UL 60335-2-68

STANDARD FOR SAFETY

Household and Similar Electrical Appliances – Safety – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use

UL Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use, UL 60335-2-68

First Edition, Dated May 8, 2020

Summary of Topics

This revision of ANSI/UL 60335-2-68 dated December 3, 2021 includes changes in requirements for Type SJ Cord for Commercial Spray Extraction Machines; 25.7DV.2.

This standard is an adoption of IEC 60335-2-68, Edition 4, published by the IEC March 2012 and its amendment 1, published April 2016. Please note that the national difference document incorporates all of the U.S. national differences for UL 60335-2-68.

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 30, 2021.

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CSA Group
CSA C22.2 No. 60335-2-68:20
First Edition
(IEC 60335-2-68:2012+A1:2016, MOD)

Underwriters Laboratories Inc.
UL 60335-2-68
First Edition

Household and Similar Electrical Appliances – Safety – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use

May 8, 2020

(Title Page Reprinted: December 3, 2021)

This national standard is based on publication IEC 60335-2-68, Edition 4.1 (edition 4:2012 consolidated with Amendment 1:2016).

ANSI/UL 60335-2-68-2021

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.

ISBN 978-1-4883-2551-9 © 2020 Canadian Standards Association

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 the 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 December 3, 2021.

The most recent designation of ANSI/UL 60335-2-68 as an American National Standard (ANSI) occurred on December 3, 2021. 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.

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PREFACE

This is the harmonized CSA Group and UL standard for Household and Similar Electrical Appliances – Safety – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use. It is the first edition of CSA C22.2 No. 60335-2-68, and the first edition of UL 60335-2-68. This edition of CSA C22.2 No. 60335-2-68 replaces CAN/CSA-E60335-2-68:01 (adopted IEC 60335-2-68:1996), Safety of Household and Similar Electrical Appliances – Part 2: Particular Requirements for Spray Extraction Appliances, for Industrial and Commercial Use. This harmonized standard has been jointly revised on December 3, 2021. For this purpose, CSA Group and UL are issuing revision pages dated December 3, 2021.

This harmonized standard is based on IEC Publication 60335-2-68: Fourth edition, Household and Similar Electrical Appliances – Safety – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use, issued March 2012, as revised by Amendment 1, issued April 2016. IEC 60335-2-68 is copyrighted by 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.

CSA C22.2 No. 60335-2-68 is to be used in conjunction with the First edition of CAN/CSA-C22.2 No. 60335-1. The requirements for spray extraction machines for commercial use are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60335-1. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 60335-1. Where a particular subclause of CAN/CSA-C22.2 No. 60335-1 is not mentioned in CSA C22.2 No. 60335-2-68, the CAN/CSA-C22.2 No. 60335-1 subclause applies.

UL Standard 60335-2-68 is to be used in conjunction with the Fifth edition of UL 60335-1. The requirements for spray extraction machines for commercial use are contained in this Part 2 Standard and 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 60335-2-68, 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 60335-2-68, Household and similar electrical appliances – Safety – Part 2-68: Particular requirements for spray extraction machines, for commercial use, copyright 2016, 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.

NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-68, *Household and similar electrical appliances – Safety – Part 2-68: Particular requirements for spray extraction machines, for commercial use*, copyright 2016, 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:

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

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – Part 2-68: Particular Requirements for Spray Extraction Machines, for Commercial Use

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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DISCLAIMER
This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60335-2-68 bears the edition number 4.1. It consists of the fourth edition (2012-03) [documents 61J/490/FDIS and 61J/499/RVD] and its amendment 1 (2016-04) [documents 61J/629/FDIS and 61J/639/RVD]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60335-2-68 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.

The principal changes in this edition as compared with the third edition of IEC 60335-2-68 are as follows (minor changes are not listed):

– the title has been changed for better distinction with regard to IEC 60335-2-72;

– the scope has been revised editorially to avoid misunderstandings;

– terms and definitions has been revised with regard to the requirements revised;

– the standard has been revised in general and updated regarding state-of-the-art, as far as necessary, in particular some changes has been made to Clauses 15, 22 and 25;

– the markings and instructions (Clause 7) have been revised basically;

– a new Annex AA 'Emission of acoustical noise' was added; and

– a new Annex BB 'Emission of vibration' was added.

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 spray extraction machines 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.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of Amendment 1 be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The committee has decided that the contents of the base publication and its amendment 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.

101DV DE *Modify Note 1 and the paragraph following it in the Part 2 Foreword by replacing it with the following:*

Note 1 When "Part 1" is mentioned in this Standard, it refers to CAN/CSA-C22.2 No. 60335-1 (1st Ed.) / 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 spray extraction machines, for commercial use.

102DV DE *Modify the last paragraph in Note 3 of 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 *Modification to add 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.

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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.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – Part 2-68: Particular requirements for spray extraction machines, for commercial use

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electrical portable, non-self-propelled motor-operated SPRAY EXTRACTION MACHINES with or without attachments and with or without electrical heating elements, intended for commercial indoor use.

NOTE 101 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;

– rental services for those machines;

– all uses other than normal housekeeping purposes.

They are not equipped with a traction drive. The following power systems are covered:

– mains powered motors up to a RATED VOLTAGE of 250 V for single-phase appliances and 480 V for other appliances,

– battery powered motors.

1DV.1 DE *Modification to replace the preceding paragraph and dashed list in the Part 2 with the following:*

They are not equipped with traction drive. 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,

– batteries supplying 150 V or less.

NOTE 102DV Machines for the same intended function but equipped with a traction drive are covered by CAN/CSA-C22.2 No. 60335-2-72/UL 60335-2-72.

It is also possible for covered products to be powered by the following. Additional requirements related to these power sources are not included in this Standard.

– double layer (ultra) capacitors;

– fuel cells.

This standard applies to machines in which the pressure of the employed CLEANING AGENT does not exceed 2,5 MPa, and in which the product of the pressure (in MPa) and the flow of CLEANING AGENT (in litres per minute) does not exceed 100, and in which the temperature of the CLEANING AGENT at the spray nozzle outlet does not exceed 85 °C.

This standard does not apply to

– vacuum cleaners and water-suction cleaning appliances for household use (IEC 60335-2-2);

– floor treatment machines for COMMERCIAL USE (IEC 60335-2-67, IEC 60335-2-72);

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

– hand-held and transportable motor-operated electric TOOLS (IEC 60745 series, IEC 61029 series, IEC 62841).

– 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 to handle hazardous solvents, such as flammable or explosive liquids;

NOTE 102 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.

1DV.2 DE *Modify the first four dashed items under "This standard does not apply to" in the Part 2 as follows:*

– First dashed item: replace "(IEC 60335-2-2)" with "(CSA C22.2 No. 243/UL 1017)".

– Second dashed item: replace "(IEC 60335-2-67, IEC 60335-2-72)" with "(CAN/CSA-C22.2 No. 60335-2-67/UL 60335-2-67, CAN/CSA-C22.2 No. 60335-2-72/UL 60335-2-72, CSA C22.2 No. 10, UL 558, UL 561, UL 583)".

– Third dashed item: replace "(IEC 60335-2-69)" with "(CSA C22.2 No. 60335-2-69/UL 60335-2-69, CSA C22.2 No. 243/UL 1017)".

– Fourth dashed item: replace "(IEC 60745 series, IEC 61029 series, IEC 62841)" with "(CSA/UL 60745 series, CSA 61029 series, CSA C22.2 No. 71.2, UL 987, CSA/UL 62841 series)".

2 Normative references

This clause of Part 1 is applicable except as follows.

2DV DC *Modification to add the following text to the first paragraph of the Part 2:*

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

Addition:

IEC 60312-1, *Vacuum cleaners for household use – Part 1: Dry vacuum cleaners – Methods for measuring the performance*

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

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, specified as follows:

the machine is operated with the spray extraction pump with the nozzle giving the highest load, the vacuum motor, the device for agitating the carpet pile (if any), the CLEANING AGENT HEATER (if any) and the soiled water discharge pump (if any) all in use. Any marking of short time intermittent operation of the pumps is observed.

The NORMAL OPERATION P_m of the vacuum motor is obtained at the following power input:

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

where

P_f is the input, in watts, when the machine has been operated for 3 min, fitted with the nozzle and hose giving the highest input;

P_i is the input, in watts, when the machine has been operated for 20 s with the nozzle sealed, immediately following the 3-minute-period with the nozzle open. Any valve or similar device used to ensure a flow of air to cool the motor in the event of a blockage of a main air inlet is rendered ineffective.

P_f and P_i are measured with the supply voltage adjusted to RATED VOLTAGE, or to a voltage equal to the mean value of the RATED VOLTAGE RANGE if the difference between the limits of the RATED VOLTAGE RANGE does not exceed 10 % of the mean value of the range. If the difference between the limits of the RATED VOLTAGE RANGE exceeds 10 % of the mean value, the tests are carried out with the supply voltage set to the upper limit of the range.

