



SLOVENSKI STANDARD

SIST EN 60312:2001

01-februar-2001

Vacuum cleaners for household use - Methods of measuring the performance

Vacuum cleaners for household use - Methods of measuring the performance

Staubsauger für den Hausgebrauch - Prüfverfahren zur Bestimmung der Gebrauchseigenschaften

Aspirateurs de poussière à usage domestique - Méthodes de mesure de l'aptitude à la fonction

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Ta slovenski standard je istoveten z: **EN 60312:1998**

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ICS:

97.080

Aparati za nego tal

Floor treatment appliances

SIST EN 60312:2001

en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60312

February 1998

ICS 97.080

English version

**Vacuum cleaners for household use
Methods of measuring the performance
(IEC 60312:1998)**

Aspirateurs de poussière à usage
domestique - Méthodes de mesure de
l'aptitude à la fonction
(CEI 60312:1998)

Prüfverfahren zur Bestimmung der
Gebrauchseigenschaften von
Staubsaugern für den Hausgebrauch
und ähnliche Zwecke
(IEC 60312:1998)

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This European Standard was approved by CENELEC on 1998-01-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 59F/84/FDIS, future edition 3 of IEC 60312, prepared by SC 59F, Floor treatment appliances, of IEC TC 59, Performance of household electrical appliances, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60312 on 1998-01-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-11-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A and B are informative.

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60312:1998 was approved by CENELEC as a European Standard without any modification.

[SIST EN 60312:2001](https://standards.iteh.ai/SIST/EN/60312/1998)

In the official version, for annex B, Bibliography, the following notes have to be added for the standards indicated:

IEC 60335-1 NOTE: Harmonized as EN 60335-1:1994 + corr. January 1995 (modified).

IEC 60335-2-2 NOTE: Harmonized as EN 60335-2-2:1995 (modified).

CISPR 14 NOTE: Harmonized as EN 55014:1993 (not modified).



Annex ZA (normative)

Normative references to international publications
with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60704-1	1982	Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances Part 1: General requirements	EN 60704-1 ¹⁾	1994
IEC 60704-2-1 (mod)	1984	Part 2: Particular requirements for vacuum cleaners	EN 60704-2-1	1994
ISO 554	1976	Standard atmospheres for conditioning and/or testing Specifications	-	-
ISO 679	1989	Methods of testing cements Determination of strength	-	-
ISO 5167-1	1991	Measurement of fluid flow by means of pressure differential devices Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full	-	-

1) EN 60704-1 is superseded by EN 60704-1:1997, which is based on IEC 60704-1:1997.

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NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60312

Troisième édition
Third edition
1998-02

Aspirateurs de poussière à usage domestique –
Méthodes de mesure de l'aptitude à la fonction

iTeh STANDARD PREVIEW
Vacuum cleaners for household use –
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International Electrotechnical Commission
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembe Geneva, Switzerland
IEC web site <http://www.iec.ch>



Commission Electrotechnique internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX XA
PRICE CODE

*For price, voir catalogue en vigueur
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**VACUUM CLEANERS FOR HOUSEHOLD USE –
METHODS OF MEASURING THE PERFORMANCE**

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 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.
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- 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.

International Standard IEC 60312 has been prepared by subcommittee 59F: Floor treatment appliances, of IEC technical committee 59: Performance of household electrical appliances.

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

FDIS	Report on voting
59F/84/FDIS	59F/85/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 third edition cancels and replaces the second edition published in 1981 and its consolidated amendment 3 (1994).

Annexes A and B are for information only.

VACUUM CLEANERS FOR HOUSEHOLD USE – METHODS OF MEASURING THE PERFORMANCE

Section 1: General

1.1 Scope

This International Standard is applicable to vacuum cleaners for households use in or under conditions similar to those in households.

The purpose of this standard is to specify essential performance characteristics of vacuum cleaners being of interest to the users and to describe methods for measuring these characteristics.

NOTE – Due to influence of environmental conditions, variations in time, origin of test materials and proficiency of the operator, most of the described test methods will give more reliable results when applied for comparative testing of a number of appliances at the same time, in the same laboratory and by the same operator.

