

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Surface cleaning appliances –
Part 7: Dry-cleaning robots for household or similar use – Methods for
measuring the performance

Appareils de nettoyage des sols –
Partie 7: Robots de nettoyage à sec à usage domestique ou analogue –
Méthodes de mesure de l'aptitude à la fonction



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SURFACE CLEANING APPLIANCES –

Part 7: Dry-cleaning robots for household or similar use – Methods for measuring the performance

FOREWORD

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International Standard IEC/ASTM 62285-7 has been prepared by subcommittee 59F: Surface cleaning appliances, of IEC technical committee 59: Performance of household and similar electrical appliances, in co-operation with ASTM Committee F11: Vacuum cleaners, under the IEC/ASTM Dual Logo Agreement.

It is published as a dual logo standard.

This first edition of IEC/ASTM 62885-7 cancels and replaces IEC 62929:2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62929:2014:

- a) the box test has been cancelled;
- b) the set of straight-line tests have been extended to contain also tests on removal of different kinds of debris both from hard floors and carpets;
- c) the set of straight-line tests also contains a test on the removal of fibres from carpets;

- d) as a miscellaneous test, a method for the determination of energy consumption has been added;
- e) a separate clause on test material and equipment has been added.

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

FDIS	Report on voting
59F/393/FDIS	59F/401/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.

In this standard, the following print types are used:

- terms defined in Clause 3: **bold type**.

A list of all parts in the IEC 62885 series, published under the general title *Surface cleaning appliances*, 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

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- amended.

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INTRODUCTION

In addition to the performance measurement methods that are included in this International Standard, a few more performance items have been reviewed and considered. The list of the performance items that have been discussed over time but have not yet been included comprises corner/edge dust pick-up, docking, fall-off prevention, and dust re-emissions.

The performance items that have been left out in this edition will be continuously reviewed and will soon be included in future editions of this document.

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SURFACE CLEANING APPLIANCES –

Part 7: Dry-cleaning robots for household or similar use – Methods for measuring the performance

1 Scope

This part of IEC 62885 is applicable to **dry-cleaning robots** for household use or under conditions similar to those in households.

The purpose of this document is to specify the essential performance characteristics of **dry-cleaning robots** that are of interest to users and to describe methods for measuring these characteristics.

This document is neither concerned with safety requirements nor with performance requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 62301, *Household electrical appliances – Measurement of standby power*

[IEC/ASTM 62885-7:2020](http://standards.iteh.ai/catalog/standards/sist/62885-7-2020/iec-astm-62885-7-2020)

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

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IEC 62885-2:2016, *Surface cleaning appliances – Part 2: Dry vacuum cleaners for household or similar use – Methods for measuring the performance*

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

IEC 60704-2-17, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-17: Particular requirements for dry cleaning robots*

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

ISO 2813, *Paints and varnishes – Determination of gloss value at 20 degrees, 60 degrees and 85 degrees*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62885-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

cleaning robot

automatic battery-powered cleaner

automatic floor cleaner that operates autonomously without human intervention within a defined perimeter

Note 1 to entry: The **cleaning robot** consists of a mobile part and may have a **docking station** and/or other accessories to assist its operation.

3.2

dry cleaning robot

cleaning robot that is intended to remove only non-liquid material from the floor by means other than with the aid of solutions or liquids

Note 1 to entry: Typical means of cleaning include vacuum, brush(es), pad(s) and duster.

3.3

robot cleaning head

cleaning head

air intake nozzle at the bottom of the **cleaning robot**

Note 1 to entry: This does not include **side brush(es)**.

3.4

width of robot cleaning head

W

width of the air intake nozzle in the direction of forward travel

3.5

docking station

base unit

unit that can provide manual or automatic battery charging facilities, dust removal from the robot, data processing facility or other robot support functions

Note 1 to entry: For some robots, the docking station could come in the form of an external power supply.

3.6

pose tracking system

PTS

measurement system which enables the tracking of the **cleaning robot's** position and orientation

3.7

dust receptacle

container inside of the **cleaning robot** used to hold the collected dust

3.8

test instance

entirety or superset of all trials of all samples to be measured for a single **cleaning robot** model

3.9

trial

single instance of a performance measurement carried out under identical conditions that can be repeated multiple times

3.10

run

subset of a **trial** where one or more factors affecting the test results is (are) changed

3.11

pass

single traverse of the **cleaning head** over the **test area**

Note 1 to entry: The number of **passes** refers to the number of times the same **test area** has been traversed by the **cleaning head**.