The hose is laid out straight. If the machine is provided with a hose as an optional accessory, it is operated without the hose.

Electrically driven devices for agitating the carpet, if any, are in operation but are not in contact with the floor or any other surface or with the means used to seal the air inlet.

The adjustment of the air inlet is not altered when it is specified that the machine is operated under normal load, irrespective of the supply voltages specified in the test. Where optional filtration systems are supplied

with the SPRAY EXTRACTION MACHINE, the filtration system giving the least air resistance (maximum flow) is fitted.

The normal load is equal to the mean load P_r for the electrically driven agitating device such as a motor driven brush is determined in accordance with the following:

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

– the mean load P_r is determined when using the device in the following way:

After setting the device, the device is moved twice over a distance of 5 m in the direction giving the highest load;

– the motor responsible for the airflow operates under the same conditions as determining P_f, i. e. no airflow restrictions, and measurements are taken after 3 min;

– the device is adjusted to the carpet pile height;

– it is necessary to move the agitating device slowly across the carpet to avoid carpet damage.

Soiled water discharge pumps, if applicable, are operated as follows:

The pump delivers a continuous flow of water without any soiled water discharge hose attached to the soiled water outlet of the machines unless the discharge hose is permanently attached to the machine. The vacuum motor works during the test, unless an interlock device is provided to prevent combined operation of both motors.

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

3.1.9.DV DE *Modification to replace "IEC 60312-1" in first dashed item with "IEC TS 62885-1".*

3.4.2DV D1 *Modification to replace Clause 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
CLEANING AGENT PRE-HEATER
electric heating element which is intended to raise the temperature of the CLEANING AGENT to operating temperature before the cleaning operation

3.102
CLEANING AGENT HEATER
electric heater which is intended to maintain the CLEANING AGENT at the correct temperature for effective operation

3.103
CLEANING AGENT
water with or without the addition of soluble or miscible detergent

3.104
SPRAY EXTRACTION MACHINE
machine with or without heating elements and with or without attachments, by which a CLEANING AGENT under pressure is sprayed into or onto the surface to be cleaned and the remaining soiled CLEANING AGENT is removed by suction

3.105
MAXIMUM RATED OPERATING PRESSURE
maximum pressure generated by the pump when operated at RATED VOLTAGE

3.106
WATER-SUCTION CLEANING MACHINE
machine for applying and extracting a CLEANING AGENT

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

3.108
OPERATOR
person installing, operating, adjusting, cleaning, moving, or performing user maintenance on the machine

3.109
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 formula of for dodecyl sodium sulphate is $C_{12}H_{25}NaSO_4$.

3.110
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.

3.111DV D2 ***Add the following definition and Table 3.111DV 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 drawn under any condition of loading, including short circuit, using a resistor is measured 60 s after the application of the load. The resistor is continuously readjusted during this 1 min. period to maintain maximum load current. The measured load current is not exceeding the value listed in Table 3.111DV.

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

c) The performance is not affected by malfunction of a single component, excluding resistors. The network complies with the value in Table 3.111DV.

– a BATTERY with output current limited by overcurrent protection in accordance with Table 3.111DV.

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

Table 3.111DV
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*
* V is the maximum output voltage, regardless of the load, with the primary energized.	

3.112DV 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.

3.113DV 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, shared hardware and 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 text:

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 D2 *Modification to the third paragraph of Clause 4 of the Part 2 as follows:*

Replace "cause no danger to persons or surroundings" with "reduce the risk of fire, electric shock, and/or injury to persons".

Addition:

For the purpose of this standard, the term 'appliance' as used in Part 1 is to be read as 'machine'.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.14DV D2 *Modification to add the following note to Clause 5.14 of the Part 1:*

NOTE 2DV Attention is drawn to the second paragraph of Clause 5.14, as it requires the evaluation of Class II constructions within Class I appliances.

5.101 *The TEST SOLUTION is to be stored in a cool atmosphere and used within seven days after its preparation.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

Machines shall be one of the following classes with respect to the protection against electric shock:

– CLASS I,

– CLASS II or

– CLASS III.

Compliance is checked by inspection and by the relevant tests.

6.2 *Addition:*

SPRAY EXTRACTION MACHINES shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Replacement of the 4th dashed item as follows:*

– the business name and address of the manufacturer and, if applicable, his authorized representative; any address shall be sufficient to ensure postal contact;

Addition:

Machines shall be marked in addition with the following:

– serial number, if any;

– designation of the machine and series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers;

NOTE 101 Designation of machine, series or type includes the model or type reference as required in Part 1.

– year of construction, i.e. the year in which the manufacturing process is completed;

NOTE 102 The year of construction can be part of the serial number.

– MAXIMUM RATED OPERATING PRESSURE in MPa or bar;

– maximum outlet temperature of the spraying liquid in °C, if above 50 °C;

– machines shall be marked with the mass of the most usual configuration in kg.

The tank for the CLEANING AGENT shall be marked on the tank, its cover or nearby, with the maximum temperature of the CLEANING AGENT filled into the tank in °C.

If the machine is designed to be filled with CLEANING AGENT exceeding 60 °C, the following warning shall be placed near the filling opening:

WARNING Hot. Do not touch.

The height of the lettering shall be not less than 4 mm. This wording may be replaced by symbol IEC 60417-5041 (2002-10).

7.1DV D2 *Modification to add the following dashed item to the list in the "Addition" to Clause 7.1 of the Part 2:*

– if a manufacturer produces or assembles floor-finishing machines at more than one factory, each finished product shall have a distinctive marking, which may be in code, by means of which it can be identified as the product of a particular factory.

7.1.101 MOTORIZED CLEANING HEADS shall be marked with

– RATED VOLTAGE or RATED VOLTAGE RANGE in volts;

– RATED POWER INPUT in watts;

– name, trade mark or identification mark of the manufacturer or responsible vendor;

– model or type reference;

– mass of the most usual configuration in kg.

MOTORIZED CLEANING HEADS for water-suction cleaning appliances, except those of CLASS III CONSTRUCTION having a WORKING VOLTAGE up to 24 V shall be marked with symbol IEC 60417-5935 (2012-09).

NOTE This symbol is an information sign and, except for the colours, the rules of ISO 3864-1 apply.

Compliance is checked by inspection.

7.1.102 Socket-outlets for accessories shall be marked with the maximum load in watts on the socket-outlet or close to it.

Compliance is checked by inspection.

7.1.102DV D2 ***Modify Clause 7.1.102 of the Part 2 by replacing the first sentence with the following:***

Socket-outlets for accessories shall be marked with the maximum load in watts or current in amps on the socket-outlet or nearby.

7.1.103DV D2 ***Add Clause 7.1.103DV to the Part 2:***

BATTERIES and BATTERY ASSEMBLIES shall be legibly and permanently marked with the following:

a) The manufacturer's name, trade name, or trademark. The manufacturer's identification may be in a traceable code when the BATTERY is identified by the brand or trademark owned by a private labeler.

b) Catalog designation or equivalent identification.

c) BATTERY nominal voltage, rated ampere-hour capacity and the hour rating at which this capacity is determined.

d) Additionally, BATTERY ASSEMBLIES shall be marked with identification letters – "Type E," "Type EE," or "Type EO." Individual batteries do not require type marking.

7.6 *Addition:*

	[symbol IEC 60417-5935 (2012-09)]	MOTORIZED CLEANING HEAD for water-suction cleaning
	[symbol IEC 60417-5041 (2002-10)]	caution – hot surface

7.12 *Addition:*

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

CAUTION Read the instructions before using the machine.

This wording may be replaced by symbols ISO 7000-0434A (2004-01) and ISO 7000-0790 (2004-01).

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;

NOTE 101 The designation of series or type can be abstracted, as long as the identification of the product is ensured.

– the general description of the machine;

– the intended use of the machine and the auxiliary equipment as covered by the scope of this standard;

NOTE 102 Examples of auxiliary equipment are MOTORIZED CLEANING HEADS and lights.

– 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 weight;

– 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 procedure to be followed to prevent unsafe situations in the event of accident (e.g. contact with or spillage of detergents, battery acid, fuel or oil) or equipment breakdown;

– the substance of the following:

> This machine is intended for commercial use, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses.

The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation, including preventive maintenance measures. They shall, if applicable, give the specifications of the spare parts if they affect the health and safety of the OPERATOR, e.g. filter elements.

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

– for battery powered 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.

7.12.101 The instructions shall include warnings concerning ways in which the machine shall not be used, which in the experience of the manufacturer are likely to occur. At least, it shall include the substance of the following warnings, if applicable.

– WARNING Operators shall be adequately instructed on the use of these machines.

– CAUTION This machine is for indoor use only.

– CAUTION This machine shall be stored indoors only.