For safety requirements, reference is made to IEC 60335-1 and IEC 60335-2-2. For radio interference suppression requirements, reference is made to CISPR 14 (see annex B).

1.2 Normative references

The following normative documents contain provisions which, through reference in the text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60704-1:1982, *Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances – Part 1: General requirements*

IEC 60704-2-1:1984, *Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances – Part 2: Particular requirements for vacuum cleaners*

ISO 554:1976, *Standard atmospheres for conditioning and/or testing – Specifications*

ISO 679:1989, *Methods of testing cements – Determination of strength*

ISO 5167-1:1991, *Measurement of fluid flow by means of pressure differential devices – Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full*

1.3 Definitions

For the purpose of this International Standard, the following definitions apply:

1.3.1

cleaning head

that part of a vacuum cleaner which is applied to a surface to be cleaned

NOTE – The cleaning head may be a plain nozzle or a brush attached to a connecting tube, a power nozzle, or form part of the cleaner housing.

1.3.2

power nozzle

cleaning head provided with an agitation device to assist dirt removal

NOTE – The agitation device may be driven by an incorporated electric motor (motorized nozzle), an incorporated turbine powered by the air flow (air-turbine nozzle) or an incorporated friction or gear mechanism actuated by moving the cleaning head over the surface to be cleaned (mechanical nozzle).

1.3.3

self-propelled cleaning head

cleaning head provided with propulsion mechanism

1.3.4

upright cleaner

vacuum cleaner with the cleaning head forming an integral part of or permanently connected to the cleaner housing, the cleaning head normally being provided with an agitation device to assist dirt removal and the complete cleaner housing being moved over the surface to be cleaned by means of an attached handle

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1.3.5

double stroke

one forward and one backward movement of the cleaning head between two parallel lines perpendicular to the direction of the forward movement

1.3.6

forward stroke

forward movement of a double stroke

NOTE – On test carpets, forward strokes are carried out in the direction of the carpet pile (direction of manufacture).

1.3.7

return stroke

backward movement of a double stroke

1.3.8

stroke length

distance between the two parallel lines defining the limits of a double stroke

1.3.9

stroke pattern

arrangement of the forward and return strokes on the surface to be cleaned

1.3.10

parallel pattern

stroke pattern where the forward and the return strokes coincide

1.3.11**zig-zag pattern**

stroke pattern where the return stroke is directed slantwise towards the starting point of the next forward stroke (see figure 1)

1.3.12**test width**

outside width of the cleaning head less 20 mm

1.3.13**track width**

width of the visible track left in the dust-covered area of a given surface after a forward stroke with the vacuum cleaner in operation, the cleaning head being in full contact with the surface and adjusted in accordance with the manufacturer's instructions

1.3.14**stroke width**

track width less 20 mm

1.3.15**active depth of cleaning head**

distance from the front edge of the cleaning head to its rear edge or a line 10 mm behind the rear edge of the suction opening on the underside of the cleaning head, whichever is the shortest

1.3.16**stroke speed**

speed of the cleaning head moved as uniformly as possible, during a forward or a return stroke

1.3.17**cleaning cycle**

for a given measurement, the sequence of forward and return strokes to be carried out at a specified stroke speed over the test area according to the appropriate stroke pattern

1.3.18**specific cleaning time**

time required for one cleaning cycle of an unobstructed area of 1 m²

1.3.19**dust removal ability**

ratio, in per cent, of the quantity of dust removed during a specified number of cleaning cycles to the quantity of dust distributed on a test area

1.3.20**thread removal ability**

ratio, in per cent, of the number of threads removed during one cleaning cycle to the number of threads distributed on a test carpet

1.3.21**fibre removal ability**

quotient of the swept width in millimetres by the number of single strokes required to remove fibres from a test carpet

1.4 General conditions for testing

1.4.1 Atmospheric conditions

Unless otherwise specified, the measurements shall be carried out under the following conditions (in accordance with ISO 554):

Standard atmosphere 23/50

Temperature:	(23 ± 2) °C
Relative humidity:	(50 ± 5) %
Air pressure:	86 kPa to 106 kPa

NOTE 1 – Temperature and humidity conditions within the specified ranges are required for good repeatability and reproducibility. Care should be taken to avoid changes during a test.

