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Household and similar electrical appliances – Test code for the determination of airborne acoustical noise –
Part 2-1: Particular requirements for dry vacuum cleaners

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Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-1: Particular requirements for dry vacuum cleaners

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – TEST CODE FOR THE DETERMINATION OF AIRBORNE ACOUSTICAL NOISE –

Part 2-1: Particular requirements for dry vacuum cleaners

FOREWORD

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International Standard IEC 60704-2-1 has been prepared by subcommittee 59F: Surface cleaning appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) product scope is extended to cordless and similar vacuum cleaners;
b) definitions of "cleaning head", "active nozzle" and "standard Wilton test carpet" have been added;
c) specification of standard Wilton test carpet has been removed; reference is made to IEC TS 62885-1;
d) specific requirements on equipping and pre-conditioning have been added;
e) topic ageing of test carpet is addressed.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
59F/399/FDIS	59F/408/RVD

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

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

This Part 2-1 is intended to be used in conjunction with IEC 60704-1:2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements.*

NOTE When "Part 1" is mentioned in this standard, it refers to IEC 60704-1:2010.

The relevant text of Part 1 as amended by this document establishes the test code for vacuum cleaners.

This Part 2-1 supplements or modifies the corresponding clauses in IEC 60704-1:2010. When a particular subclause of Part 1 is not mentioned in this Part 2-1, that subclause is applicable as far as reasonable. Where this standard states "addition", "modification" or "replacement", the relevant requirements, test specifications or explanatory matter in Part 1 should be adapted accordingly.

Subclauses, tables, and figures that are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered AA, BB, etc.

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.

A list of all the parts in the IEC 60704 series, published under the general title *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise*, can be found on the IEC website.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

The measuring conditions specified in this part of IEC 60704 provide for sufficient accuracy in determining the noise emitted and comparing the results of measurements taken by different laboratories, whilst simulating as far as possible the practical use of vacuum cleaners.

It is recommended to consider the determination of noise levels as part of a comprehensive testing procedure covering many aspects of properties and performance of household vacuum cleaners.

NOTE As stated in the introduction to IEC 60704-1, this test code is concerned with airborne noise only.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – TEST CODE FOR THE DETERMINATION OF AIRBORNE ACOUSTICAL NOISE –

Part 2-1: Particular requirements for dry vacuum cleaners

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

~~These particular requirements apply to electrical vacuum cleaners (including their accessories and their component parts) for household use in or under conditions similar to those in households.~~

~~This part of IEC 60704 applies as it is to electrical vacuum cleaners operating in dry conditions. Some additions and modifications for vacuum cleaners operating in wet conditions are under consideration. How to test robotic vacuum cleaners is under consideration for a future edition.~~

This part of IEC 60704 is applicable for the determination of airborne acoustical noise of mains operated and cordless dry vacuum cleaners for household use or under conditions similar to those in households.

This part of IEC 60704 does not apply to vacuum cleaners for industrial or professional purposes.

NOTE Particular requirements for dry cleaning robots are specified in IEC 60704-2-17.

1.1.2 Types of noise

Replacement:

The methods specified in ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by electric vacuum cleaners.

1.1.3 Size of the source

Replacement:

The method specified in ISO 3744 is applicable to noise sources of any size. When applying ISO 3743-1 and ISO 3743-2, ~~care should be taken that~~ the maximum size of the appliance under test ~~fulfils~~ should fulfil the requirements specified in 1.2 of ISO 3743-1:2010 and 1.3 of ISO 3743-2:1994.

1.2 Object

Addition:

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This part of IEC 60704 describes the determination of the noise emission of vacuum cleaners under normal operating conditions on carpet and hard floor in accordance with 4.6 of ~~IEC 60312-1:2010~~ IEC 62885-2.

NOTE 101 For determining and verifying noise emission values declared in product specifications, see IEC 60704-3.

~~NOTE 102 If a boost position is incorporated, this is not taken into account.~~

~~NOTE 103 A boost position is a setting of a control for occasional use which results in a higher temporary fan speed.~~

1.3 Measurement uncertainty

Replacement:

For vacuum cleaners designed for cleaning carpets the estimated values of standard deviations of sound power levels determined in accordance with this part of IEC 60704 are provided in Table 101.

Table 101 – Standard deviations of sound power levels determined on carpets

Standard deviation (dB)	
σ_r (repeatability)	σ_R (reproducibility)
0,3	0,8

For vacuum cleaners designed for cleaning hard floors the estimated values of standard deviations of sound power levels determined in accordance with this part of IEC 60704 are provided in Table 102.

Table 102 – Standard deviations of sound power levels determined on hard floors

Standard deviation (dB)	
σ_r (repeatability)	σ_R (reproducibility)
0,2	0,6

NOTE 101 The values in Table 101 and Table 102 are derived from the results of a round robin test (RRT) conducted in 2010/2011 with 4 different vacuum cleaners (passive and active) in 8 participating laboratories.

Addition:

1.101 Standard deviation for declaration and verification

For the purpose of determining and verifying declared noise emission values for vacuum cleaners designed for cleaning carpets, in accordance with IEC 60704-3, the following values provided in Table 103 apply:

Table 103 – Standard deviations for declaration and verification for vacuum cleaners for carpets

Standard deviation (dB)		
σ_P (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	0,9 to 1,3	1,5

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For the purpose of determining and verifying declared noise emission values for vacuum cleaners designed for cleaning hard floors, in accordance with IEC 60704-3, the following values provided in Table 104 apply:

Table 104 – Standard deviations for declaration and verification for vacuum cleaners for hard floors

Standard deviation (dB)		
σ_P (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	0,8 to 1,2	1,5

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

~~IEC 60312-1:2010, *Vacuum cleaners for household use – Part 1: Dry vacuum cleaners – Methods for measuring the performance*~~

IEC TS 62885-1, *Surface cleaning appliances – Part 1: General requirements on test material and test equipment*

ISO 3743-1:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

ISO 3744:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

Addition:

3.101
cleaning head
plain nozzle or brush attached to a connecting tube, or a power nozzle, separate or part of the cleaner housing, and ~~the~~ that part of a dry vacuum cleaner which is applied to ~~the~~ a surface to be cleaned

[SOURCE: ~~IEC 60312-1:2010~~ IEC 62885-2:2016, 3.3]

3.102
~~**nozzle**~~
active nozzle
cleaning head provided with a driven agitation device to assist dirt removal

Note 1 to entry: The agitation device ~~may~~ can 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).

[SOURCE: ~~IEC 60312-1:2010~~ IEC 62885-2:2016, 3.4]

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3.103
standard Wilton test carpet
~~Wilton type carpet according to the typical specification provided in Table 105 used for testing~~

~~Table 105 – Wilton type carpet specifications~~

~~Type~~	~~Wilton~~
~~Pile composition wool~~	~~8,6/2 x 2~~
~~Method of manufacturing~~	~~Wilton fabric~~
~~Colour~~	~~dark, one colour~~
~~Backing~~	~~jute and cotton with latex~~
~~Type~~	~~cut-pile~~
~~Total height~~	~~7,5 mm, see also tolerances~~
~~Pile height~~	~~6,4 mm, see also tolerances~~
~~Total weight/m^2~~	~~2 100 g/m^2, see also tolerances~~
~~Pile weight/m^2~~	~~1 500 g/m^2, see also tolerances~~
~~Number of knots/m^2~~	~~96 000 knots/m^2, see also tolerances~~
~~Reed~~	~~320 reed /m~~
~~Shots~~	~~300 shots/m~~
~~Standard width~~	~~400 cm~~
~~Tolerances~~	~~±5 %~~

~~Note 1 to entry: For acoustical reasons, the size of the carpet used is 1 m × 1 m.~~

~~Note 2 to entry: Carpets conforming to previous editions of this standard do not conform with this definition.~~

Wilton carpet on which the vacuum cleaner and its cleaning head is placed for the measurement

Note 1 to entry: The specification of the standard Wilton test carpet can be found in IEC TS 62885-1.

3.104
standard hard floor
~~part of the floor of at least 1 m by 1 m on which the vacuum cleaner and its nozzle is placed for the measurement, with a sound absorption coefficient lower than 0,1 and an areal density of at least 50 kg/m^2~~

~~Note 1 to entry: Scratches and other irregularities of the surface roughness shall be below 0,5 mm to prevent turbulence noise generated by these irregularities.~~

part of the floor on which the vacuum cleaner and its cleaning head is placed for the measurement

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4 Measurement methods and acoustical environments

This clause of Part 1 is applicable except as follows:

4.2 Direct method

Addition:

If pure tone components are present in the noise emitted by the source, the estimated standard deviation of the measured sound pressure levels in the special reverberation room may increase. In such cases additional microphone positions or source positions may be necessary, as specified in ISO 3743-2.

4.3 Comparison method

Addition:

If pure tone components are present in the noise emitted by the source, the estimated standard deviation of the measured sound pressure levels in the hard-walled test room or in the special reverberation room may increase. In such cases additional microphone positions or source positions may be necessary, as specified in ISO 3743-1 or ISO 3743-2.