– A warning that the machine shall be disconnected from its power source during cleaning or maintenance and when replacing parts or converting the machine to another function:

• for mains operated machines, by removing the plug from the socket-outlet;

• for battery powered machines, by safely disconnecting at least the B+ or B- pole of the battery or by an equivalent method (disconnecting device); for non-SELV, both poles must be disconnected.

Instructions for mains operated machines shall also include the substance of the following:

– WARNING Do not allow the supply cord to come into contact with the rotating brushes.

Instructions for machines having a current-carrying hose for dry suction, operating at other than SAFETY EXTRA-LOW VOLTAGE, shall also include the substance of the following:

– WARNING This hose contains electrical connections: do not use it to collect water and do not immerse in water for cleaning.

Compliance is checked by inspection.

7.12.102 Information on noise

NOTE The instructions can provide information on airborne noise emission as indicated in AA.2.7.

7.12.103 Information on vibration

NOTE The instructions can provide information on the vibration total value as indicated in Clause BB.2.

7.12.104DV DR *Add Clauses 7.12.104DV.1 and 7.12.104DV.2 to the Part 2:*

7.12.104DV.1 The instructions for Class I, cord-connected products shall include the text or the equivalent in Item a) plus the information in Item b) or c), as appropriate. The instructions for Class II mains supplied machines shall include the text or the equivalent in Item d).

a) For all Class I appliances:

This spray extractor machine shall be grounded while in use to protect the operator from electric shock. The machine is provided with a three-contact grounding-type attachment plug to fit the proper grounding type receptacle.

b) For a Class I, cord-connected appliance rated less than 15 A and intended for use on a nominal 120-V supply circuit, the instructions shall include the statements in either Item 1 or 2:

1) This appliance is for use on a nominal 120-V circuit and has a grounded plug that looks like the plug illustrated in sketch A in Figure 106DV. Other than in Canada, where the use of a temporary adapter is not permitted by the Canadian Electrical Code, Part I, CSA C22.1, a temporary adapter that looks like the adapter illustrated in sketches B and C in Figure 106DV may be used to connect this plug to a 2-pole receptacle as shown in sketch B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet (sketch A) can be installed by a qualified electrician. The green colored rigid ear, lug, or the like extending from the adapter shall be connected to a permanent ground such as a properly grounded outlet. Whenever the adapter is used, it shall be held in place by a metal screw.

2) This appliance is for use on a nominal 120-V circuit and has a grounding attachment plug that looks like the plug illustrated in sketch A in Figure 106DV. Make sure that the appliance is connected to an outlet having the same configuration as the plug. No adapter should be used with this appliance.

c) For spray extractors rated 150 – 250 V:

No adapter is available for this plug.

d) For all Class II appliances:

In a double-insulated product, two systems of insulation are provided instead of grounding. No grounding means is provided on a double-insulated machine, nor should a means for grounding be added to the machine. Servicing a double-insulated machine requires extreme care and knowledge of the system and should be performed only by qualified service personnel. Replacement parts for a double-insulated machine shall be identical to the parts they replace. Always replace a damaged cord. A double-insulated product is marked with the words "DOUBLE INSULATION" or "DOUBLE INSULATED." The symbol: ⧈ (square within a square) may also be marked on the machine.

7.12.104DV.2 A Class II appliance provided with a two-blade, polarized attachment plug shall be provided with the following instructions or the equivalent: To reduce the risk of electric shock, this appliance has a polarized plug (one blade is wider than the other). This plug will fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install the proper outlet. Do not change the plug in any way.

7.12.105DV D2 ***Add Clauses 7.12.105DV.1 and 7.12.105DV.2 to the Part 2:***

7.12.105DV.1 Machines intended for rental use may be provided with legible and permanent safety instruction markings instead of an instruction manual. The markings shall include all of the applicable safety instructions required in Clause 7.12. The marking's letter height shall be not less than 2,4 mm (3/32 in), and any caution or warning signal word shall be more prominent than any other required marking on the unit.

7.12.105DV.2 Machines intended for rental use and provided with a specialty connector or assembly for connection of the power supply cord to the machine may be provided with

the markings described in Clause 7.12.105DV.1 in the form of a cord tag; see Clause 7.14.101DV. The statement "Do Not Remove This Tag", or equivalent wording, shall be included on the cord tag.

7.13 *Addition:*

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

7.14 *Addition:*

The height of symbol IEC 60417-5935 (2012-09) shall be at least 15 mm.

Compliance is checked by measurement.

7.14DV D2 *Add the following subclause to Clause 7.14 of the Part 1:*

7.14.101DV Cord tags

7.14.101DV.1 A cord tag used for cautionary markings and a tag other than a cord tag that is used for cautionary or warning markings shall comply with the requirements:

a) In Clauses 7.14.101DV.2 to 7.14.101DV.5; and

b) For permanence and legibility in UL 969/CSA C22.2 No. 0.15.

7.14.101DV.2 Three as-received samples and six samples of the tag that have been subjected to the conditioning specified in 7.14.101DV.4, three for each condition, shall be subjected to the test described in 7.14.101DV.5. After testing, the samples shall comply with the following requirements:

a) The tag shall not tear for more than 1,6 mm at any point;

b) The tag shall not separate from its point of attachment;

c) The tag shall not slip or move along the length of a cord or a tubular-type mounting surface more than 15 mm;

d) There shall be no permanent shrinkage, deformation, cracking, or any other condition that will render the marking on the tag illegible; and

e) Overlamination shall remain in place and not be torn or otherwise damaged. The printing shall remain legible.

7.14.101DV.3 Each sample shall consist of a length of cord or tubular-type mounting surface, or if the surface is flat, a section of the surface having dimensions larger than the tag. The tag is to be affixed to the cord or surface in the intended manner. If tags are applied by an adhesive, tests shall be conducted no sooner than 24 h after application of the tag.

7.14.101DV.4 The conditioning required by 7.14.101DV.2 shall consist of the following:

a) The samples shall be conditioned for 24 h in an air-circulating oven maintained at a uniform temperature of 87,0 ±1,0 C. Following removal from the oven, the samples

shall remain at a temperature of 23,0 ±2,0 C and a relative humidity of 50 ±5 percent for 30 min before testing.

b) The samples shall be conditioned for 72 h in a humidity of 85 ±5 percent at 32,0 ±2,0 C. The samples shall be tested within 1 min after the conditioning.

7.14.101DV.5 A cord or tubular-type mounting surface shall be held rigidly in a vertical orientation. A flat mounting surface shall be held rigidly in a vertical plane. A force of 22,3 N shall be applied to the uppermost corner of the tag farthest from the point of attachment, within 7 mm of the vertical edge of the tag. The force shall be applied vertically downward and maintained for 1 min. In determining compliance with 7.14.101DV.2 d), manipulation such as straightening of the tag by hand is permitted.

7.14.101DV.6 The cord tag shall:

a) Be permanently affixed to the power-supply cord; and

b) Be located not more than 150 mm from the attachment plug.

7.16DV D2 ***Modification of Clause 7.16 of the Part 1 by deleting the note:***

This NOTE does not apply.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows:

8.1 *Addition:*

Water and water-borne CLEANING AGENTS are considered conductive.

8.1.1DV D2 ***Modification to add the following text to Clause 8.1.1 of the Part 1 after the first paragraph:***

If the instructions state that a part shall be removed when replacing a lamp or a drive belt, and a tool is required for its removal, the part is not considered to be a detachable part provided that

– an instruction to disconnect the appliance from the supply before opening is marked on the cover or is visible during its removal, and

– after removal of the cover, access to live parts is prevented by at least basic insulation

8.1.4DV D2 ***Modification to add the following dashed item after the second bullet and before "or" in Clause 8.1.4 of the Part 1:***

– the part is supplied by a battery and the voltage does not exceed 60 V d.c.;

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

9DV.1 DE *Modification to replace the first sentence of Clause 9 of the Part 2 with the following:*

This clause of Part 1 is applicable for mains powered machines.

9DV.2 DR *Modification to replace 9DV.2 of the Part 1 with the following:*

The use of time delay fuses is acceptable for stationary or portable appliances marked as indicated in Clause 7.17DV.

10 Power input and current

This clause of Part 1 is not applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.3DV D2 *Modification to replace the paragraph following NOTE 3 in Clause 11.3 of the Part 1 with the following:*

Temperature measurements of windings are determined by means of thermocouples or by the resistance method.

11.7 *Addition:*

Machines are operated until steady conditions are established.

Table 3DV D2 *Modification of Table 3 of the Part 1 by adding NOTE 5DV:*

NOTE 5DV A temperature is considered constant when readings taken during any continuous 1 h period of the test indicate an increase of no more than 3 K, or until the batteries have been discharged, whichever comes first.

