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Vacuum cleaners for household use – Methods of measuring the performance

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

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FOREWORD

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

This fourth edition cancels and replaces the third edition published in 1998, amendment 1 (2000) and amendment 2 (2004). The following subclauses have been updated:

– 2.9 on performance with partly filled receptacle;
– 2.10 on determination of dust emission of the vacuum cleaners;
– 4.14 on energy consumption.

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

FDIS	Report on voting
59F/163/FDIS	59F/164/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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- withdrawn;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.

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 household 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 the 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.

1.2 Normative references

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

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 2-1: 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 2439:1997, *Flexible cellular polymeric materials – Determination of hardness (indentation technique)*

ISO 3386-1:1986, *Polymeric materials, cellular flexible – Determination of stress-strain characteristics in compression – Part 1: Low-density materials*

ISO 5167:2003 (all parts), *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full*

CIE 15.2:1986, *Colorimetry*

1.3 Definitions

For the purposes 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

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 if not otherwise specified, 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 m^2

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
time, in seconds, required to remove a quantity of fibres from a test surface

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.

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 must 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.