5 Instrumentation

This clause of Part 1 is applicable except as follows:

5.1 Instrumentation for measuring acoustical data

Addition:

The use of a windscreen is recommended. If necessary, the observed sound pressure level shall be corrected for changes in the microphone sensitivity, in accordance with the instructions accompanying the instrumentation.

6 Operation and location of appliances under test

This clause of Part 1 is applicable except as follows:

6.1 Equipping and pre-conditioning of appliances

6.1.1

Replacement:

~~The appliance is equipped with the ordinary cleaning head intended for dust removal from carpets or hard floors respectively and the necessary attachments, for example hoses and connecting tubes.~~

~~The vacuum cleaner and its attachments 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.~~

~~NOTE 101 Additional measurements can be made for other settings (for instance: "boost" position, minimum speed). A boost position is a setting of a control for occasional use, which results in a higher temporary motor speed.~~

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

~~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 reusable dust receptacle (as the sole original dust receptacle or as an enclosure for disposable dust receptacles), the dust receptacle and any additional filters removable without the aid of tools shall, prior to each measurement, be cleaned according to manufacturer's instructions until its weight is within 1 % or 2 g of its original weight whichever is lower.~~

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The tube grip of cleaners with suction hose or the handle of other cleaners shall be held at a height of (800 ± 50) mm above the test surface. Any telescopic suction tubes or sticks shall be extended to maximum length. For nozzles without pivoting connectors, it shall be ensured that the bottom of the cleaning head be made parallel with the test surface by adjusting the handle height within the tolerances. If this is not possible, the length of a telescopic tube or stick may be adjusted. Any adjustment shall be reported.

For declaration and compliance purposes, related tests conducted on a surface type (carpet or hard surface with or without crevice) shall be conducted with the same dry vacuum cleaner setting configurations such as power, cleaning head and cleaning head setting.

Unless otherwise specified, the dry vacuum cleaner setting configurations, such as cleaning head and cleaning head setting, shall be used and adjusted in accordance with the manufacturer's instructions for the surface to be cleaned (e.g. carpet or hard floor) for the test to be carried out.

In the absence of unambiguous instructions within the manufacturer's instructions, the product shall be tested with settings that are in accordance with any explicitly clear text, symbol or pictogram that is identifiable on the product.

If, after following the above order of checks, the tester believes the device under test to be in a configuration that is ambiguous, or that multiple configurations are possible with no way to clearly determine which is the most suitable for a given task, then the manufacturer shall be contacted for additional guidance.

If all of the above-mentioned measures to get information regarding the correct setting fail, the setting for maximum continuous airflow shall be used.

Complete details of the settings used for each cleaning task shall be recorded in the test documentation.

If the dry 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 dry vacuum cleaner.

If the dry vacuum cleaner is provided with a reusable dust receptacle (as the sole original dust receptacle or as an enclosure for disposable dust receptacles), the dust receptacle and any additional filters removable without the aid of tools shall, prior to each measurement, be cleaned in accordance with the manufacturer’s instructions until its mass is within 1 % or 2 g of its original mass, whichever is the lower.

Each test of a cordless dry vacuum cleaner is started with a fully charged sample. For tests where more than one repeat is needed, testing should be carried out on one full charge. This document does not currently address changing performance throughout the whole run time of some appliances. Results at different states of battery charge can vary. However, if the device becomes fully discharged during a repeat, that repeat is annulled, and the product is fully charged.

If the manufacturer provides no instructions on determination of fully charged battery, a charging time of 24 h shall be used.

After a full charge, the cordless cleaner shall not be tested until 30 min have elapsed, and before 48 h have elapsed. The cleaner shall be disconnected from the charger during this period.

Make a note in the report if it is not possible to test owing to a short runtime.

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6.1.3

Replacement:

Prior to the first test on a new mains-operated vacuum cleaner, it shall be kept running with unrestricted air flow for at least 2 h to ensure adequate running-in. For active nozzles, the agitation device shall be running but not be in contact with the floor.

~~Prior to the first test on a new battery-operated vacuum cleaner it shall be kept running with unrestricted air flow for at least 3 full charge and discharge cycles to ensure adequate running-in. For active nozzles, the agitation device shall be running but not in contact with the floor.~~

Prior to the first test (and following preparation in line with the manufacturer's instructions) on a new cordless dry vacuum cleaner, it shall be fully charged in accordance with the manufacturer's instructions and then discharged by running in the same setting as for the noise measurement with unrestricted air flow. The sequence shall be repeated one more time with an interval of at least two hours after each discharge. For active nozzles during discharge, the agitation device shall be running but not in contact with the floor.

Prior to conducting any series of tests, the age, condition, and history of the product shall be recorded.

6.1.4

Addition:

If the vacuum cleaner is unused ~~and de-energized~~ for more than 1 h, then the vacuum cleaner and attachments to be used shall be kept running for at least 10 min to allow them to stabilise.

For appliances supplied from batteries, this duration for ~~stabilising~~ stabilisation is reduced to ~~2~~ 1 min.

6.2 Supply of electric energy and of water or gas

6.2.2

Addition:

Rechargeable vacuum cleaners are measured with fully charged batteries and disconnected from the external power source.

6.4 Loading and operating of appliances during tests

6.4.2

Replacement:

Vacuum cleaners shall be operated either on standard Wilton test carpet or on standard hard floor, depending on the function specified by the manufacturer. Vacuum cleaners designed for cleaning both carpets and hard floor shall be operated on a standard Wilton test carpet and on a standard hard floor.

~~Any controls shall be set to the maximum position for normal operating. Unless the manufacturer's instructions state otherwise, any bypass air openings for reducing the suction power shall be closed. If such openings are not controlled manually this shall be reported.~~

The dry vacuum cleaner setting configurations, such as cleaning head and cleaning head setting, shall be used and adjusted in accordance with 6.1.1.

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Before starting the measurement procedure, ensure that the cleaning head is adjusted correctly in accordance with the manufacturer's instructions for cleaning carpets and/or hard floors.

For operation of the appliance on carpets:

~~If the cleaning head is equipped with a device to put out brushes or other retractable parts for cleaning carpets, the cleaning head is 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 ($2^{+0,2}_{0}$) mm or, if not possible, from at least 2 mm.~~

If there are no unambiguous instructions for cleaning heads equipped with a device to put out brushes or other retractable parts for cleaning carpets, adjust in such a way that the bristles protrude at least 2 mm from the theoretical support plane. All parts intended for hard floor treatment only shall be removed or retracted.

With the appliance switched off, lift the cleaning head off the carpet, replace the cleaning head on the edge of the carpet and push along the pile direction into the measurement position, ~~taking care~~ ensuring that no vertical force is exerted. To avoid any vertical force, it is recommended to push the cleaning head directly by hand. Switch on the appliance.

Other conditions are specified in 6.1.1, 6.2 and 6.3.

If the appliance is delivered with an ordinary carpet nozzle and in addition with a power nozzle, measurements shall be carried out for both cleaning heads.

Care shall be taken that ageing of the test carpet does not influence the results.

NOTE Test carpets are subject to ageing and wear. The preferred method to control the test carpet and to discover potential wear is to compare measurement data of an internal reference vacuum cleaner over time. For this purpose, one internal reference vacuum cleaner can be used or, if necessary, use more (e.g. a passive/active or low/average/high noise vacuum cleaner).

In addition, air data (air flow/vacuum) may be monitored over time since air data have a considerable impact on noise. In any case, the carpet shall be replaced if wear is visible.

For operation of the appliance on hard floors:

All parts intended for carpet treatment only shall be removed or retracted.

With the appliance switched off, lift the cleaning head off the floor, replace the cleaning head approximately 30 cm before the measurement position and push along in a forward direction into the measurement position, taking care that no vertical force is exerted. Switch on the appliance.

Other conditions are specified in 6.1.1, 6.2 and 6.3.

If the appliance is delivered with an ordinary hard floor nozzle and in addition with a power nozzle for hard floors, measurements shall be carried out for both cleaning heads.

6.5 Location and mounting of appliances

6.5.1 *Replacement:*

For measurement on carpet:

The standard Wilton test carpet is specified in IEC TS 62885-1. The size of the carpet is 1 m × 1 m.

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The vacuum cleaner is located on the standard Wilton test carpet ~~Wilton (defined in 3.103)~~ placed directly without any resilient means:

– either on the floor of the hard-walled test room or the special reverberation test room with a minimum distance of 1 m between any surface (including protruding parts) of the appliance and the nearest wall;

– or on the reflecting plane of the free-field environment, taking into account the shape and the size of the specified measurement surface.

The vertical projection of the shape of the appliance under test and its cleaning head shall be at the centre of the carpet area (see Figure 101 and Figure 102).

The axis of longitudinal travelling of the cleaning head shall be parallel with the direction of the pile of the carpet (x-axis). The angle α between the transverse axis of the cleaning head (parallel with y-axis) and the longitudinal axis of the appliance (or the tube, if any) shall be α = (90 ± 5)° (see Figure 101 and Figure 102).

For measurements on standard hard floor:

The size of standard hard floor is specified as follows:

– size is at least 1 m × 1 m;

– sound absorption coefficient shall be lower than 0,1; and

– areal density is at least 50 kg/m^2.

