASSEMBLY – a multi-cell BATTERY design that is ready for use, contains a common pressure vessel construction, a single vent line assembly, and shared hardware and that is furnished with a single connection cable that has an electrical connector at the end

NOTE See IEV (IEC 60050) definition 482-02-17.

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.

4DV DE *Modification of Clause 4 of the Part 2:*

Replacing “cause no danger to person or surroundings” with “reduce the risk of fire, electric shock, and/or injury to persons” in the third paragraph.

Addition:

For the purposes of this standard, the term ‘appliance’ as used in Part 1 is to be read as ‘machine’.