INTERNATIONAL STANDARD

IEC 60335-2-67

Third edition
2002-07

Household and similar electrical appliances – Safety –

Part 2-67: Particular requirements for floor treatment and floor cleaning machines, for industrial and commercial use

Appareils électrodomestiques et analogues – Sécurité –

Partie 2-67: Règles particulières pour les machines de traitement et de nettoyage des sols, à usage industriel et commercial

Reference number
IEC 60335-2-67:2002(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site (www.iec.ch)**

- **Catalogue of IEC publications**

  The on-line catalogue on the IEC web site (www.iec.ch/catlg-e.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

  This summary of recently issued publications (www.iec.ch/JP.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

  If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

  Email: custserv@iec.ch
  Tel: +41 22 919 02 11
  Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

IEC 60335-2-67

Third edition
2002-07

Household and similar electrical appliances – Safety –

Part 2-67: Particular requirements for floor treatment and floor cleaning machines, for industrial and commercial use

Appareils électrodomestiques et analogues – Sécurité –

Partie 2-67: Règles particulières pour les machines de traitement et de nettoyage des sols, à usage industriel et commercial

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE K

For price, see current catalogue

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 7
3 Definitions 7
4 General requirement 7
5 General conditions for the tests 7
6 Classification 8
7 Marking and instructions 8
8 Protection against access to live parts 9
9 Starting of motor-operated appliances 9
10 Power input and current 9
11 Heating 9
12 Void 10
13 Leakage current and electric strength at operating temperature 10
14 Transient overvoltages 10
15 Moisture resistance 10
16 Leakage current and electric strength 11
17 Overload protection of transformers and associated circuits 11
18 Endurance 11
19 Abnormal operation 11
20 Stability and mechanical hazards 12
21 Mechanical strength 12
22 Construction 13
23 Internal wiring 14
24 Components 14
25 Supply connection and external flexible cords 14
26 Terminals for external conductors 15
27 Provision for earthing 15
28 Screws and connections 15
29 Clearances, creepage distances and solid insulation 15
30 Resistance to heat and fire 16
31 Resistance to rusting 16
32 Radiation, toxicity and similar hazards 16
Annexes 18
Annex AA (normative) Precast concrete flags 18

Bibliography 19

Figure 101 – Impact test apparatus 17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-67: Particular requirements for floor treatment and floor cleaning machines, for industrial and commercial use

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by sub-committee 61J: Electrical motor-operated cleaning appliances for industrial use, of IEC technical committee 61: Safety of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 1997 and its amendment 1 (2000). It constitutes a technical revision.

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

FDIS	Report on voting
61J/127/FDIS	61J/132/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This 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 fourth edition (2001) 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 electric floor treatment and floor cleaning machines, for industrial and 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.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The following differences exist in the countries indicated below.

- 25.7: PVC-cords may not be suitable for operation outdoors at low temperatures (Finland, Sweden);
- 25.14: Flexing test is not conducted (U.S.A.)

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.

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.

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.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-67: Particular requirements for floor treatment and floor cleaning machines, for industrial and commercial use

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric **motor-operated appliances** primarily designed for industrial and commercial use, with or without attachments, including appliances incorporating wet and/or dry suction, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances. Such appliances may be used for floor polishing (including waxing and buffing), scrubbing and grinding, scarifying and carpet shampooing.

NOTE 101 Commercial uses are for example for use in hotels, schools, hospitals, factories, shops and offices for other than normal housekeeping purposes.

Appliances incorporating wet and/or dry suction shall also meet the appropriate requirements for industrial vacuum cleaners.

This standard also applies to machines handling hazardous dust such as asbestos or liquids for which additional national requirements might apply.

It is also applicable to appliances making use of other forms of energy for the motor; but it is necessary that their influence is taken into consideration.

NOTE 102 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 103 This standard does not apply to

- appliances for household use to which IEC 60335-2-10 applies;
- spray extraction appliances (IEC 60335-2-68);
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (vapour or gas).
- audio, video and similar electronic apparatus (IEC 60065);
- appliances for medical purposes (IEC 60601);
- hand-held motor-operated electric tools (IEC 60745);
- personal computers and similar equipment (IEC 60950);
- transportable motor-operated electric tools (IEC 61029).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

IEC 60335-2-69, *Household and similar electrical appliances – Safety – Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for industrial and commercial use*

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation
the load, except for suction, or the highest obtainable load of all the particular loads of the various functions that can be operated at the same time according to the manufacturer's instructions.