The vacuum cleaner is located on the standard hard floor ~~(defined in 3.104)~~ placed directly without any resilient means:

– either on the floor of the hard-walled test room or the special reverberation test room with a minimum distance of 1 m between any surface (including protruding parts) of the appliance and the nearest wall,

– or on the reflecting plane of the free-field environment, taking into account the shape and the size of the specified measurement surface.

Generally, the floor in a hard-walled test room, a special reverberation test room or in a semi-anechoic test room fulfils the requirements for a standard hard floor ~~(3.104)~~.

Scratches and other irregularities of the surface roughness shall be below 0,5 mm to prevent turbulence noise generated by these irregularities.

If the requirements for a standard hard floor are not met, two plates made of marble or similar natural stone with a polished surface shall be used. The size of the plates shall be at least 0,5 m × 1,0 m; thickness shall be at least 0,02 m. Care is to be taken to prevent additional noise production between the plates and between plates and the floor.

~~NOTE 101~~ To avoid additional noise production, a resilient underlay with a thickness of 25 mm, mechanical loss factor 0,25 and a dynamic E-modulus less than 0,2 N/mm^2 shall be used. The foam Getzner Sylomer®[1] SR11 fulfils these requirements ~~(www.getzner.com)~~.

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The vertical projection of the shape of the appliance under test and its cleaning head, shall be at the centre of the test area (see Figure 101 and Figure 102).

If the cleaning head is connected by a hose and connecting tube(s) to the appliance, the cleaning head is placed close to the appliance on the carpet so that the projection of the axis of longitudinal travelling of the cleaning head and that of the longitudinal axis of the appliance are parallel, the projections of the appropriate transverse axis coincide and the clearance between the projection of the appliance and the projection of the cleaning head is (2 ± 1) cm.

In the case of a hard floor measurement, the placement of cleaning head, connecting hose, tubes and appliance is done as if it were placed on a 1 m × 1 m carpet, to ensure a sufficiently compact placement of the various elements. The hose and connecting tube(s) or the handles of hand-supported and upright vacuum cleaners are resiliently suspended or supported in normal position of use (middle of the handles at (800 ± 50) mm above the floor, if possible), the cleaning head being in full contact with the floor.

~~Telescopic connecting tubes should be adjusted in accordance with the owner's manual. If no instructions are given, then the length of the telescopic connecting tubes shall be adjusted so that the angle β between the telescopic connecting tubes and the floor shall be $\beta = (45^{+5}_{0})°$ or, if not possible, as near as possible to 45°.~~

If necessary, the cleaning head is resiliently fastened to prevent self-propulsion.

~~Sound radiation due to possible vibrations of the test floor should be prevented.~~

Vacuum cleaners with active nozzles shall be tested on glued carpet to avoid noise from carpet vibration. It shall be glued with commercial carpet glue in the entire surface of 1 m × 1 m directly on the laboratory floor or on a laminated plywood panel with a thickness of 18 mm ± 2 mm and a density of 675 kg/m^3 ± 75 kg/m^3.

Gluing shall not be used for testing vacuum cleaners with passive nozzles.

The test floor is considered to be a part of the appliance to be tested and its possible influence on the acoustical characteristics of the test environment, for example of the hard reflecting plane, or on the absorption (reverberation time) of the reverberant test room or hard-walled room should not be taken into account.

6.5.2 to **6.5.5** *Not applicable*.

7 Measurement of sound pressure levels

This clause of Part 1 is applicable except as follows:

7.1.1 to **7.1.3** *Not applicable.*

7.1.5 and **7.1.6** *Not applicable.*

7.4 Measurements

7.4.1 *Addition:*

The A-weighted sound pressure level shall be time-averaged during at least 30 s.

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8 Calculation of sound pressure and sound power levels

This clause of Part 1 is applicable.

9 Information to be recorded

This clause of Part 1 is applicable except as follows:

9.12.5 *Not applicable.*

10 Information to be reported

This clause of Part 1 is applicable except as follows:

10.3.1 *Addition:*

The state of openings for reduction of suction power shall be reported.

10.3.9 *Addition:*

The version of the carpet, carpet batch and panel are to be recorded. This shall include a reference to IEC TS 62885-1, which describes the carpet used.

10.4.10 *Not applicable.*

10.4.12 *Addition:*

– L_{WA} values for both hard floor and carpet shall be reported for appliances designed for both floor types.
– L_{WA} value for a single floor type shall be reported if the appliance is specifically designed for that floor type, meaning that the manufacturer discourages the use of the device on the alternative floor type.
– In all cases, the type of floor and the measured value shall be clearly coupled.

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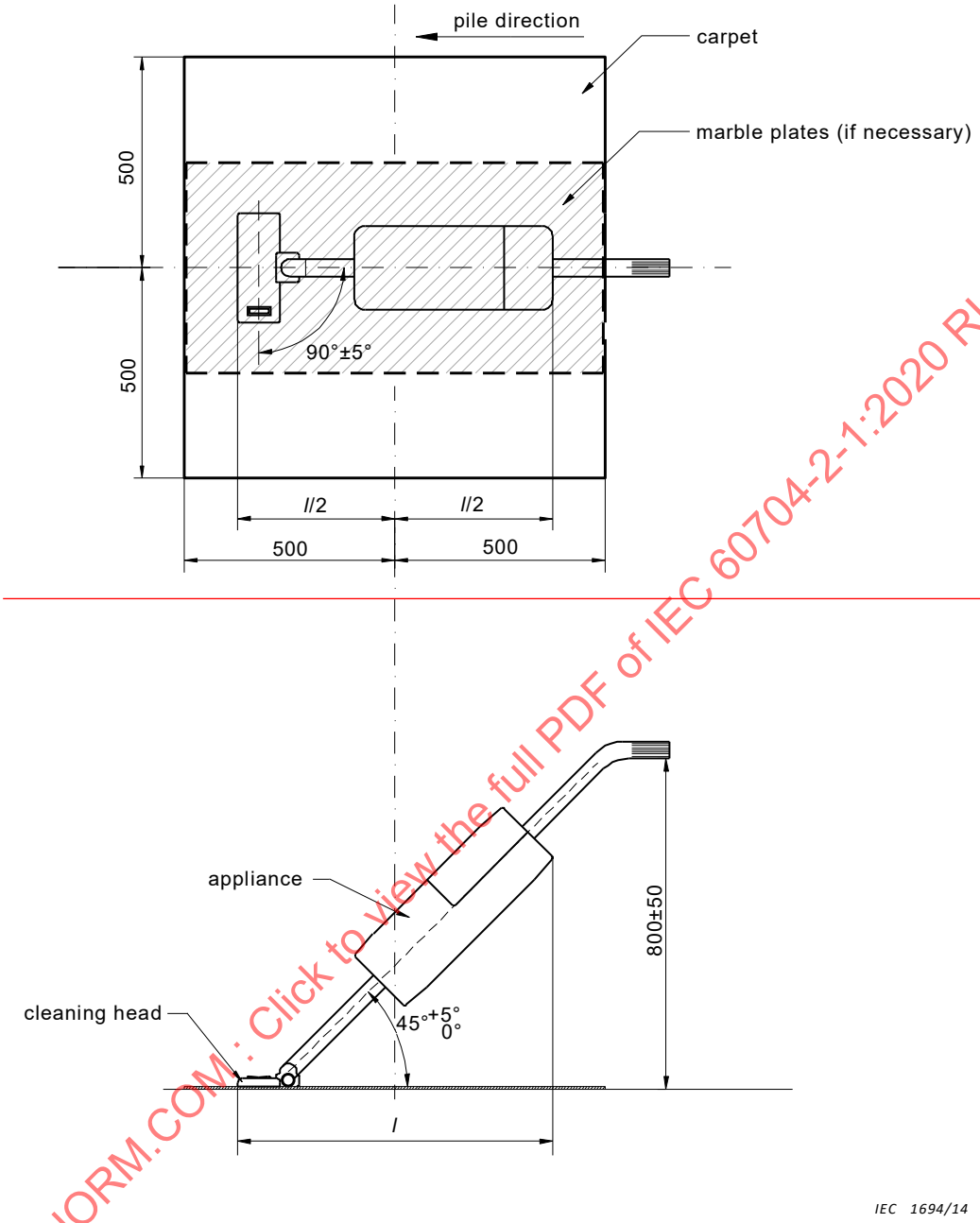
Additional figures:



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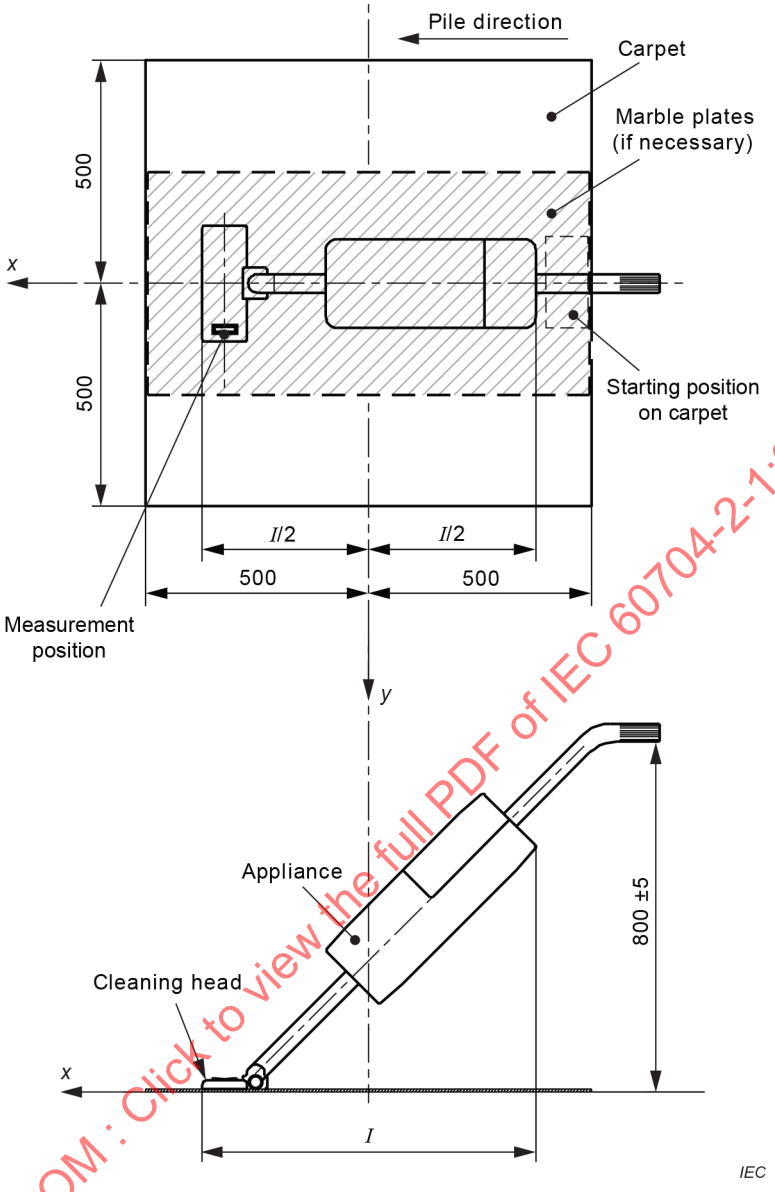
Dimensions in millimetres



Key

l length of the horizontal projection of the appliance

Figure 101 – Appliance with cleaning head connected directly

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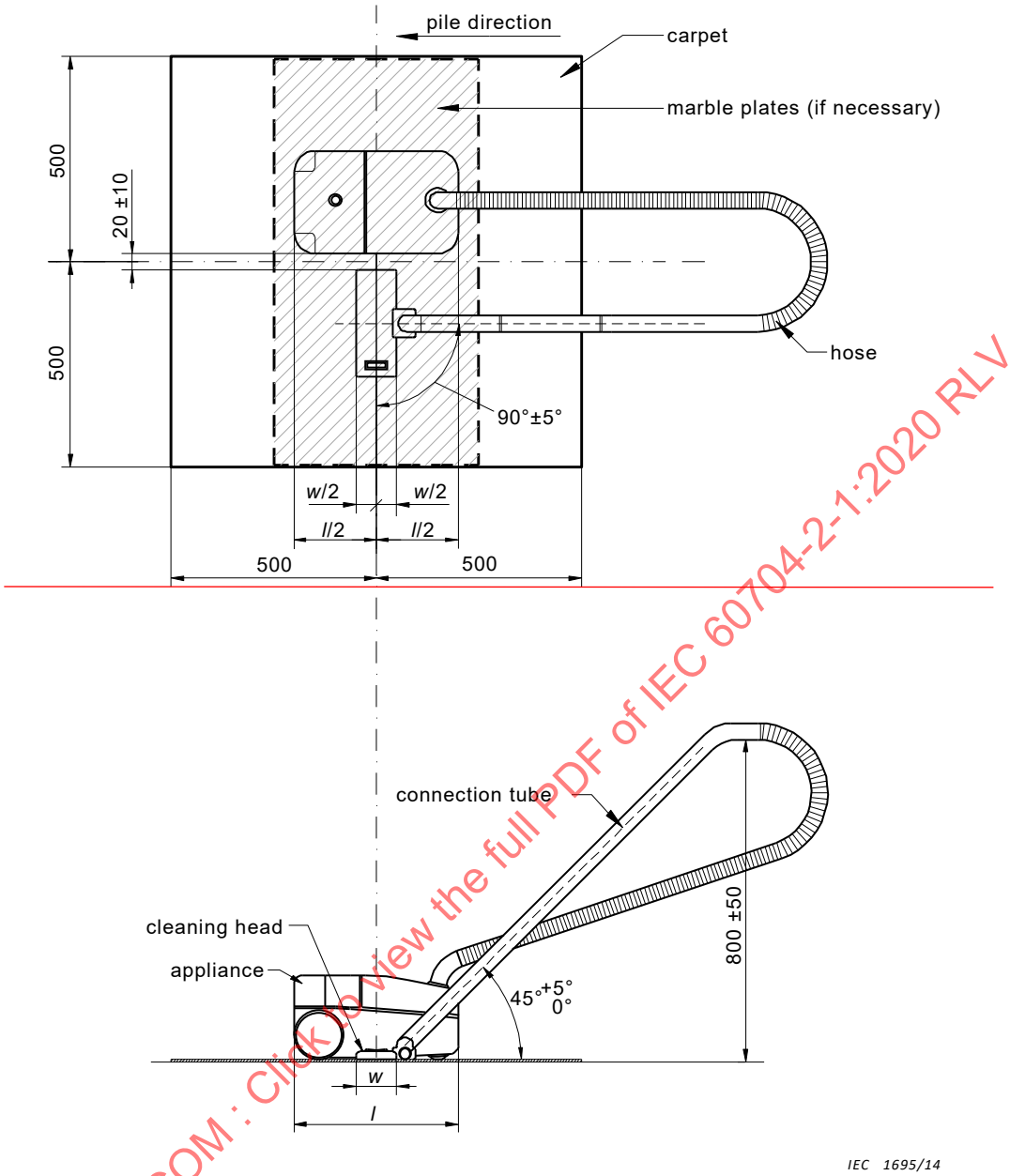

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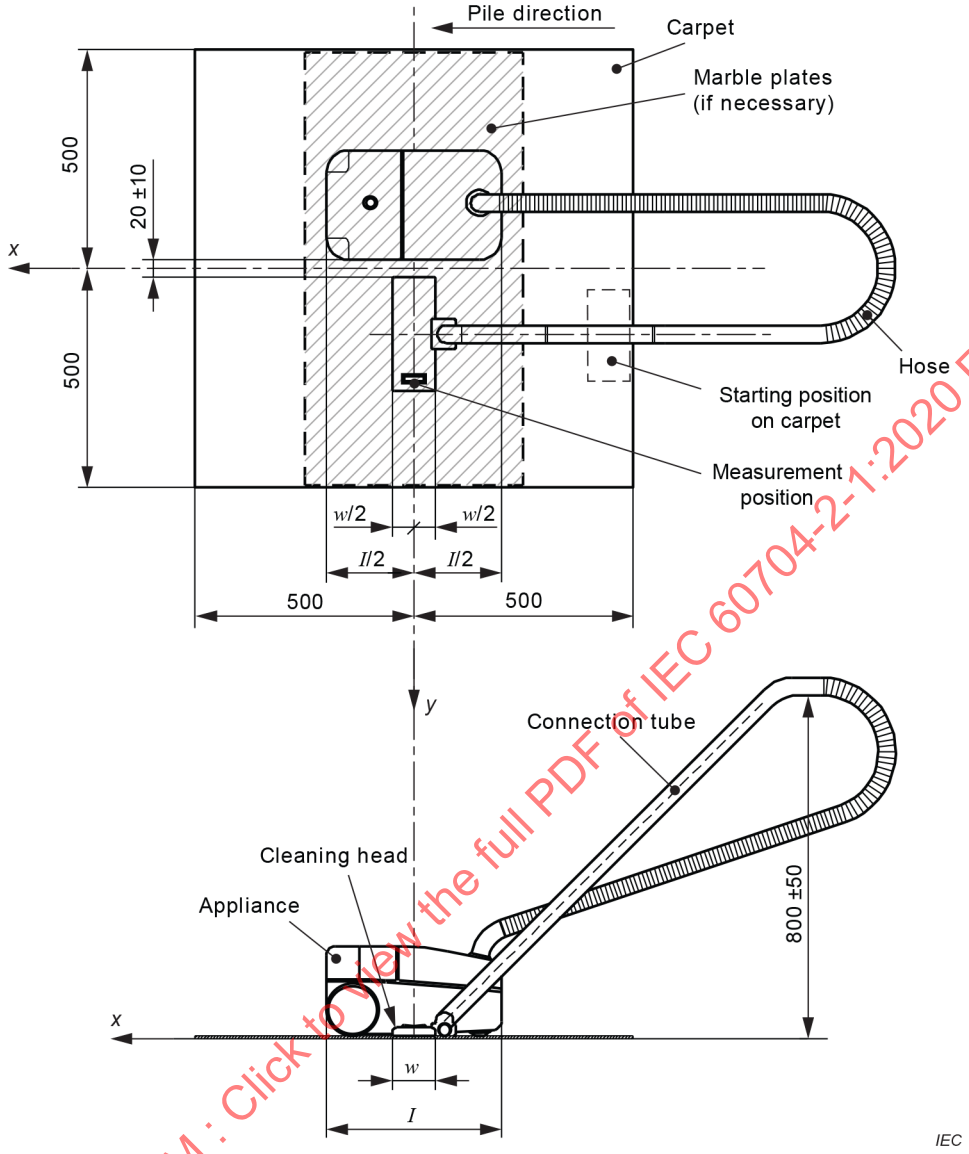
Dimensions in millimetres



Key

l length of the appliance

w depth of the cleaning head

Figure 102 – Appliance with the cleaning head connected by hose and connecting tube

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Annexes

The annexes of Part 1 apply with the following exception:

Annex A
(normative)

Standard test table

This annex of Part 1 is not applicable.