12 Void

13 Leakage current and dielectric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.1DV.1 D2 ***Delete Clause 13.1DV.1 of the Part 1.***

13.1DV.2 D2 ***Modification to replace the last paragraph of Clause 13.1 of the Part 1 with the following:***

PROTECTIVE IMPEDANCE, ***radio interference filters and personal protective devices, such as ground fault circuit interrupters (GFCI), appliance leakage current interrupters (ALCI), arc-fault circuit interrupters (AFCI), and the like shall be disconnected before carrying out the tests.***

13.1DV.3 D2 ***Modification to add the following text to Clause 13.1 of the Part 1:***

Additionally, printed wiring assemblies and other electronic circuit components that would be damaged by application of the test potential, or that short-circuit the test potential, shall be removed, disconnected, or otherwise rendered inoperative before the dielectric voltage-withstand tests are made. A representative subassembly may be tested instead of an entire unit. The semiconductor devices in the unit may be individually shunted before the test is made to avoid destroying them in the case of a malfunction elsewhere in the secondary circuits.

13.2 *Addition*

For CLASS I APPLIANCES where several motors operate at the same time, the leakage current shall not exceed 3,5 mA.

13.2DV D2 ***Delete Clause 13.2 of the Part 2:***

This clause does not apply.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.2 *Addition:*

Machines are operated for 10 min on a level surface wetted by the TEST SOLUTION.

In practice, the pick-up consists largely of air such that there is no overloading of the suction motor; the input load should be observed to avoid overloading.

15.2 *Replacement:*

Machines shall be so constructed that

– spillage of liquid due to normal operation,

– filling including overfilling, and

– overturning of unstable machines

does not affect their electrical insulation.

Tanks for the following liquids are excluded from the tests:

– hydraulic oil,

– coolant,

– fuel (diesel, gasoline, LPG).

Compliance is checked by the following tests:

The machine is placed on a support inclined at an angle of 10° to the horizontal, the liquid container being filled to half the level indicated in the instructions. A machine is considered to be unstable if it overturns when a force of 180 N is applied to the top of the machine in the most unfavourable horizontal direction.

Machines provided with an appliance inlet are fitted with an appropriate connector and flexible cable or cord; machines with TYPE X ATTACHMENT are fitted with the lightest cross-sectional area specified in Table 11. Other machines are tested as delivered.

The liquid container of the machine is completely filled with a saline solution of water containing approximately 1 % NaCl and 0,6 % rinsing agent and a further quantity, equal to 15 % of the capacity of the container or 0,25 l, whichever is the greater, is poured in steadily over a period of 1 min.

Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:

– viscosity = 17 mPa·s,

– pH = 2,2 (1 % in water).

and its composition shall be

Substance	Parts by mass %
Plurafac ® LF 221[1]	*15,0*
Cumene sulfonate (40 % solution)	*11,5*
Citric acid (anhydrous)	*3,0*
Deionized water	*70,5*

[1] Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product.

Machines which are unstable are then, with the container completely filled and with the cover or lid in place, overturned from the most unfavourable of the normal positions of use, and are left in that position for 5 min unless the machine returns automatically to its normal position of use.

Nozzles and MOTORIZED CLEANING HEADS of WATER-SUCTION CLEANING MACHINES are placed in a tray, the base of which is level with the surface supporting the machine. The tray is filled with the TEST SOLUTION to a level of 5 mm above its base, this level being maintained throughout the test. The machine including the MOTORIZED CLEANING HEAD is operated until its liquid container is completely full and afterwards for a further 5 min.

After each of these tests, the machine shall withstand the electric strength test of 16.3.

There shall be no trace of liquid on insulation that reduces the CLEARANCES or CREEPAGE DISTANCES below the values specified in Clause 29.

15.3 *Modification:*

The relative humidity shall be (93 ± 6) %.

15.101 MOTORIZED CLEANING HEADS of water suction cleaning machines shall be resistant to liquids that may come into contact with them during normal use.

The following test is not applicable to MOTORIZED CLEANING HEADS of CLASS III CONSTRUCTION having a WORKING VOLTAGE up to 24 V

Compliance is checked by the following four tests.

The MOTORIZED CLEANING HEAD is subjected to an impact test as described in IEC 60068-2-75, the value of the impact being 2 J. The MOTORIZED CLEANING HEAD is rigidly supported and three blows are applied to every point of the enclosure that is likely to be weak.

It is then subjected to the free fall test procedure 1 of IEC 60068-2-31. It is dropped 4 000 times from a height of 100 mm onto a steel plate having a thickness of not less than 15 mm. It is dropped

– 1 000 times on its right side;

– 1 000 times on its left side;

– 1 000 times on its front face;

– 1 000 times on its cleaning surface.

The MOTORIZED CLEANING HEAD is then subjected to the test described in 14.2.4 of IEC 60529, using the test solution.

The MOTORIZED CLEANING HEAD is to be operated in a flat-bottomed vessel filled with a saline solution of water containing approximately 1 % NaCl so that a depth of 3,0 mm of water is maintained. The vessel is to be a size such that the MOTORIZED CLEANING HEAD moves about freely; and is to be operated:

– without connection to the SPRAY EXTRACTION MACHINE for 15 min, if applicable; and

– connected to the SPRAY EXTRACTION MACHINE until the machine has picked up as much water as its capacity holds or for 5 min, whichever occurs sooner.

The MOTORIZED CLEANING HEAD shall then withstand the electric strength test of 16.3, the voltage being applied between the LIVE PARTS and the TEST SOLUTION. There shall be no trace of saline solution on insulation that reduces the CLEARANCES or CREEPAGE DISTANCES below the values specified in Clause 29.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.1DV.1 D2 ***Delete Clause 16.1DV of the Part 1.***

16.1.DV.2 D2 ***Modification to replace the third paragraph of Clause 16.1 in the Part 1 with the following:***

Protective impedance, radio interference filters and personal protective devices, such as ground fault circuit interrupters (GFCI), appliance leakage current interrupters (ALCI), arc-fault circuit interrupters (AFCI), and the like shall be disconnected before carrying out the tests.

16.1.DV.3 D2 ***Modification to add the following text to Clause 16.1 of the Part 1:***

Additionally, printed wiring assemblies and other electronic circuit components that would be damaged by application of the test potential, or that short-circuit the test potential, shall be removed, disconnected, or otherwise rendered inoperative before the dielectric voltage-withstand tests are made. A representative subassembly may be tested instead of an entire unit. The semiconductor devices in the unit may be individually shunted before the test is made to avoid destroying them in the case of a malfunction elsewhere in the secondary circuits.

16.2.DV.1 D2 ***Delete Clause 16.2DV.1 of the Part 1.***

16.3 *Addition:*

Current-carrying hoses, except for their electrical connections, are immersed for 1 h in a saline solution of water containing approximately 1 % NaCl, at a temperature of 20 °C ± 5 °C. While the hose is still immersed, a voltage of 2 000 V is applied for 5 min between each conductor and all the other conductors connected together. A voltage of 3 000 V is then applied for 1 min between all the conductors and the saline solution.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Addition:*

Machines are also subjected to the tests of 19.101 and 19.102.

19.2 *Addition:*

The machine is tested without liquid in the container.

NOTE 101 The term restricted heat dissipation of Part 1 means without liquid in the container.

The conditions of adequate heat dissipation are different for heaters and pre-heaters:

– for the CLEANING AGENT PRE-HEATER: the conditions that apply when the complete machine is at ambient temperature when the heating element is switched on for the first time;

– for the CLEANING AGENT HEATER: the conditions that apply when the heating element is operated during normal use of the SPRAY EXTRACTION MACHINE.

19.7 *Addition:*

Pressure pumps provided with a filter, fan blades of water suction systems and agitating devices except those of MOTORIZED CLEANING HEADS, are not regarded as parts liable to get blocked.

Soiled water discharge pumps are liable to get blocked.

MOTORIZED CLEANING HEADS are tested with the rotating brush or similar device locked for 30 s.

19.9 Not applicable.

19.10 *Addition:*

For this test, the lowest possible load is obtained with the air inlet sealed.

In the case of agitating devices driving a brush or agitator, the belt is removed.

19.13 *Modification:*

Modification:

In the second paragraph, add "and 104" after "20.2 ".

19.101 *Machines having containers which are provided with shut-off device(s) or valve(s) are again subjected to the test of 15.2.*

Stop valves or other fluid shut-off devices shall be made inoperative. If two or more independent shut-off devices are provided, only one of them is made inoperative at a time, provided that they have passed the test of operating 3 000 times satisfactorily. Otherwise, all devices that failed shall be made inoperative.

Care should be taken to suck-up an air-liquid mixture to prevent overloading of the motor of the suction unit. The input power should be observed to avoid overloading.

After this test, the machine shall be subjected to the electrical strength test of 16.3. Inspection shall show that water has not entered the machine to any dangerous extent. In particular, there shall be no trace of water on the electrical insulation that reduces the CLEARANCE or CREEPAGE DISTANCES below the limits specified in Clause 29.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 *Addition:*

MOTORIZED CLEANING HEADS are not subjected to this test.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 *Replacement of the first paragraph by the following text:*

Machines and their components and fittings shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the machine.