NOTE 2 – Reference for laboratories for setting the correct values:

Wet-bulb temperature:	16,3 °C
Vapour pressure:	1,41 kPa
Water content:	8,8 g/kg dry air

For measurements which may be carried out at other than standard atmospheric conditions, the ambient temperature shall be maintained at (23 ± 5) °C.

1.4.2 Test equipment and materials

To minimize the influence of electrostatic phenomena, measurements on carpets shall be carried out on a flat floor consisting of a smooth untreated pine plywood or equivalent panel, at least 15 mm thick and of a size appropriate for the test.

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Equipment and materials for measurements (devices, test carpets, test dust etc.) to be used in a test shall, prior to the test, be kept for at least 24 h at standard atmospheric conditions according to 1.4.1.

1.4.3 Voltage and frequency

Measurements shall be carried out at rated voltage with a tolerance of ±1 % and, if applicable, at rated frequency.

Vacuum cleaners designed for d.c. only shall be operated at d.c. Vacuum cleaners designed for both a.c. and d.c. shall be operated at a.c. Vacuum cleaners not marked with rated frequency shall be operated at either 50 Hz or 60 Hz, as is common in the country of use.

For vacuum cleaners with a rated voltage range, measurements shall be carried out at the mean value of the voltage range if the difference between the limits of the range does not exceed 10 % of the mean value. If the difference exceeds 10 % of the mean value, measurements shall be carried out both at the upper and lower limits of the voltage range.

NOTE – If the rated voltage differs from the nominal system voltage of the country concerned, measurements carried out at rated voltage may give test results misleading for the consumer and additional measurements may be required. If the test voltage differs from the rated voltage, this shall be reported.

1.4.4 Running-in of vacuum cleaner and attachments

Prior to the initial test, the vacuum cleaner and its attachments, if any, shall be kept running with unrestricted air flow for at least 2 h to ensure adequate running-in. For upright cleaners or power nozzles, the agitation device shall be running but not in contact with the floor.

1.4.5 Equipment of the vacuum cleaner

If the vacuum cleaner is designed to be used with disposable dust receptacles, it shall, prior to each measurement, be equipped with a new dust receptacle of the type recommended or supplied by the manufacturer of the vacuum cleaner.

If the vacuum cleaner is provided with a permanent dust receptacle (as the sole original dust receptacle or as an enclosure for disposable dust receptacles), the dust receptacle shall, prior to each measurement, be cleaned by shaking or beating until its weight is within 1 % of its original weight. Brushing or washing of textile receptacles is not allowed; however, plastic receptacles may be washed and dried thoroughly.

NOTE – If the vacuum cleaner has additional filter(s) and the manufacturer's instructions recommend periodic cleaning or replacement of the filter(s), the above requirements also apply, unless it is evident that reusing such filters will not significantly affect the test result.

1.4.6 Operation of the vacuum cleaner

The vacuum cleaner and its accessories shall be used and adjusted in accordance with the manufacturer's instructions for normal operation for the test to be carried out. Height adjustment controls for the cleaning head shall be set as appropriate for the surface to be cleaned and the position noted. Any electrical controls shall be set for maximum continuous air flow and, unless the manufacturer's instruction states otherwise, any air by-pass openings for reduction of the suction power shall be closed.

The tube grip of cleaners with suction hose or the handle of other cleaners shall be held as for normal operation at a height of (800 ± 50) mm above the test floor.

During measurements where the agitation device of an upright cleaner or a power nozzle is not used as in normal operation, it shall be running but not in contact with the floor.

1.4.7 Conditioning prior to tests

Prior to each test, the vacuum cleaner with its accessories, attachments, disposable dust receptacles and additional filters to be used during a test shall be kept for at least 24 h at standard atmospheric conditions according to 1.4.1.

The vacuum cleaner and attachments to be used shall then be kept running for at least 10 min under the provisions given in 1.4.4 to allow them to stabilize.

1.4.8 Initial application of dust

Prior to tests where the quantity of the dust collected is to be weighed, dust shall initially be applied to all parts of the vacuum cleaner through which the air passes before reaching the dust receptacle by carrying out, on the appropriate test surface, two preliminary measurements of dust removal, the results of which are not taken into account.