The operational functions for various types are given in 3.1.9.101 to 3.1.9.104.

3.1.9.101 Scrubbing, scarifying, grinding machines are operated with the appropriate brushes on a surface of hydraulically pressed concrete paving slabs (see annex AA).

NOTE 101 Concrete scrubbing is considered to be the heaviest load.

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

3.1.9.102 Dry and wet pick-up machines are operated according to IEC 60335-2-69.

3.1.9.103 Polishing and dry buffing machines are operated as follows.

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

3.1.9.104 Carpet shampooers are operated on a test surface consisting of a carpet, in accordance with IEC 60312, the carpet being fastened to the floor. The brush of the shampooing machine has, prior to testing, to be conditioned by operating it for 15 min on a clean, dry concrete surface. After running on the concrete surface the brush has to be immersed in a shampoo solution for at least 30 min.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

Appliances and their attachments shall be **class I**, **class II** or **class III** with respect to their protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

6.2 *Addition:*

Mains supplied machines for indoor use and intended for dry cleaning only, shall be at least IPX0. Other machines shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.9 *Addition:*

The operation of the vacuum motor is deemed to be an adequate indication of the position of the switch that exclusively controls the vacuum motor.

7.12 *Addition:*

The cover of the instruction sheet shall carry the following:

WARNING: Do not use the appliance without reading the instruction sheet.

This warning may be replaced by symbol 0434 or symbol 1641 of ISO 7000.

If it is necessary to take special precautions when using the appliance (e. g. handling with inflammable liquids, dusts hazardous to health or flammable sanding dust), details of these shall be given in an instruction sheet that accompanies the appliance.

All machines shall be accompanied by an instruction sheet that includes a statement specifying that the plug of the supply cord shall be removed from the socket-outlet before cleaning the appliance or undertaking maintenance operations.

If electric power is necessary to change brushes or other attachments, an appropriate warning shall be given.

The instruction sheet shall state that during operation hazard may occur when running the machines over the supply cord, and that if the supply cord is damaged, it has to be replaced.

If several brushes are supplied or specified with/or for an appliance, instruction sheets shall include descriptions of the brushes and explanations of the purposes for which they are intended. If a special large diameter brush is provided for dry buffing, this shall be clearly identified with the description and shall include a warning that it is not intended for general polishing.

The substance of the following statement may be given in the instruction manual:

This machine is also suitable for commercial use, for example in hotels, schools, hospitals, factories, shops, offices, rental businesses and for other than normal housekeeping purposes.

The following warnings shall be included in the instruction sheet if applicable:

– CAUTION: This machine is for dry use only and shall not be used or stored outdoors in wet conditions.

– WARNING: This appliance has been designed for use with brushes specified by the manufacturer. The fitting of other brushes may impair its safety.

Any limitation to the use of the socket outlet on the machine shall be clearly stated in the instruction sheet.

The instructions shall contain explanations of the symbols and pictograms present on the appliance.

Appliance outlets shall be marked as follows:

When connecting attachments read and observe the instructions for use.

A suitable pictogram may be provided instead of the text. The pictogram shall be explained in the instructions.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 *Addition:*

NOTE 101 The soiled liquid picked up by a wet-suction attachment, if provided, is considered as conductive.

8.1.4 *Addition:*

Isolated battery systems of 18 to 24 cells of either acid or alkaline electrochemistry, including gel batteries, shall be regarded as **class III** provided that

- the maximum voltage per cell on charge does not exceed 2,7 V;
- there are no earthed parts;
- conductive parts cannot fall on to and thereby bridge **live parts** of opposite polarity.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.4 Not applicable.

11.6 Not applicable.

11.7 *Addition:*

Appliances are operated until steady conditions are established.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 *Addition:*

*For **class I appliances** where several motors operate at the same time, the leakage current shall not exceed 3,5 mA*

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:*

Wet cleaning appliances, except shampooing machines, shall be operated for 10 min with to and fro movements over a distance of 1 m at 15 cycles per minute on a floor of pavement flagstone according to annex AA, with a smooth surface, that is fixed to the bottom of a pan. Before starting the test, the pan is filled with a detergent solution as specified in 15.2 to a level of approximately 5 mm above the surface.