3.12

test area

area where the test dust, or debris, or fibre is distributed for the cleaning performance test

3.13

Wilton carpet

carpet as defined in IEC TS 62885-1

3.14

fully charged

point during charging when, according to the manufacturer's instructions, by indicator or time period, the product does not need to be charged anymore

3.15

fully discharged

point in use when the manufacturer's instructions state the product is fully discharged or the robot cannot restart the operation

3.16

side brush

rotating peripheral brush whose main function is to relocate the dust and debris along the floor and extend the cleaning reach beyond the **width of robot cleaning head**

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4 General conditions for testing

4.1 General

During the tests, any external interference that affects the functions of the **cleaning robot** (e.g. sensors, processors and actuators) shall be minimized.

4.2 Atmospheric conditions

The test procedures and measurements shall be carried out under the following atmospheric conditions (in accordance with ISO 554).

Cleaning performance test:

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

All other tests:

Temperature:	(23 ± 5) °C
Relative humidity:	(45 ± 15) %
Air pressure:	86 kPa to 106 kPa

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

4.3 Lighting conditions

Unless otherwise specified, the test procedures and measurements shall be carried out under the following lighting conditions.

Intensity: (200 ± 50) lx
Colour temperature: 2 000 K to 7 000 K

Measurements shall be made at floor level.

NOTE Lighting conditions for autonomous navigation/coverage test (Clause 7) are different from the general lighting conditions, which are defined in 9.3.3.

4.4 Test equipment and materials

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

Unless otherwise specified, 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 16 h at standard atmospheric conditions in accordance with the type of test (see 4.2).

Carpets that have already been used shall be stored beaten at standard atmospheric conditions in accordance with 4.2.

When not in use, carpets shall be hanging free, or lying flat, pile upwards and uncovered. Carpets shall not be rolled when stored between testing. Carpets that have been rolled shall be laid flat for a minimum of 16 h before use.

4.5 Number of samples

All measurements of performance shall be carried out on the same sample(s) of the **cleaning robot** with its attachments, if any. During a set of tests, the sample robot shall not be changed.

A minimum of three samples of the same model shall be tested.

If possible, the software shall be updated to the latest available for the robot in the region of purchase in accordance with the manufacturer's instructions.

If available, the manufacture date, the serial number, and the software version of the samples shall be reported.

4.6 Preparation of the battery

Any unused Li-ion battery shall be fully charged and fully discharged once prior to conducting the first test on a **cleaning robot**. Any unused other type of battery shall be fully charged and fully discharged three times prior to conducting the first test on a **cleaning robot**.

Full discharge shall be done by carrying out one or more normal cleaning operation(s) in a clean area following the manufacturer's instructions until the robot ceases to function. Remove the charge station once it is in operation to ensure full discharge.

NOTE It is understood that some robots do not allow discharge below a certain energy level for battery protection. Full discharge means either low battery signal without robot motion or robot stops operation without being able to restart.

4.7 Running-in of a new cleaning robot

Prior to the first test on a new **cleaning robot**, it shall be run in accordance with 4.6 for one battery cycle. Prior to conducting any series of tests, the age, condition, and history of the product shall be recorded.

4.8 Operation of the cleaning robot

Unless otherwise specified,

- the **cleaning robot**, its attachments, the **docking station** and any accessories shall be used and adjusted in accordance with the manufacturer's instructions before a test is carried out; and
- the operation mode of the robot can be selected and adjusted in accordance with the manufacturer's published instructions only before the test to fit the environment to be cleaned.

The mode and settings used for the test shall be recorded and reported.

Any safety-related device shall be able to operate.

4.9 Measurement of collected dust weight

Some reusable receptacles consist of a rigid container and an integral filter. In this case, the container and the filter are considered to be the receptacle and should be treated as if they were a single component.

The dust receptacle and removable filtration units shall be carefully removed from the robot and weighed together.

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For **cleaning robots** equipped with separation devices, being part of the appliance, used to separate the dust from the air flow and/or having additional filters to be changed or cleaned by the user, without the use of tools, the weight of such specific devices shall be taken into account for dust removal ability.

Cleaning robots with disposable or reusable **dust receptacles** may have secondary filtration stage devices, which do not collect meaningful dust in removal ability tests, but which do impact on filtration and life tests. Replacement and/or maintenance of such devices shall be in accordance with relevant clauses and carried out in accordance with the manufacturer's instructions.

4.10 Measurement resolution and accuracy

Unless specified in the test methods, the resolution and the accuracy of the measurement device shall be as follows.

Weight measurement:

Fibre measurement:

Resolution $\leq 0,001$ g

Accuracy $\leq 0,005$ g

All other measurement:

Resolution $\leq 0,01$ g

Accuracy $\leq 0,02$ g