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Bibliography

Addition:

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

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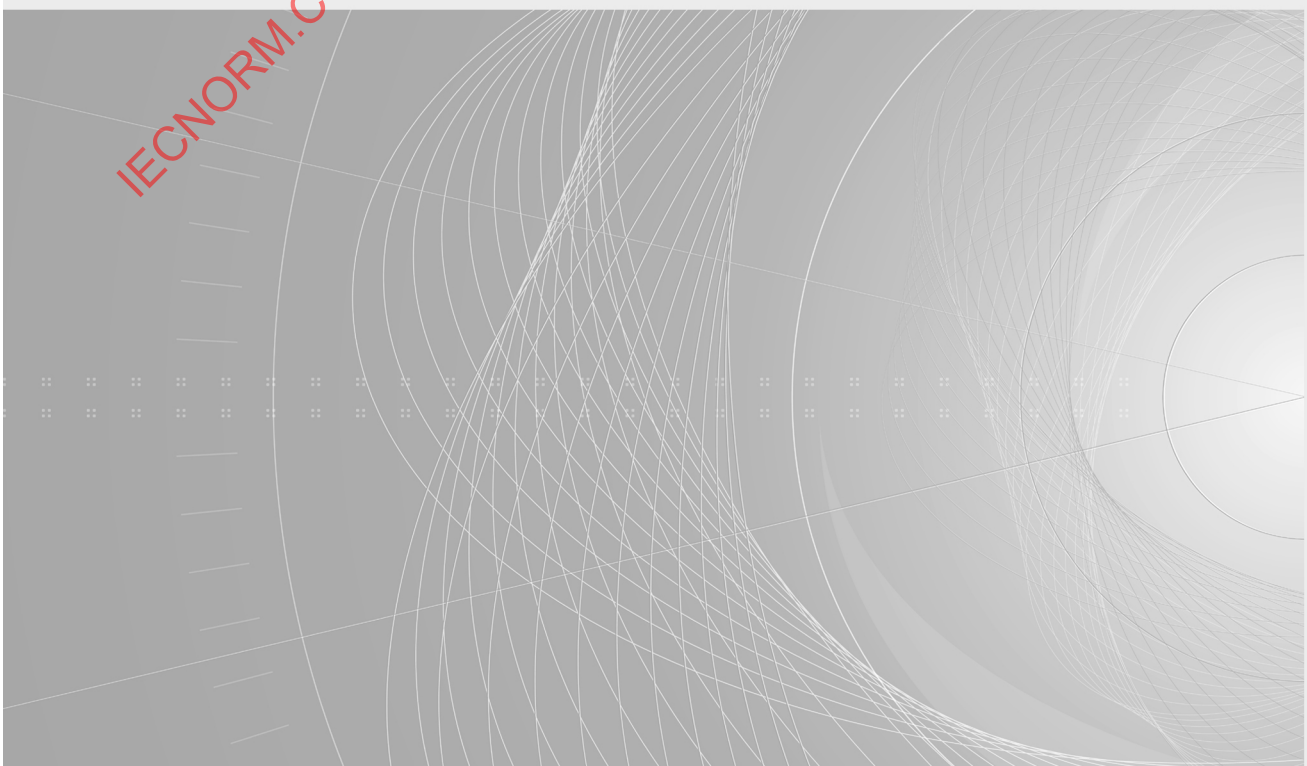
Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-1: Particular requirements for dry vacuum cleaners

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien – Partie 2-1: Exigences particulières pour les aspirateurs à sec



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – TEST CODE FOR THE DETERMINATION OF AIRBORNE ACOUSTICAL NOISE –

Part 2-1: Particular requirements for dry vacuum cleaners

FOREWORD

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International Standard IEC 60704-2-1 has been prepared by subcommittee 59F: Surface cleaning appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) product scope is extended to cordless and similar vacuum cleaners;
b) definitions of "cleaning head", "active nozzle" and "standard Wilton test carpet" have been added;
c) specification of standard Wilton test carpet has been removed; reference is made to IEC TS 62885-1;

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d) specific requirements on equipping and pre-conditioning have been added;

e) topic ageing of test carpet is addressed.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
59F/399/FDIS	59F/408/RVD

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

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

This Part 2-1 is intended to be used in conjunction with IEC 60704-1:2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements.*

NOTE When "Part 1" is mentioned in this standard, it refers to IEC 60704-1:2010.

The relevant text of Part 1 as amended by this document establishes the test code for vacuum cleaners.

This Part 2-1 supplements or modifies the corresponding clauses in IEC 60704-1:2010. When a particular subclause of Part 1 is not mentioned in this Part 2-1, that subclause is applicable as far as reasonable. Where this standard states "addition", "modification" or "replacement", the relevant requirements, test specifications or explanatory matter in Part 1 should be adapted accordingly.

Subclauses, tables, and figures that are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered AA, BB, etc.

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.

A list of all the parts in the IEC 60704 series, published under the general title *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

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INTRODUCTION

The measuring conditions specified in this part of IEC 60704 provide for sufficient accuracy in determining the noise emitted and comparing the results of measurements taken by different laboratories, whilst simulating as far as possible the practical use of vacuum cleaners.

It is recommended to consider the determination of noise levels as part of a comprehensive testing procedure covering many aspects of properties and performance of household vacuum cleaners.

NOTE As stated in the introduction to IEC 60704-1, this test code is concerned with airborne noise only.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – TEST CODE FOR THE DETERMINATION OF AIRBORNE ACOUSTICAL NOISE –

Part 2-1: Particular requirements for dry vacuum cleaners

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

This part of IEC 60704 is applicable for the determination of airborne acoustical noise of mains operated and cordless dry vacuum cleaners for household use or under conditions similar to those in households.

This part of IEC 60704 does not apply to vacuum cleaners for industrial or professional purposes.

NOTE Particular requirements for dry cleaning robots are specified in IEC 60704-2-17.

1.1.2 Types of noise

Replacement:

The methods specified in ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by electric vacuum cleaners.

1.1.3 Size of the source

Replacement:

The method specified in ISO 3744 is applicable to noise sources of any size. When applying ISO 3743-1 and ISO 3743-2, the maximum size of the appliance under test should fulfil the requirements specified in 1.2 of ISO 3743-1:2010 and 1.3 of ISO 3743-2:1994.

1.2 Object

Addition:

This part of IEC 60704 describes the determination of the noise emission of vacuum cleaners under normal operating conditions on carpet and hard floor in accordance with 4.6 of IEC 62885-2.

NOTE 101 For determining and verifying noise emission values declared in product specifications, see IEC 60704-3.

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1.3 Measurement uncertainty

Replacement:

For vacuum cleaners designed for cleaning carpets the estimated values of standard deviations of sound power levels determined in accordance with this part of IEC 60704 are provided in Table 101.

Table 101 – Standard deviations of sound power levels determined on carpets

Standard deviation (dB)	
σ_r (repeatability)	σ_R (reproducibility)
0,3	0,8

For vacuum cleaners designed for cleaning hard floors the estimated values of standard deviations of sound power levels determined in accordance with this part of IEC 60704 are provided in Table 102.

Table 102 – Standard deviations of sound power levels determined on hard floors

Standard deviation (dB)	
σ_r (repeatability)	σ_R (reproducibility)
0,2	0,6

NOTE 101 The values in Table 101 and Table 102 are derived from the results of a round robin test (RRT) conducted in 2010/2011 with 4 different vacuum cleaners (passive and active) in 8 participating laboratories.

Addition:

1.101 Standard deviation for declaration and verification

For the purpose of determining and verifying declared noise emission values for vacuum cleaners designed for cleaning carpets, in accordance with IEC 60704-3, the following values provided in Table 103 apply:

Table 103 – Standard deviations for declaration and verification for vacuum cleaners for carpets

Standard deviation (dB)		
σ_P (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	0,9 to 1,3	1,5

For the purpose of determining and verifying declared noise emission values for vacuum cleaners designed for cleaning hard floors, in accordance with IEC 60704-3, the following values provided in Table 104 apply:

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Table 104 – Standard deviations for declaration and verification for vacuum cleaners for hard floors

Standard deviation (dB)		
σ_P (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	0,8 to 1,2	1,5

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

IEC TS 62885-1, *Surface cleaning appliances – Part 1: General requirements on test material and test equipment*

ISO 3743-1:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

ISO 3744:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

Addition:

3.101
cleaning head
plain nozzle or brush attached to a connecting tube, or a power nozzle, separate or part of the cleaner housing, and that part of a dry vacuum cleaner which is applied to a surface to be cleaned

[SOURCE: IEC 62885-2:2016, 3.3]

3.102
active nozzle
cleaning head provided with a driven agitation device to assist dirt removal

Note 1 to entry: The agitation device can 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).

[SOURCE: IEC 62885-2:2016, 3.4]

3.103
standard Wilton test carpet
Wilton carpet on which the vacuum cleaner and its cleaning head is placed for the measurement

Note 1 to entry: The specification of the standard Wilton test carpet can be found in IEC TS 62885-1.

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3.104
standard hard floor
part of the floor on which the vacuum cleaner and its cleaning head is placed for the measurement

4 Measurement methods and acoustical environments

This clause of Part 1 is applicable except as follows:

4.2 Direct method

Addition:

If pure tone components are present in the noise emitted by the source, the estimated standard deviation of the measured sound pressure levels in the special reverberation room may increase. In such cases additional microphone positions or source positions may be necessary, as specified in ISO 3743-2.

4.3 Comparison method

Addition:

If pure tone components are present in the noise emitted by the source, the estimated standard deviation of the measured sound pressure levels in the hard-walled test room or in the special reverberation room may increase. In such cases additional microphone positions or source positions may be necessary, as specified in ISO 3743-1 or ISO 3743-2.

5 Instrumentation

This clause of Part 1 is applicable except as follows:

5.1 Instrumentation for measuring acoustical data

Addition:

The use of a windscreen is recommended. If necessary, the observed sound pressure level shall be corrected for changes in the microphone sensitivity, in accordance with the instructions accompanying the instrumentation.

6 Operation and location of appliances under test

This clause of Part 1 is applicable except as follows:

6.1 Equipping and pre-conditioning of appliances

6.1.1

Replacement:

The tube grip of cleaners with suction hose or the handle of other cleaners shall be held at a height of (800 ± 50) mm above the test surface. Any telescopic suction tubes or sticks shall be extended to maximum length. For nozzles without pivoting connectors, it shall be ensured that the bottom of the cleaning head be made parallel with the test surface by adjusting the handle height within the tolerances. If this is not possible, the length of a telescopic tube or stick may be adjusted. Any adjustment shall be reported.

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For declaration and compliance purposes, related tests conducted on a surface type (carpet or hard surface with or without crevice) shall be conducted with the same dry vacuum cleaner setting configurations such as power, cleaning head and cleaning head setting.

Unless otherwise specified, the dry vacuum cleaner setting configurations, such as cleaning head and cleaning head setting, shall be used and adjusted in accordance with the manufacturer's instructions for the surface to be cleaned (e.g. carpet or hard floor) for the test to be carried out.

In the absence of unambiguous instructions within the manufacturer's instructions, the product shall be tested with settings that are in accordance with any explicitly clear text, symbol or pictogram that is identifiable on the product.

If, after following the above order of checks, the tester believes the device under test to be in a configuration that is ambiguous, or that multiple configurations are possible with no way to clearly determine which is the most suitable for a given task, then the manufacturer shall be contacted for additional guidance.

If all of the above-mentioned measures to get information regarding the correct setting fail, the setting for maximum continuous airflow shall be used.

Complete details of the settings used for each cleaning task shall be recorded in the test documentation.

If the dry 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 dry vacuum cleaner.

If the dry vacuum cleaner is provided with a reusable dust receptacle (as the sole original dust receptacle or as an enclosure for disposable dust receptacles), the dust receptacle and any additional filters removable without the aid of tools shall, prior to each measurement, be cleaned in accordance with the manufacturer’s instructions until its mass is within 1 % or 2 g of its original mass, whichever is the lower.

Each test of a cordless dry vacuum cleaner is started with a fully charged sample. For tests where more than one repeat is needed, testing should be carried out on one full charge. This document does not currently address changing performance throughout the whole run time of some appliances. Results at different states of battery charge can vary. However, if the device becomes fully discharged during a repeat, that repeat is annulled, and the product is fully charged.

If the manufacturer provides no instructions on determination of fully charged battery, a charging time of 24 h shall be used.

After a full charge, the cordless cleaner shall not be tested until 30 min have elapsed, and before 48 h have elapsed. The cleaner shall be disconnected from the charger during this period.

Make a note in the report if it is not possible to test owing to a short runtime.

6.1.3

Replacement:

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Prior to the first test on a new mains-operated vacuum cleaner, it shall be kept running with unrestricted air flow for at least 2 h to ensure adequate running-in. For active nozzles, the agitation device shall be running but not be in contact with the floor.

Prior to the first test (and following preparation in line with the manufacturer's instructions) on a new cordless dry vacuum cleaner, it shall be fully charged in accordance with the manufacturer’s instructions and then discharged by running in the same setting as for the noise measurement with unrestricted air flow. The sequence shall be repeated one more time with an interval of at least two hours after each discharge. For active nozzles during discharge, the agitation device shall be running but not in contact with the floor.

Prior to conducting any series of tests, the age, condition, and history of the product shall be recorded.

6.1.4

Addition:

If the vacuum cleaner is unused for more than 1 h, then the vacuum cleaner and attachments to be used shall be kept running for at least 10 min to allow them to stabilise.

For appliances supplied from batteries, this duration for stabilisation is reduced to 1 min.

6.2 Supply of electric energy and of water or gas

6.2.2

Addition:

Rechargeable vacuum cleaners are measured with fully charged batteries and disconnected from the external power source.

6.4 Loading and operating of appliances during tests

6.4.2

Replacement:

Vacuum cleaners shall be operated either on standard Wilton test carpet or on standard hard floor, depending on the function specified by the manufacturer. Vacuum cleaners designed for cleaning both carpets and hard floor shall be operated on a standard Wilton test carpet and on a standard hard floor.

The dry vacuum cleaner setting configurations, such as cleaning head and cleaning head setting, shall be used and adjusted in accordance with 6.1.1.

Before starting the measurement procedure, ensure that the cleaning head is adjusted correctly in accordance with the manufacturer's instructions for cleaning carpets and/or hard floors.

For operation of the appliance on carpets:

If there are no unambiguous instructions for cleaning heads equipped with a device to put out brushes or other retractable parts for cleaning carpets, adjust in such a way that the bristles protrude at least 2 mm from the theoretical support plane. All parts intended for hard floor treatment only shall be removed or retracted.

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With the appliance switched off, lift the cleaning head off the carpet, replace the cleaning head on the edge of the carpet and push along the pile direction into the measurement position, ensuring that no vertical force is exerted. To avoid any vertical force, it is recommended to push the cleaning head directly by hand. Switch on the appliance.

Other conditions are specified in 6.1.1, 6.2 and 6.3.

If the appliance is delivered with an ordinary carpet nozzle and in addition with a power nozzle, measurements shall be carried out for both cleaning heads.

Care shall be taken that ageing of the test carpet does not influence the results.

NOTE Test carpets are subject to ageing and wear. The preferred method to control the test carpet and to discover potential wear is to compare measurement data of an internal reference vacuum cleaner over time. For this purpose, one internal reference vacuum cleaner can be used or, if necessary, use more (e.g. a passive/active or low/average/high noise vacuum cleaner).

In addition, air data (air flow/vacuum) may be monitored over time since air data have a considerable impact on noise. In any case, the carpet shall be replaced if wear is visible.

For operation of the appliance on hard floors:

All parts intended for carpet treatment only shall be removed or retracted.

With the appliance switched off, lift the cleaning head off the floor, replace the cleaning head approximately 30 cm before the measurement position and push along in a forward direction into the measurement position, taking care that no vertical force is exerted. Switch on the appliance.

Other conditions are specified in 6.1.1, 6.2 and 6.3.

If the appliance is delivered with an ordinary hard floor nozzle and in addition with a power nozzle for hard floors, measurements shall be carried out for both cleaning heads.

6.5 Location and mounting of appliances

6.5.1 *Replacement:*

For measurement on carpet:

The standard Wilton test carpet is specified in IEC TS 62885-1. The size of the carpet is 1 m × 1 m.

The vacuum cleaner is located on the standard Wilton test carpet placed directly without any resilient means:

– either on the floor of the hard-walled test room or the special reverberation test room with a minimum distance of 1 m between any surface (including protruding parts) of the appliance and the nearest wall;

– or on the reflecting plane of the free-field environment, taking into account the shape and the size of the specified measurement surface.

The vertical projection of the shape of the appliance under test and its cleaning head shall be at the centre of the carpet area (see Figure 101 and Figure 102).

The axis of longitudinal travelling of the cleaning head shall be parallel with the direction of the pile of the carpet (x-axis). The angle α between the transverse axis of the cleaning head (parallel

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with y-axis) and the longitudinal axis of the appliance (or the tube, if any) shall be α = (90 ± 5)° (see Figure 101 and Figure 102).

For measurements on standard hard floor:

The size of standard hard floor is specified as follows:

– size is at least 1 m × 1 m;
– sound absorption coefficient shall be lower than 0,1; and
– areal density is at least 50 kg/m^2.