15.2 *Replacement:*

Appliances having a liquid container shall be so constructed that spillage of liquid due to overfilling and, for unstable appliances and **hand-held appliances**, overturning, does not affect their electrical insulation.

Compliance is checked by the following tests:

*Appliances having a liquid container and provided with an appliance inlet are fitted with an appropriate connector and flexible cable or cord; appliances having a liquid container and **type X attachment** are fitted with the lightest cross-sectional area specified in Table 11. Other appliances are tested as delivered.*

The liquid container of the appliance is completely filled with water containing approximately 1 % NaCl 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.

Hand-held appliances *and appliances that 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 appliance returns automatically to its normal position of use.*

NOTE 101 Appliances are considered to be unstable if they overturn when applying a force of 180 N at the top of the appliance in the most unfavourable horizontal direction while they are placed in the most unfavourable of the normal positions of use on a support inclined at an angle of 10° to the horizontal, the liquid container being filled to half the level indicated in the manufacturer's instructions.

Appliances are then subjected to the following test.

The appliance is operated under ***normal operation*** *for 5 min after the liquid container has been filled completely.*

Immediately after these treatments, the appliance shall withstand an electric strength test as specified in 16.3.

Inspection shall show that any liquid that may have entered the appliance does not impair compliance with this standard. In particular, there shall be no trace of liquid on insulation that could result in a reduction of ***clearances*** *and* ***creepage distances*** *below the values specified in Clause 29.*

NOTE 102 The appliance is allowed to stand in normal test room atmosphere for 24 h before being subjected to the test of 15.3.

15.3 *Modification:*

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

16 Leakage current and electric strength

This clause of Part 1 is applicable.

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.

19.2 *Addition:*

The appliance is tested without liquid in the container.

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

19.7 *Addition:*

NOTE 101 Brushes are not regarded as parts liable to be jammed.

19.9 Not applicable.

19.10 *Addition:*

NOTE 101 For this test the lowest possible load is obtained either by lifting the brushes from the floor or in case of appliances fitted with a clutch drive that disengages the drive to the brushes, by disengaging the clutch. For appliances that include suction equipment, the inlet shall be closed.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Addition:*

This requirement does not apply to rotating brushes and similar devices, or to moving parts exposed during the fitting of accessories that allow conversion from one application to another.

20.101 A device shall be fitted to prevent uncontrolled hazardous operation of floor treatment appliances. It may take one of the following forms:

a) switch interlocked with the handle so that the motor is switched off when the handle is restored to the standing position or left unattended;

b) a switch that has to be held in the ON position by the operator;

c) any other method that gives an equivalent degree of safety.

The inadvertent operation of appliances with single disc-type brushes where the whole weight of the appliance is supported by the brushes when in parked position, shall be prevented.

Compliance is checked by the following test.

The appliance shall be examined and found to be fitted with a device as to provide a degree of safety equivalent or better than

a) switch that has to be held in the ON position by the operator (deadman's switch) and that can be activated only after unlocking a self resetting interlock, or

b) switch that has to be held in the ON position by the operator together with either a switch interlocked with the handle so that the motor cannot be switched on when the handle is restored to the upright position, or a device that disconnects a driving means to the brushes when the handle is restored to the upright position. Such devices shall be operated 10 000 times. After that test they shall be operable for further use.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Modification:

The impact value is increased to 1,0 J ± 0,04 J.

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 that may be exposed during normal cleaning function 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 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.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 *Addition:*

Appliances shall be constructed so as to prevent entry of water, cleaning liquids or foam from detergents into motors, switch gear or controls.

22.35 *Modification:*

Delete the note.

Addition:

These parts are subjected to the hammer test of clause 21. If this insulation does not meet the requirement of 29.3, these are subjected 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 use, 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 area required to be insulated.

22.101 Appliances shall be constructed so as to prevent the penetration of objects from the floor, that may impair their safety.

Machines for wet use shall have no **live parts** at a distance of less than 30 mm from the floor where there is an opening that could admit liquid.

Compliance is checked by inspection and measurements.