Modification:

In the third paragraph, the impact value is increased to 1,0 J ± 0,04 J.

21.1DV.1 DE *Modification of Clause 21.1 of the Part 2 by deleting the "Modification" to the third paragraph.*

21.1DV.2 DE *Modification of Clause 21.1 of the Part 2 by adding the following note:*

NOTE 101DV Clauses 21.1DV.1 and 21.1DV.2 of the Part 1 remain applicable.

21.101 Those parts of the machine that are subjected to impact in normal use are tested as follows.

If failure of the part subject to impact would cause a failure to comply with this specification, any spot of the machine which may be exposed during NORMAL OPERATION to impacts or blows shall be subjected to a single blow with an impact energy of 6,75 Nm. The impact stress on the free-standing machines shall be exerted by a steel sphere with a diameter of 50,8 mm and a mass of 0,535 kg dropped from a height of 1,3 m or hanging on a string acting as a pendulum, falling from a height of 1,3 m.

21.102 Current-carrying hoses shall be resistant to crushing.

Compliance is checked by the following test.

The hose is placed between two parallel steel plates each having a length of 100 mm, a width of 50 mm and the edges of the longer sides rounded with a radius of 1 mm. The axis of the hose is positioned at right angles to the longer sides of the plates. The plates are placed at a distance of approximately 350 mm from one end of the hose.

The steel plates are pressed together at a rate of 50 mm/min ± 5 mm/min until the applied force is 1,5 kN. The force is then released and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.103 Current-carrying hoses shall be resistant to abrasion.

Compliance is checked by the following test.

One end of the hose is attached to the connecting rod of the crank mechanism shown in Figure 102. The crank rotates at 30 revolutions per minute resulting in the end of the hose moving horizontally backwards and forwards over a distance of 300 mm.

The hose is supported by a rotating smooth roller over which a belt of abrasive cloth moves at a speed of 0,1 m/min. The abrasive is corundum grit size P100, as specified in ISO 6344-2.

A mass of 1 kg is suspended from the other end of the hose, which is guided to avoid rotation.

In the lowest position, the mass has a maximum distance of 600 mm from the centre of the roller.

The test is carried out for 100 revolutions of the crank.

After the test, BASIC INSULATION shall not be exposed and the electric strength test of 16.3 is carried out between the conductors connected together and the saline solution.

21.104 Current-carrying hoses shall be resistant to flexing.

Compliance is checked by the following test.

The end of the hose intended to be connected to the MOTORIZED CLEANING HEAD is attached to the pivoting arm of the test equipment shown in Figure 103. The distance between the pivot axis of the arm and the point where the hose enters the rigid part is 300 mm ± 5 mm. The arm can be raised from the horizontal position by an angle of 40° ± 1°. A mass of 5 kg is suspended from the other end of the hose or from a convenient point along the hose so that when the arm is in the horizontal position, the mass is supported and there is no tension on the hose.

NOTE It can be necessary to reposition the mass during the test.

The mass slides against an inclined plate so that the maximum deflection of the hose is 3°.

The arm is raised and lowered by means of a crank that rotates at a speed of 10 ± 1 r/min.

The test is carried out for 2 500 revolutions of the crank after which the fixed end of the hose is turned through 90° and the test continued for a further 2 500 revolutions. The test is repeated in each of the other two 90° positions.

After 10 000 revolutions, the hose shall withstand the electric strength test of 16.3.

If the hose ruptures before 10 000 revolutions are achieved, the flexing test is terminated. The hose shall still withstand the electric strength test of 16.3.

21.105 Current-carrying hoses shall be resistant to torsion.

Compliance is checked by the following test.

One end of the hose is held in a horizontal position with the remainder of the hose freely suspended. The free end is rotated in cycles, each cycle consisting of five turns in one direction and five turns in the opposite direction, at a rate of 10 turns per minute.

The test is carried out for 2 000 cycles.

After the test, the hose shall withstand the electric strength test of 16.3 and shall not be damaged to such an extent that compliance with this standard is impaired.

21.106 Current-carrying hoses shall be resistant to cold conditions.

Compliance is checked by the following test.

A 600 mm length of hose is bent as shown in Figure 104 and the ends are tied together over a length of 25 mm. The hose is then placed for 2 h in a cabinet having a temperature of −15 °C ± 2 °C. Immediately after the hose is removed from the cabinet it is flexed three times, as shown in Figure 105, at a rate of one flexing per second.

The test is carried out three times.

There shall be no cracks or breaks in the hose and it shall withstand the electric strength test of 16.3. Any colour change of the hose is not considered as a failure.

21.107 CLEANING AGENT pumps, pipes and hoses, hose connectors and couplers, valves and other components of SPRAY EXTRACTION MACHINES shall be designed to withstand any mechanical, chemical or thermal stresses that may occur during normal use.

Compliance is checked by the following test:

Pipes and hoses, hose connectors and couplers, valves and other components which are subjected to the operating pressure of the CLEANING AGENT shall be filled with the CLEANING AGENT recommended by the manufacturer at the normal dilution and aged for 10 days (240 h) freely suspended in a heating cabinet with natural circulation.

The temperature shall be maintained:

– at (70 ± 2) °C, if the temperature of the CLEANING AGENT solution does not exceed 50 °C during conditions of NORMAL OPERATION, or

– at (90 ± 2) °C, if the temperature of the CLEANING AGENT exceeds 50 °C during conditions of NORMAL OPERATION.

Immediately afterwards, the parts, or the entire assembly of these parts, shall be put into a water bath with a temperature of:

– (50 ± 3) °C, if the temperature of the CLEANING AGENT does not exceed 50 °C during conditions of NORMAL OPERATION, or

– (85 ± 3) °C, if the temperature of the CLEANING AGENT exceeds 50 °C during conditions of NORMAL OPERATION.

While the parts are in the water bath, they shall be subjected to a pressure test at 1,5 times the MAXIMUM RATED OPERATING PRESSURE of the machine for 30 min. CLEANING AGENT shall be used as a test liquid. No damage that could impair safety shall occur to any of the parts during the test. Pressure operated switches for the control of cleaning solution pumps shall be subjected to pressure obtained during the appropriate test of Clause 19. Pressure operated switches shall also be inspected for effectiveness in avoiding CLEANING AGENT coming into contact with insulation and a pin hole shall be made in any polymer diaphragm that is flexed in use to ensure that this does not pass the CLEANING AGENT which would result in the reduction of CLEARANCES or CREEPAGE DISTANCES below the limits specified in Clause 29.

A switch or an unloading device that remains in a functioning mode shall be further tested by allowing the pressure to build up until it operates. The pressure so created is then regarded as the normal pressure for that part of the system.

Further testing at 1,5 times this (elevated) normal pressure is then done on the part of the system sustaining this pressure. There shall be no failure within the meaning of this standard.

21.108 Polymeric tanks designed to be filled with liquids exceeding a temperature of 50 °C shall be of adequate strength.

Compliance is checked as follows:

Fill the container with the maximum specified liquid quantity, at the highest specified temperature. Maintain this temperature during 5 periods of 8 h. Replenish the liquid at the beginning of each period.

During the test, the container shall remain fully functional and shall show no critical deformations or cracks which may impair compliance with this standard.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 *Addition:*

Machines shall be constructed that neither water nor foam from detergents can penetrate into the motor or come in contact with LIVE PARTS.

22.6DV D2 *Add the following subclause to Clause 22 of the Part 1:*

22.6.101DV Leakage

22.6.101DV.1 General

Leakage from a polymeric liquid reservoir is not considered likely to occur, if the reservoir is subjected to the tests in Clauses 22.6.101DV.2 and 22.6.101DV.3 without any cracking, breaking, shrinking, warping, or distortion that allows liquid to leak from the reservoir.

22.6.101DV.2 Oven conditioning test

The reservoir shall be subjected to the test of Clauses 7.1 and 7.3 of IEC 60695-10-3, except that the oven shall be maintained at a temperature of 10 K higher than the maximum operating temperature of the reservoir measured at the hottest spot on the inside of the reservoir under normal operating conditions but not less than 70°C. The product shall not be operated during the test. After conditioning, the reservoir shall be allowed to cool to room temperature and shall show no signs of shrinking, warping, or distortion that allows liquid to leak from the reservoir.

22.6.101DV.3 Impact test

The container shall be subjected to the impact test for polymeric reservoirs described in Clause 21.101 without distortion of the reservoir, including attached tubing, that results in one or both of the following conditions:

a) interference with the operation or user servicing of the product; or

b) openings that allow liquid to leak from the tank.

22.35 *Addition:*

These parts are subject to the hammer test of Clause 21. If this insulation does not meet the requirement of 29.2, these are subject to the following impact test.

A sample of the covered part is conditioned at a temperature of 70 °C ± 2 °C for seven days (168 h). After conditioning, the sample is allowed to attain approximately room temperature.

Inspection shall show that the covering has not shrunk to such an extent that the required insulation is no longer given or that the covering has not peeled off, so that it may move longitudinally.

After this, the sample is maintained for 4 h at a temperature of –10 °C ± 2 °C.

While still at this temperature, the sample is then subjected to impact by means of the apparatus shown in Figure 101. The weight "A", having a mass of 0,3 kg, falls from a height of 350 mm on to the chisel "B" of hardened steel, the edge of which is placed on the sample.

One impact is applied to each place where the insulation is likely to be weak or damaged in NORMAL OPERATION, the distance between the points of impact being at least 10 mm.

After this test, it shall show that the insulation has not peeled off and an electric strength test as specified in 16.3 is made between metal parts and metal foil wrapped round the insulation in the required area.

22.101 Machines shall be constructed so as to prevent the penetration of objects from the floor, which may impair the safety of the machine.

LIVE PARTS shall be at least 30 mm distance from the surface of the floor, measured in vertical direction through existing holes. This requirement does not apply to MOTORIZED CLEANING HEADS.

Compliance is checked by inspection and measurements.

22.102 CLASS I APPLIANCES or CLASS II APPLIANCES shall be equipped with a mains isolating switch that ensures ALL-POLE DISCONNECTION according to overvoltage category III conditions.

For built-in battery chargers, this ALL-POLE DISCONNECTION can be realised by pulling the plug.

Other switches may be of single pole construction.

The following circuits need not to be disconnected by the supply disconnecting device:

– plug and socket-outlets;

– undervoltage protection circuits that are only provided for automatic tripping in the event of supply failure;

– phase rotating indicators;

– control circuits for interlocking.

It is recommended, however, that such circuits be provided with their own disconnecting device.

Compliance is checked by inspection.

22.103 For machines where the OPERATOR is required to use personal protective equipment (PPE), controls shall be designed in such a way that they can be operated safely.

Compliance is checked by inspection and by functional test.

22.104 If machines are provided with shut-off devices, the devices shall prevent the liquid level from exceeding the maximum allowed level.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

23DV.1 DE *Modification by replacing the paragraph below the clause title with the following:*

This clause of Part 1 is applicable except as follows.

23DV.2 D2 *Add the following subclauses to Clause 23 of the Part 1:*

23.101DV All wiring not part of an LVLE CIRCUIT shall comply with the standards specified in Annex DVA of the Part 1 or Annex 101.DVA of this Part 2.

23.102DV Wiring in an LVLE CIRCUIT is not required to be protected against mechanical damage.

23.103DV.1 Wiring connections to a continuously moving part, or a part for which the degree of movement is appreciable shall be a Type such as S, SJ, SJE, SJO, SEO, SJT, SJTO, SJEO, SO, ST, SE, or STO flexible cord, or the cord shall be of a type at least equally as serviceable for the intended use.

23.103DV.2 Individual conductors having flexible stranding and enclosed in flexible tubing such as flexible nonmetallic conduit, nonmetallic insulated tubing, or other suitable method in which the wiring is protected sufficiently against mechanical damage may be used in place of flexible cord. For other than mains supplied machines, the tubing is not required on exposed moving conductors that are readily visible to the OPERATOR and are therefore subject to replacement when damaged.

23.103DV.3 Cords determined to be equivalent to those complying with the standards specified in Annex DVA of the Part 1, but with an increased number of conductors, are acceptable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1DV D2 *Modification to add the following text to Clause 24.1 of the Part 1:*

A tab used in an electrical quick-connect terminal shall comply with the standards specified in Annex DVA of the Part 1 or the requirements of Annex 101.DVB of this Part 2.

24.1.3 *Addition:*

The main switch shall be tested for 50 000 cycles of operations.

24.1.3DV D2 *Add Clauses 24.1.3ADV.1 and 24.1.3ADV.2 to the Part 1:*

24.1.3ADV.1 General

24.1.3ADV.1.1 Switches located in other than LVLE circuits shall comply with the standards specified in Annex DVA of the Part 1 or Clause 24.1.3ADV.1.2 of this Part 2.

24.1.3ADV.1.2 A switch or relay used outside of the manufacturer's ratings shall comply with the overload test of Clause 24.1.3ADV.2.

Compliance is checked by inspection and test.

24.1.3ADV.2 Overload test

24.1.3ADV.2.1 Unless interlocked so that it will never break the locked-rotor motor current, a switch or other device that controls a motor of a product shall perform acceptably when subjected to an overload test consisting of 50 cycles of operation as described in Clauses 24.1.3ADV.2.2 to 24.1.3ADV.2.6 as applicable. There shall be no electrical or mechanical malfunction or breakdown of the device or undue burning or pitting of the contacts, and the fuse in the grounding connection shall not open.

24.1.3ADV.2.2 For battery connected machines, temperature-limiting devices and current-limiting devices (such as electronic monitoring circuits) of a power controller shall be allowed in the power circuit to limit the current or open the circuit under the test conditions. When one of those devices causes an interruption of the power, the test shall be discontinued.

24.1.3ADV.2.3 Exposed dead metal parts of the product shall be connected to ground through:

a) a 3-ampere plug fuse, and the product shall be connected to a grounded supply circuit of rated frequency for main connected machines; or

b) a 30-ampere non-time delay connected between the non-energized metal part of the switch for battery connected machines.

24.1.3ADV.2.4 During the test the device shall be operated at a rate of not more than 10 cycles per minute unless a faster rate of operation is agreeable to those concerned.

24.1.3ADV.2.5 The rotor of the motor shall be locked in position. For a mains-operated machine, the product shall be connected to a supply circuit of maximum rated voltage. For a battery-powered machine, a fully charged battery shall be used.

24.1.3ADV.2.6 The connection shall be such that any single-pole, current-interrupting device will be located in the ungrounded conductor of the supply circuit.

Compliance is checked by inspection and test.

24.2DV D2 *Modification of Clause 24.2 of the Part 1 by adding the following paragraph:*

AFCIs and LCDIs shall be installed as an integral part of the attachment plug or located in the supply cord within 102 mm of the attachment plug.

24.7 Not applicable.

24.101 Machines with motors provided with SELF-RESETTING THERMAL CUT-OUTS shall work reliably under overvoltage conditions.

Compliance is checked by the following test.

The machine is supplied at a voltage equal to 1,1 times RATED VOLTAGE, under locked rotor conditions so as to cause the THERMAL CUT-OUT to operate within a few minutes, until the THERMAL CUT-OUT has performed 200 cycles of operation. The test shall be carried out with a CLEANING AGENT that has not been heated, and with heating elements, if any, out of circuit.

After the test, the machine shall withstand the tests of Clause 16.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 *Addition:*

Machines classified as IPX7 shall not be provided with an appliance inlet.

Machines classified as IPX4, IPX5 or IPX6 shall not be provided with an appliance inlet, unless both inlet and connector have the same classification as the machine when coupled or separated, or unless inlet and connector can only be separated by the use of a TOOL and have the same classification as the machine when coupled.

Machines provided with an appliance inlet shall also be provided with an appropriate cord set.

25.1DV D2 *Add the following subclauses to Clause 25.1 of the Part 1:*

25.1DV.1 The length of the detachable or nondetachable supply cord shall be at least 4,6 m, including fittings.

25.1DV.2 Alternatively to the requirement of Clause 25.1DV.1, a product may be provided with not more than 0,5 m of nondetachable supply cord if the plug connection cannot be placed within 75 mm of the floor and:

a) It is likely that the product will be connected by means of an extension cord during operation, and the manufacturer recommends the use of a suitably rated extension cord and provides the ratings; or

b) The manufacturer provides with the product a suitably rated extension cord that is not less than 4,6 m long, including fittings.

25.1DV.3 A three-to-two-wire, earthing-type adapter shall not be provided with a product.

25.7 *Replacement:*

SUPPLY CORDS shall be one of the following types:

– Rubber sheathed

Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53);

NOTE 101 These cords are not suitable for machines intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.

– Polychloroprene sheathed

Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57);

NOTE 102 These cords are suitable for machines intended to be used in low temperature applications.

– Polyvinyl chloride sheathed

These cords shall not be used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of Clause 11. Their properties shall be at least those of ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53), for other machines;

– Heat-resistant polyvinyl chloride sheathed

These cords shall not be used for TYPE X ATTACHMENT other than specially prepared cords. Their properties shall be at least those of

• heat-resistant light polyvinyl chloride sheathed cord (code designation 60227 IEC 56), for machines having a mass not exceeding 3 kg;

• heat-resistant polyvinyl chloride sheathed cord (code designation 60227 IEC 57), for other machines.

Compliance is checked by inspection.

25.7DV D2 *Modification to replace Clause 25.7 of the Part 2 with the following:*

25.7DV.1 A heater cord is required where the temperature measured during the test of Clause 11 exceeds 121 °C on any surface that the cord is likely to touch when the machine is used as intended.