The vacuum cleaner is located on the standard hard floor placed directly without any resilient means:

– either on the floor of the hard-walled test room or the special reverberation test room with a minimum distance of 1 m between any surface (including protruding parts) of the appliance and the nearest wall,
– or on the reflecting plane of the free-field environment, taking into account the shape and the size of the specified measurement surface.

Generally, the floor in a hard-walled test room, a special reverberation test room or in a semi-anechoic test room fulfils the requirements for a standard hard floor.

Scratches and other irregularities of the surface roughness shall be below 0,5 mm to prevent turbulence noise generated by these irregularities.

If the requirements for a standard hard floor are not met, two plates made of marble or similar natural stone with a polished surface shall be used. The size of the plates shall be at least 0,5 m × 1,0 m; thickness shall be at least 0,02 m. Care is to be taken to prevent additional noise production between the plates and between plates and the floor.

To avoid additional noise production, a resilient underlay with a thickness of 25 mm, mechanical loss factor 0,25 and a dynamic E-modulus less than 0,2 N/mm^2 shall be used. The foam Getzner Sylomer®[1] SR11 fulfils these requirements.

The vertical projection of the shape of the appliance under test and its cleaning head, shall be at the centre of the test area (see Figure 101 and Figure 102).

If the cleaning head is connected by a hose and connecting tube(s) to the appliance, the cleaning head is placed close to the appliance on the carpet so that the projection of the axis of longitudinal travelling of the cleaning head and that of the longitudinal axis of the appliance are parallel, the projections of the appropriate transverse axis coincide and the clearance between the projection of the appliance and the projection of the cleaning head is (2 ± 1) cm.

In the case of a hard floor measurement, the placement of cleaning head, connecting hose, tubes and appliance is done as if it were placed on a 1 m × 1 m carpet, to ensure a sufficiently compact placement of the various elements. The hose and connecting tube(s) or the handles of hand-supported and upright vacuum cleaners are resiliently suspended or supported in

[1] Getzner Sylomer® SR11 is the trade name of a product supplied by company Getzner. SR11 might be commercially available by other suppliers after the date of publication of this document. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product named. Equivalent products may be used if they can be shown to lead to the same result.

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normal position of use (middle of the handles at (800 ± 50) mm above the floor, if possible), the cleaning head being in full contact with the floor.

If necessary, the cleaning head is resiliently fastened to prevent self-propulsion.

Vacuum cleaners with active nozzles shall be tested on glued carpet to avoid noise from carpet vibration. It shall be glued with commercial carpet glue in the entire surface of 1 m × 1 m directly on the laboratory floor or on a laminated plywood panel with a thickness of 18 mm ± 2 mm and a density of 675 kg/m^3 ± 75 kg/m^3.

Gluing shall not be used for testing vacuum cleaners with passive nozzles.

The test floor is considered to be a part of the appliance to be tested and its possible influence on the acoustical characteristics of the test environment, for example of the hard reflecting plane, or on the absorption (reverberation time) of the reverberant test room or hard-walled room should not be taken into account.

6.5.2 to **6.5.5** *Not applicable*.

7 Measurement of sound pressure levels

This clause of Part 1 is applicable except as follows:

7.1.1 to **7.1.3** *Not applicable.*

7.1.5 and **7.1.6** *Not applicable.*

7.4 Measurements

7.4.1 *Addition:*

The A-weighted sound pressure level shall be time-averaged during at least 30 s.

8 Calculation of sound pressure and sound power levels

This clause of Part 1 is applicable.

9 Information to be recorded

This clause of Part 1 is applicable except as follows:

9.12.5 *Not applicable.*

10 Information to be reported

This clause of Part 1 is applicable except as follows:

10.3.1 *Addition:*

The state of openings for reduction of suction power shall be reported.

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10.3.9 *Addition:*

The version of the carpet, carpet batch and panel are to be recorded. This shall include a reference to IEC TS 62885-1, which describes the carpet used.

10.4.10 *Not applicable.*

10.4.12 *Addition:*

– L_{WA} values for both hard floor and carpet shall be reported for appliances designed for both floor types.
– L_{WA} value for a single floor type shall be reported if the appliance is specifically designed for that floor type, meaning that the manufacturer discourages the use of the device on the alternative floor type.
– In all cases, the type of floor and the measured value shall be clearly coupled.

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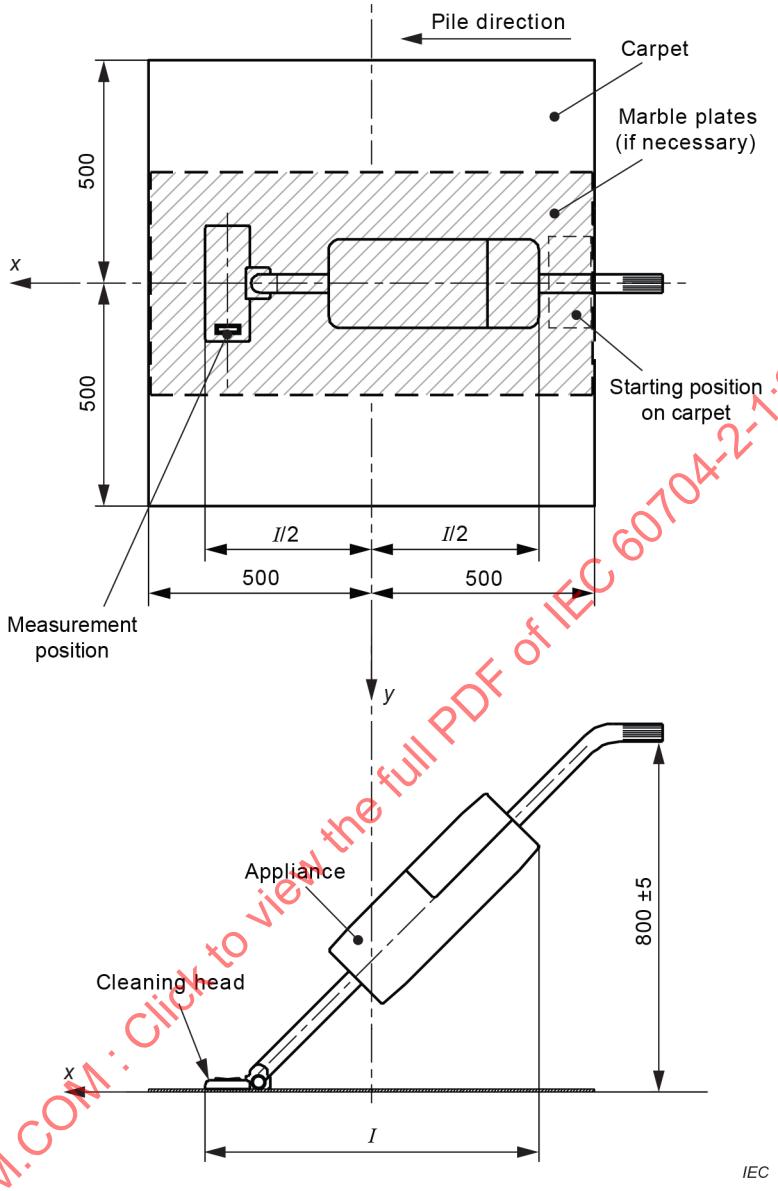
Additional figures:

Dimensions in millimetres



Key

l length of the horizontal projection of the appliance

Figure 101 – Appliance with cleaning head connected directly

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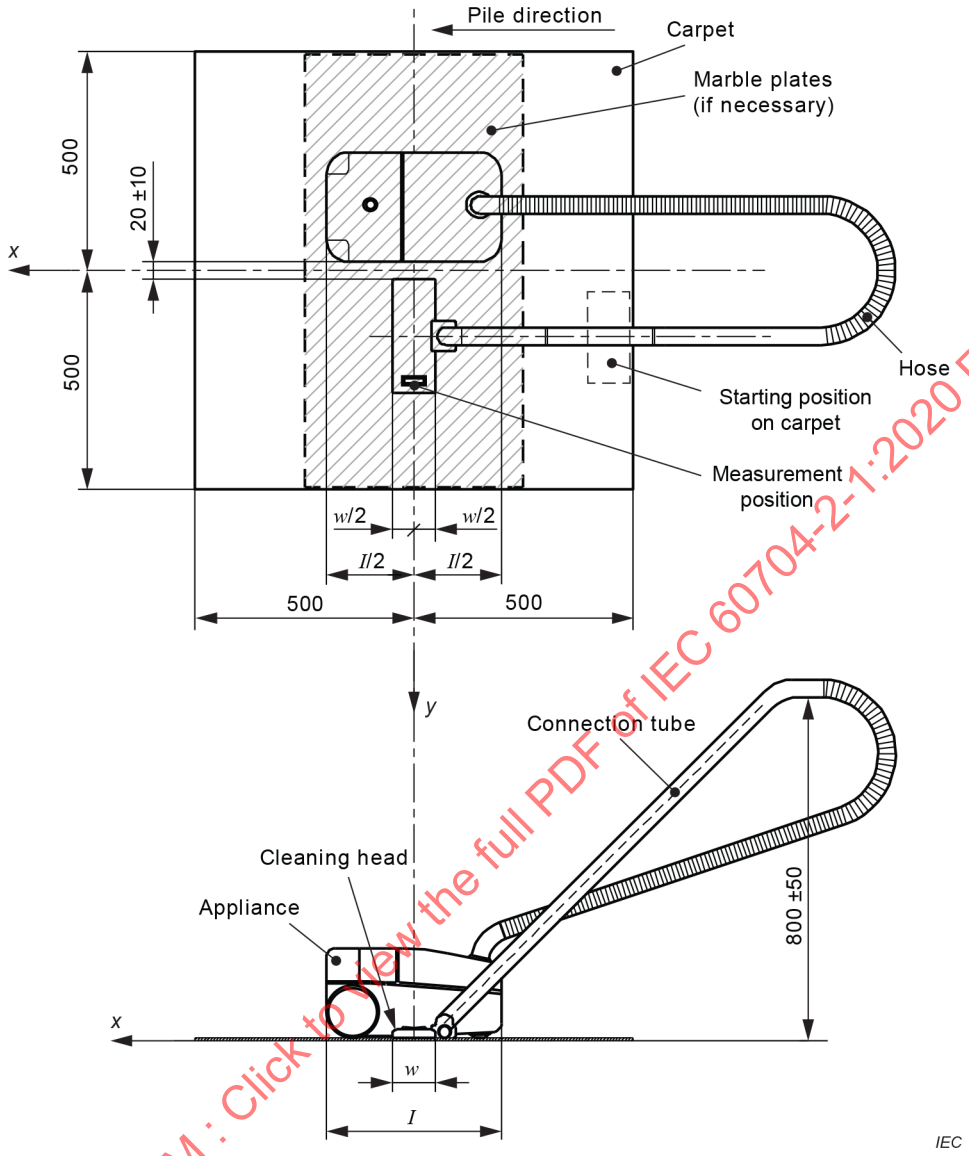
Dimensions in millimetres



Key

l length of the appliance

w depth of the cleaning head

Figure 102 – Appliance with the cleaning head connected by hose and connecting tube

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Annexes

The annexes of Part 1 apply with the following exception:

Annex A
(normative)

Standard test table

This annex of Part 1 is not applicable.

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Bibliography

Addition:

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

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – CODE D'ESSAI POUR LA DÉTERMINATION DU BRUIT AÉRIEN –

Partie 2-1: Exigences particulières pour les aspirateurs à sec

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La Norme internationale IEC 60704-2-1 a été établie par le sous-comité 59F: Appareils de nettoyage des sols, du comité d'études 59 de l'IEC: Aptitude à la fonction des appareils électrodomestiques et analogues.

Cette quatrième édition annule et remplace la troisième édition parue en 2014. Cette édition constitue une révision technique.

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Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) le domaine d'application des produits a été étendu aux aspirateurs sans cordon et appareils analogues;

b) les définitions des termes "tête de nettoyage", "suceur actif" et "tapis d'essai normalisé Wilton" ont été ajoutées;

c) la spécification du tapis d'essai normalisé Wilton a été supprimée; il est fait référence à l'IEC TS 62885-1;

d) des exigences spécifiques pour l'équipement et le conditionnement préalable ont été ajoutées;

e) le sujet du vieillissement du tapis d'essai est traité.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
59F/399/FDIS	59F/408/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

La présente Partie 2-1 est destinée à être utilisée conjointement avec l'IEC 60704-1:2010, *Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien – Partie 1: Règles générales.*

NOTE L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60704-1:2010.

Le texte correspondant de la Partie 1 modifié par le présent document établit le code d'essai pour les aspirateurs.

La présente Partie 2-1 complète ou modifie les articles correspondants de l'IEC 60704-1:2010. Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2-1, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme spécifie "addition", "modification" ou "remplacement", il convient d'adapter les exigences, spécifications d'essai ou explications correspondantes de la Partie 1 en conséquence.

Les paragraphes, tableaux et figures qui sont ajoutés à ceux de la Partie1 sont numérotés à partir de 101. Les annexes qui sont ajoutées sont désignées AA, BB, etc.

A l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés.

Une liste de toutes les parties de la série IEC 60704, publiées sous le titre général *Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien*, peut être consultée sur le site web de l'IEC.

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INTRODUCTION

Les conditions de mesure spécifiées dans la présente partie de l'IEC 60704 sont prévues pour assurer une précision suffisante pour la détermination du bruit émis et la comparaison des résultats de mesures obtenus par différents laboratoires tout en simulant, dans la mesure du possible, l'utilisation pratique des aspirateurs.

Il est recommandé de prendre en compte la détermination des niveaux de bruit comme faisant partie d'une procédure d'essai complète qui couvre de nombreux aspects des caractéristiques et des performances des aspirateurs à usage domestique.

NOTE Comme indiqué dans l'introduction de l'IEC 60704-1, le présent code d'essai concerne uniquement le bruit aérien.

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – CODE D'ESSAI POUR LA DÉTERMINATION DU BRUIT AÉRIEN –

Partie 2-1: Exigences particulières pour les aspirateurs à sec

1 Domaine d'application et objet

L'article de la Partie 1 s'applique avec les exceptions suivantes:

1.1 Domaine d'application

1.1.1 Généralités

Remplacement:

La présente partie de l'IEC 60704 s'applique pour la détermination du bruit aérien des aspirateurs à sec qui fonctionnent sur secteur et des aspirateurs à sec sans cordon destinés à un usage domestique ou dans des conditions analogues à celles des foyers domestiques.

La présente partie de l'IEC 60704 ne s'applique pas aux aspirateurs destinés à des usages industriels ou professionnels.

NOTE Les exigences particulières pour les robots de nettoyage à sec sont spécifiées dans l'IEC 60704-2-17.

1.1.2 Types de bruit

Remplacement:

Les méthodes spécifiées dans l'ISO 3743-1, l'ISO 3743-2 et l'ISO 3744 peuvent être utilisées pour mesurer le bruit émis par les aspirateurs électriques.

1.1.3 Dimensions de la source

Remplacement:

La méthode spécifiée dans l'ISO 3744 est applicable aux sources de bruit de toutes dimensions. Lorsque l'ISO 3743-1 et l'ISO 3743-2 s'appliquent, il convient que les dimensions maximales de l'appareil en essai respectent les exigences spécifiées en 1.2 de l'ISO 3743-1:2010 et en 1.3 de l'ISO 3743-2:1994.

1.2 Objet

Addition:

La présente partie de l'IEC 60704 décrit la méthode utilisée pour déterminer le bruit émis par un aspirateur qui fonctionne dans les conditions normales d'utilisation sur un tapis et sur un sol dur conformément au 4.6 de l'IEC 62885-2.

NOTE 101 Pour la détermination et la vérification des valeurs déclarées d'émission sonore dans les spécifications du produit, voir l'IEC 60704-3.

1.3 Incertitude de mesure

Remplacement:

Pour les aspirateurs conçus pour le nettoyage des tapis, les valeurs estimées des écarts-types des niveaux de puissance acoustique, déterminées selon la présente partie de l'IEC 60704, sont présentées dans le Tableau 101.

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Tableau 101 – Ecarts-types des niveaux de puissance acoustique déterminés sur les tapis

Ecart-type (dB)	
σ_r (répétabilité)	σ_R (reproductibilité)
0,3	0,8

Pour les aspirateurs conçus pour le nettoyage des sols durs, les valeurs estimées des écarts-types des niveaux de puissance acoustique, déterminées selon la présente partie de l'IEC 60704, sont présentées dans le Tableau 102.

Tableau 102 – Ecarts-types des niveaux de puissance acoustique déterminés sur les sols durs

Ecart-type (dB)	
σ_r (répétabilité)	σ_R (reproductibilité)
0,2	0,6

NOTE 101 Les valeurs du Tableau 101 et du Tableau 102 sont issues des résultats d'essais interlaboratoires réalisés en 2010/2011 à l'aide de 4 aspirateurs différents (passifs et actifs) dans 8 laboratoires participants.

Addition:

1.101 Ecart-type pour la déclaration et la vérification

Dans le but de déterminer et de vérifier les valeurs déclarées d'émission sonore pour les aspirateurs conçus pour le nettoyage des tapis, conformément à l'IEC 60704-3, les valeurs suivantes présentées dans le Tableau 103 s'appliquent:

Tableau 103 – Ecarts-types pour la déclaration et la vérification dans le cas des aspirateurs pour les tapis

Ecart-type (dB)		
σ_P (production)	σ_t (total)	σ_M (référence)
0,5 à 1,0	0,9 à 1,3	1,5

Dans le but de déterminer et de vérifier les valeurs déclarées d'émission sonore pour les aspirateurs conçus pour le nettoyage des sols durs, conformément à l'IEC 60704-3, les valeurs suivantes présentées dans le Tableau 104 s'appliquent:

Tableau 104 – Ecarts-types pour la déclaration et la vérification dans le cas des aspirateurs pour les sols durs

Ecart-type (dB)		
σ_P (production)	σ_t (total)	σ_M (référence)
0,5 à 1,0	0,8 à 1,2	1,5

2 Références normatives

L'Article de la Partie 1 s'applique avec l'exception suivante:

Addition:

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