22.102 The addition of a power outlet shall not impair the safety of the appliance.

Compliance is checked by the test of this standard taking the manufacturer's instructions into consideration.

22.103 Class I appliances or **class II appliances** shall employ a mains isolating switch or switches having a contact separation in all poles that provide full disconnection under overvoltage category III conditions. Additional switches may be of single-pole construction.

Components, such as RFI suppressors, mains indicating lights or phase rotation indicators, can be connected to the live side of the isolating switch, providing any failure does not constitute a failure to comply with the requirements of this standard.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 *Addition:*

*Switches that are considered as being frequently in service during **normal operation** shall be tested for 50 000 cycles of operations.*

24.101 Appliances shall be constructed so that, in normal use, there will be no electrical or mechanical failure that could impair compliance with this standard. The insulation shall not be damaged and contacts and connections shall not work loose as a result of such things as heating and vibration.

*Compliance is checked by the tests of this standard and for appliances with motors provided with **self-resetting thermal cut-outs** as follows.*

*The appliance 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.*

After the test the appliance 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:*

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

Appliances 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 appliance 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 appliance when coupled.

Appliances provided with appliance inlets shall also be provided with an appropriate cord set.

25.7 *Addition:*

Ordinary tough rubber-sheathed flexible cord is not suitable for this type of appliance due to attack by chemicals commonly used, hence polychloroprene sheathed flexible cord such as code designation 60245 IEC 57 or higher is acceptable.

If polyvinyl chloride insulated, ordinary polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 53) is acceptable.

25.14 *Addition:*

For appliances 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 appliance *kg*	***Pull force*** *N*	***Torque*** *Nm*
≤ 1	*30*	*0,1*
>1 and ≤ 4	*60*	*0,25*
> 4	*125*	*0,40*

Addition:

The test is also applied to the cord in the cord set for appliances 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.

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 appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.3 Not applicable.

31 Resistance to rusting

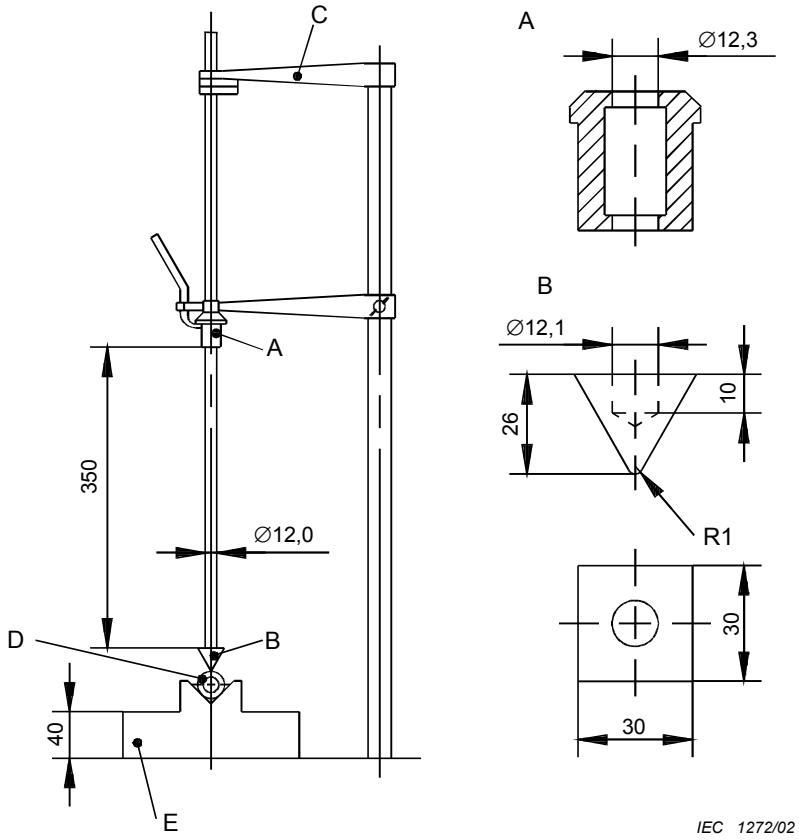
This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

Addition:

NOTE 101 For attachments intended to pick up hazardous dust, additional requirements are specified in Annex AA of IEC 60335-2-69.