25.7DV.2 For machines rated no more than 300 V, the cord shall be Type SJ, SJO, SJT, or SJTO; for all other products, the cord shall be Type S, SO, ST, or STO; or the cord shall be of a type at least equally as serviceable for the intended use.

25.14 *Addition:*

For machines incorporating a TYPE X ATTACHMENT or TYPE Y ATTACHMENT, the number of flexings is 20 000.

25.15 *Modification:*

Replace Table 12 by the following:

Table 12
Pull force and torque

Mass of machine *kg*	*Pull force* *N*	*Torque* *Nm*
≤ 1 *> 1 and ≤ 4* *> 4*	*30* *60* *125*	*0,1* *0,25* *0,40*

Addition:

The test is also applied to the cord in the cord set for machines classified as IPX4 or higher that are provided with an appliance inlet. The cord set is fitted to the appliance inlet prior to the commencement of the test.

25.22DV D2 *Modification to add the following text to Clause 25.22 of the Part 1:*

If a product incorporates a disconnecting means (such as a cord connector in the cord between the handle and the motor), the construction shall be such that no live part will be exposed when used as intended. The probe illustrated in Figure 12DV of the Part 1 shall be used to determine if live parts are accessible.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution due to normal use of the machine.

30 Resistance to heat and fire

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

30.2DV D2 *Modification to add the following text to Clause 30.2 of the Part 1:*

A nonmetallic enclosure of a switch or relay located in other than an LVLE circuit and having a minimum flammability rating of V-2 complies with Clauses 30.2.2 and 30.2.3.

NOTE 101DV A switch complying with the standards specified in Annex DVA of the Part 1 is considered to comply with this requirement.

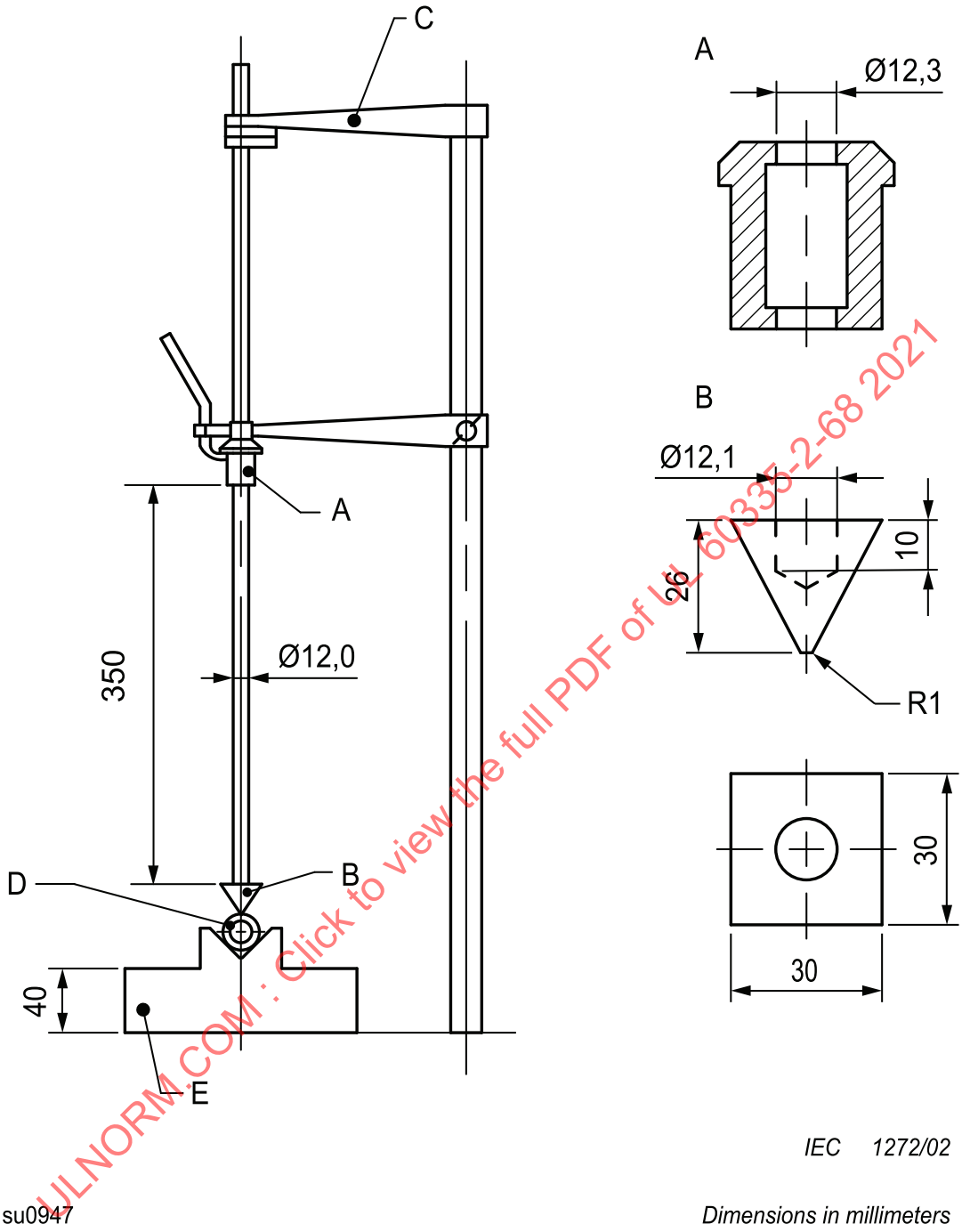
30.2.3 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



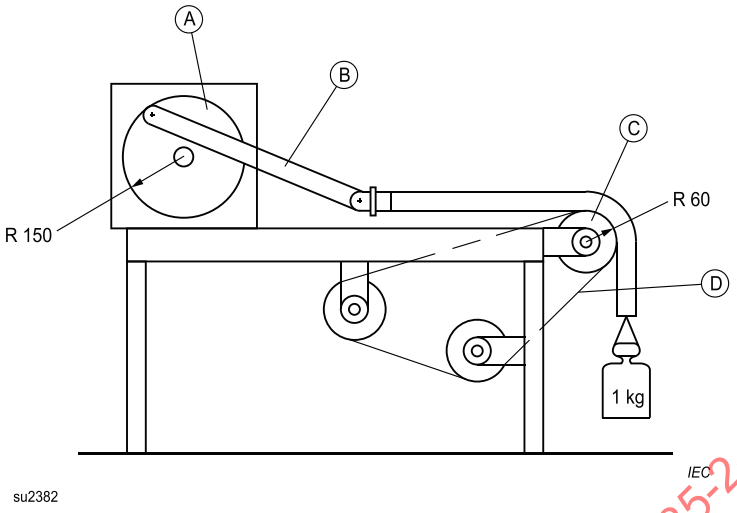
Key

A weight
B chisel
C fixing arm
D sample
E base having mass of 10 kg

Figure 101

Impact test apparatus

Dimensions in millimetres



Key

A crank mechanism

B connecting rod

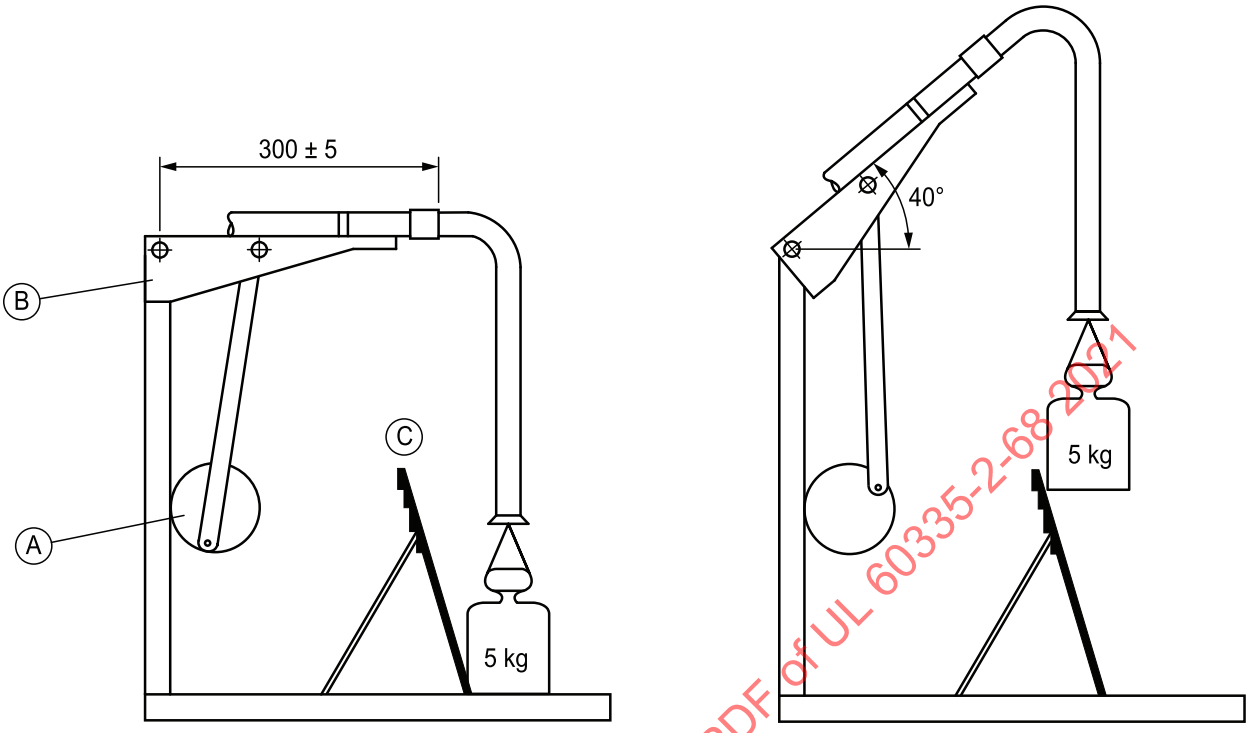
C roller, diameter 120 mm

D abrasive cloth belt

Figure 102

Apparatus for testing the abrasion resistance of current-carrying hoses

Dimensions in millimetres



Key

A crank mechanism

B arm

C inclined plane

Figure 103

Apparatus for testing the resistance to flexing of current-carrying hoses

Dimesions in millimetres

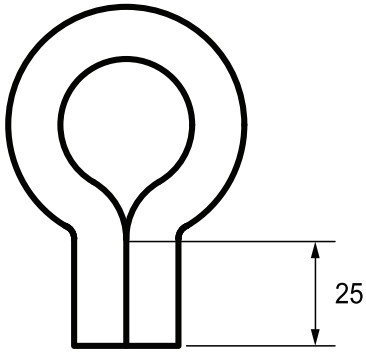


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Figure 104

Configuration of the hose for the freezing treatment

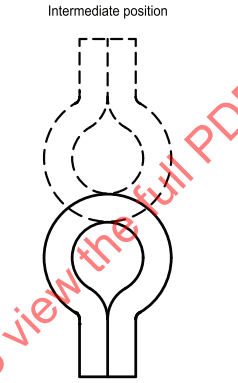

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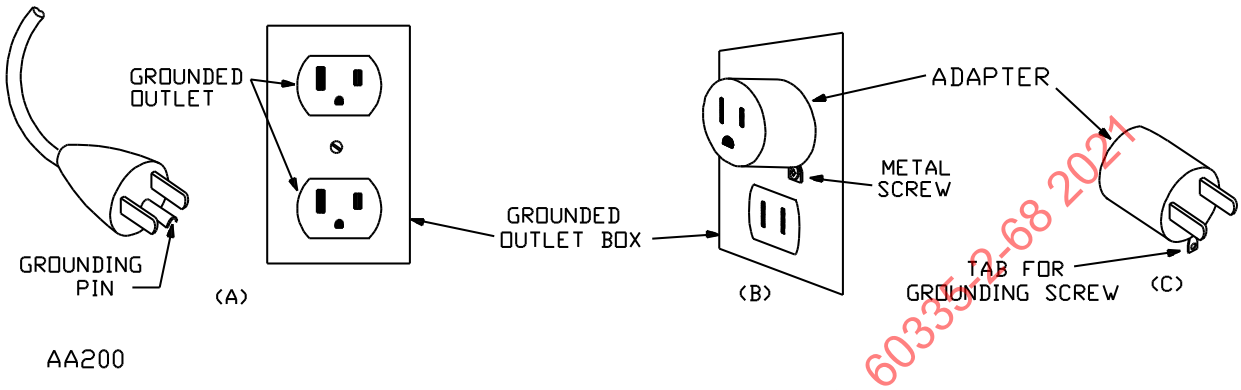
Figure 105

Flexing positions for the hose after removal from the freezing cabinet

Figure 106DV DR ***Add the following figure to the Part 2:***

Figure 106DV

Earthing methods



Annexes

The annexes of Part 1 are applicable except as follows.

Annex A
(informative)

Routine tests

ADV D2 ***Modification to Annex A of the Part 1 as follows:***

Following the title, replace “informative” with “normative”.

ADV.2 D2 ***Modification to add the following text to the “Introduction” in Annex A of the Part 1:***

The tests of Clauses A.1 and A.2 do not apply to battery-powered products.

Annex B
(normative)

Appliances powered by rechargeable batteries that are recharged in the appliance

Annex B of Part 1 is applicable except as follows.

7 Marking and Instructions

7.1 *Delete the last paragraph.*

7.12 *Replace the last two paragraphs by:*

For machines intending to be supplied from a DETACHABLE SUPPLY UNIT or a battery charger for the purposes of recharging the battery, the type reference of the DETACHABLE SUPPLY UNIT or battery charger shall be stated.

7.15 *Delete the last paragraph.*

BDV.1 D2 *Modification to Annex B of the Part 1 as follows:*

24 Components

24.B.101DV D2 *Add Clause 24.B.101DV to the Part 1:*

24.B.101DV.1 A motor located in an LVLE CIRCUIT is not required to comply with requirements for clearances and creepage distances.

24.B.101DV.2 A motor that is not located in an LVLE circuit shall comply with the requirements in Clause 16 immediately after being removed from an air circulating oven after being maintained for a period of 7 h at a temperature of 175°C. The potential shall be applied between the terminals and the motor frame. A motor that complies with the requirements within UL 1004-1 / CAN/CSA C22.2 No. 100, and when used within its acceptable insulation systems ratings is not required to comply with this requirement.

Compliance is checked by inspection.

Annex D
(normative)

Thermal motor protectors

Annex DDV D2 ***Modification by replacing all of Annex D of the Part 1 after the first paragraph with the following:***

A motor incorporating a thermal protector shall comply with Clause 8 of UL 1004-3 / CSA C22.2 No. 77 and Clause 17.101 of UL 60730-2-2 / CAN/CSA-E730-2-2.

Annex S
(normative)

Battery-operated appliances powered by batteries that are non-rechargeable or not recharged in the appliance

Annex SDV D2 ***Modification to replace Annex S of the Part 2 with the following:***

Annex S is not applicable.

Annex S of Part 1 is applicable except as follows.

7 Marking and instructions

7.1 *Add to the last sentence at the beginning:* "If relevant and".

19 Abnormal operation

19.S.102 This clause is not applicable for machines with hardwired battery sets.

Annex AA
(Informative)

Emission of acoustical noise

AA.1 Noise reduction

Noise reduction at SPRAY EXTRACTION MACHINES is an integral part of the design process and shall be achieved by particularly applying measures at source to control noise, see for example ISO/TR 11688-1. The success of the applied noise reduction measures is assessed on the basis of the actual noise emission values in relation to other machines of the same type with comparable non-acoustical technical data.

The major sound sources of SPRAY EXTRACTION MACHINES are: motors and fans.

AA.2 Noise test code

AA.2.1 Emission sound pressure level determination

The emission sound pressure level is determined in accordance with ISO 11203 applying the method described in 6.2.3 d) with the measurement distance d = 1 m.

NOTE In this case, the emission sound pressure level is equal to the surface sound pressure level used for calculating the sound power level according to ISO 3744 when applying a rectangular parallelepiped measurement surface at a distance of 1 m from the reference box.

AA.2.2 Sound power level determination

The sound power level is measured in accordance with ISO 3744, or with ISO 3743-1 if a suitable hard-walled test room is available, or with ISO 9614-2. The direction of the x-axis in Figure AA.1a and Figure AA.1b must be the same as the x-axis defined for the microphone configurations in ISO 3744.

AA.2.3 Operating and mounting conditions

The operating condition shall be identical for the determination for both sound power and emission sound pressure level at the specified positions.

In addition to NORMAL OPERATION in accordance with 3.1.9, the following requirements shall be taken into account.

Before starting the measurement procedure, the suction nozzle shall be adjusted correctly in accordance with the manufacturer's instructions for cleaning carpets.

If the machine is equipped with a MOTORIZED CLEANING HEAD, the cleaning head shall be adjusted so that the bristles of rotating brushes or other retractable parts go beyond the theoretical supporting plane of the cleaning head on a hard floor from (2 $2^{+0,2}_{-0}$) mm or, if not possible, from at least 2 mm.

The SPRAY EXTRACTION MACHINE shall be fixed directly without any resilient means on the Wilton carpet (according to IEC 60312-1) of a size 2 m × 1 m, placed on the floor of the test room. In case the measurement is done in a reverberation test room or a hard-walled test room, a minimum CLEARANCE of 1 m between any part of the machine or attachments and the nearest wall shall be observed. The machine shall be positioned in accordance with Figure AA.1.

The hose and connecting tube(s) or the handles of hand-supported machines shall be resiliently suspended or supported in normal position of use (middle of the handles at (80 ± 5) cm above the carpet, if possible), the suction nozzle or cleaning head being in full contact with the carpet.