Dimensions in millimetres

Key

A Weight
B Chisel
C Fixing arm
D Sample
E Base having mass of 10 kg

Figure 101 – Impact test apparatus

Annexes

The annexes of Part 1 are applicable except as follows.

Annex AA
(normative)

Precast concrete flags

The cement in the manufacturing of these paving flags shall be of or similar to one of the following:

– Portland cement (ordinary or rapid hardening)
– Portland blast furnace cement

The fine and coarse aggregate shall consist of either natural occurring materials, crushed or uncrushed, or alternatively of coarse aggregate to meet the following requirements:

– 10 % fines test: not less than 10 tons:
– flakiness index: not more than 35 %.

The normal maximum size of the aggregate shall not exceed 14 mm.

The total sulphate content of the concrete mix shall not exceed 4,0 % as SO_3 by weight of the cement. The sulphate of the cement shall be calculated from the known sulphate contents of the cement, aggregates (where applicable) and pulverised fuel ash, as determined by tests.

The flags may be made by any process. The escape of the finer particles of mortar during the process of manufacture shall be prevented as far as practicable. A flag described as "pressed" shall only be made by employing a pressure of not less than 7 MN/m² over the entire surface.

After casting the flags shall be stored so as to prevent undue loss of moisture particularly during the early stages of curing.

Flags shall be manufactured to the following size: 65 mm * 600 mm * 750 mm.

The maximum deviation from a 750 mm straight edge placed in any position on the wearing surface shall not exceed 2 mm.

There shall be no special preparation for smoothing of the test surface. The flag should be made under normal production conditions for commercial use.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-10, *Household and similar electrical appliances – Safety – Part 2-10: Particular requirements for floor treatment machines and wet scrubbing machines*

IEC 60335-2-68, *Household and similar electrical appliances – Safety – Part 2-68: Particular requirements for spray extraction appliances for industrial and commercial use*

_____

Standards Survey

The IEC would like to offer you the best quality standards possible. To make sure that we continue to meet your needs, your feedback is essential. Would you please take a minute to answer the questions overleaf and fax them to us at +41 22 919 03 00 or mail them to the address below. Thank you!

Customer Service Centre (CSC)

International Electrotechnical Commission
3, rue de Varembé
1211 Genève 20
Switzerland

or

Fax to: **IEC**/CSC at +41 22 919 03 00

Thank you for your contribution to the standards-making process.

A Prioritaire

Nicht frankieren
Ne pas affranchir

Non affrancare
No stamp required

RÉPONSE PAYÉE

SUISSE

Customer Service Centre (CSC)
International Electrotechnical Commission
3, rue de Varembé
1211 GENEVA 20
Switzerland

Q1 Please report on **ONE STANDARD** and **ONE STANDARD ONLY**. Enter the exact number of the standard: *(e.g. 60601-1-1)*

.....

Q2 Please tell us in what capacity(ies) you bought the standard *(tick all that apply).* I am the/a:

purchasing agent ❑
librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other.....

Q3 I work for/in/as a: *(tick all that apply)*

manufacturing ❑
consultant ❑
government ❑
test/certification facility ❑
public utility ❑
education ❑
military ❑
other.....

Q4 This standard will be used for: *(tick all that apply)*

general reference ❑
product research ❑
product design/development ❑
specifications ❑
tenders ❑
quality assessment ❑
certification ❑
technical documentation ❑
thesis ❑
manufacturing ❑
other.....

Q5 This standard meets my needs: *(tick one)*

not at all ❑
nearly ❑
fairly well ❑
exactly ❑

Q6 If you ticked NOT AT ALL in Question 5 the reason is: *(tick all that apply)*

standard is out of date ❑
standard is incomplete ❑
standard is too academic ❑
standard is too superficial ❑
title is misleading ❑
I made the wrong choice ❑
other .....

Q7 Please assess the standard in the following categories, using the numbers:
(1) unacceptable,
(2) below average,
(3) average,
(4) above average,
(5) exceptional,
(6) not applicable

timeliness.....
quality of writing.....
technical contents.....
logic of arrangement of contents .....
tables, charts, graphs, figures.....
other .....

Q8 I read/use the: *(tick one)*

French text only ❑
English text only ❑
both English and French texts ❑

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

ISBN 2-8318-6381-3

ICS 23.080; 91.140.65

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND