

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**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 IEC, Geneva, Switzerland

Copyright © 2022 ASTM International

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing being secured. Requests for permission to reproduce should be addressed to either IEC at the address below or IEC's member National Committee in the country of the requester or from ASTM.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

ASTM Headquarters
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
United States of America
<mailto:mkhooper@astm.org>
www.astm.org

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC/ASTM 62885-7

Edition 1.1 2022-06
CONSOLIDATED VERSION

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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 97.080

ISBN 978-2-8322-3947-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

REDLINE VERSION

VERSION REDLINE



**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**

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
INTRODUCTION to Amendment 1	8
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	9
4 General conditions for testing	11
4.1 General.....	11
4.2 Atmospheric conditions	11
4.3 Lighting conditions	12
4.4 Test equipment and materials	12
4.5 Number of samples.....	12
4.6 Preparation of the battery	12
4.7 Running-in of a new cleaning robot	13
4.8 Operation of the cleaning robot.....	13
4.9 Measurement of collected dust weight	13
4.10 Measurement resolution and accuracy	13
4.11 Tolerance of dimensions	14
5 Cleaning performance – Straight line	14
5.1 General.....	14
5.2 Preparation of test	14
5.2.1 Pre-treatment of cleaning robot	14
5.2.2 Preconditioning of test floor	15
5.2.3 Pre-treatment of test carpet	15
5.3 Test mode.....	16
5.3.1 General	16
5.3.2 Access to test mode	16
5.3.3 Test mode action	17
5.3.4 Speed verification	17
5.4 Dust removal from hard floor.....	18
5.4.1 Test bed	18
5.4.2 Preparation of test	18
5.4.3 Test method	18
5.4.4 Determination of dust removal ability	19
5.5 Dust removal from carpet.....	20
5.5.1 Test bed	20
5.5.2 Preparation of test	20
5.5.3 Test method	20
5.5.4 Determination of dust removal ability	21
5.6 Medium size debris removal from hard floor	21
5.6.1 Test bed	21
5.6.2 Preparation of test	21
5.6.3 Test method	21
5.6.4 Determination of medium size debris removal ability.....	21
5.7 Medium size debris removal from carpet.....	22
5.7.1 Test bed	22

5.7.2	Preparation of test	22
5.7.3	Test method	22
5.7.4	Determination of medium size debris removal ability	22
5.8	Large debris removal from hard floor	22
5.8.1	Test bed	22
5.8.2	Preparation of test	22
5.8.3	Test method	24
5.8.4	Determination of large debris removal ability	24
5.9	Large debris removal from carpet	24
5.9.1	Test bed	24
5.9.2	Preparation of test	24
5.9.3	Test method	25
5.9.4	Determination of large debris removal ability	25
5.10	Fibre removal from carpet	25
5.10.1	Test bed	25
5.10.2	Preparation of test	25
5.10.3	Test method	27
5.10.4	Determination of fibre removal ability	27
6	Mobility	28
6.1	General	28
6.2	Test bed	29
6.3	Preparation of test	29
6.3.1	Test conditions	29
6.3.2	Preconditioning of test floor	29
6.3.3	Pre-treatment of cleaning robot	29
6.4	Test method	29
6.4.1	General	29
6.4.2	Minimum passable gap width	30
6.4.3	Minimum passable height	31
6.4.4	Maximum passable transition height	31
6.4.5	Maximum passable threshold height	32
6.5	Determination of mobility results	33
7	Autonomous navigation/coverage test	34
7.1	General	34
7.2	Preparation of test	34
7.2.1	Test bed	34
7.2.2	Test conditions	34
7.3	Test method	34
7.4	Performance measurement	36
8	Miscellaneous	38
8.1	Energy consumption of a cleaning robot	38
8.1.1	General	38
8.1.2	Test conditions	38
8.1.3	Test method	39
8.2	Airborne acoustical noise	41
8.3	Straight-line cleaning speed	41
8.3.1	General	41
8.3.2	Preparation	41
8.3.3	Test method	41

8.3.4	Determination of straight-line cleaning speed	42
9	Test material and equipment	44
9.1	Straight-line test bed.....	44
9.1.1	Hard floor	44
9.1.2	Carpet	44
9.2	Mobility test bed.....	46
9.2.1	Basic test bed configuration.....	46
9.2.2	Minimum passable gap width – additional equipment.....	46
9.2.3	Minimum passable height – additional equipment	47
9.2.4	Maximum passable transition height – additional equipment	48
9.2.5	Maximum passable threshold height – additional equipment	49
9.3	Coverage test bed.....	50
9.3.1	Floor configuration.....	50
9.3.2	Wall and ceiling configuration	56
9.3.3	General conditions.....	63
10	Instructions for use	64
Annex A (informative)	Calculation of coverage	65
A.1	Definitions.....	65
A.2	Calculating orifice pass coverage.....	65
Annex B (informative)	Comprehensive cleaning performance metric	67
Annex C (informative/normative)	Detailed images of fibre removal ability.....	68
Annex D (informative)	Information on materials.....	73
Bibliography	74
Figure 1	– Test mode action	17
Figure 2	– Dust distribution devices	18
Figure 3	– Large debris template	23
Figure 4	– Large debris template hole alignment.....	24
Figure 5	– Straight-line fibre removal from carpet test bed configuration	25
Figure 6	– Exemplary picture of fibre distribution	26
Figure 7	– Exemplary picture of judgement area	27
Figure 8	– Starting positions and orientations	30
Figure 9	– Minimum passable gap width test.....	30
Figure 10	– Suggested process to determine the minimum passable gap width.....	31
Figure 11	– Minimum passable height test	31
Figure 12	– Maximum passable transition height test.....	32
Figure 13	– Process to determine the maximum passable transition height	32
Figure 14	– Maximum passable threshold height test.....	33
Figure 15	– Starting positions for navigation test.....	36
Figure 16	– Exemplary graph of coverage test result.....	38
Figure 17	– Straight-line speed measurement areas	43
Figure 18	– Straight-line hard floor test bed configuration	44
Figure 19	– Straight-line carpet test bed configuration	45
Figure 20	– Basic test bed configuration for mobility testing.....	46
Figure 21	– Test bed with an additional adjustable wall.....	47

Figure 22 – Part 1 and part 2 of the wall 47

Figure 23 – Test bed with an additional tunnel 48

Figure 24 – Test bed with additional transition and its sectional view 49

Figure 25 – Test bed with additional threshold 49

Figure 26 – Drawings of cylindrical and rectangular thresholds 50

Figure 27 – Navigation/coverage test bed configuration 51

Figure 28 – Details of obstacles around table 52

Figure 29 – Illustration of metal transition installation 54

Figure 30 – Illustration of wood transition installation 54

Figure 31 – Detail view of checkerboard and transitions 55

Figure 32 – Configuration of four walls and ceiling 56

Figure 33 – Illustration of four-panel door 60

Figure 34 – Illustration of window 60

Figure 35 – Illustration of skirting board 61

Figure 36 – Illustration of pendant light 61

Figure 37 – Illustration of clock 62

Figure 38 – Illustration of mirror 62

Figure 39 – Illustration of picture 63

Figure 40 – Illustration of curtains 63

Figure A.1 – Robot coordinate frame 65

Figure A.2 – Coverage step 66

Figure C.1 – Detailed images for rating 1 68

Figure C.2 – Detailed images for rating 2 69

Figure C.3 – Detailed images for rating 3 70

Figure C.4 – Detailed images for rating 4 71

Figure C.5 – Detailed images for rating 5 72

Table 1 – Tolerance of dimensions 14

Table 2 – Medium size debris 21

Table 3 – Large Debris 23

Table 4 – Rating system with exemplary pictures 28

Table 5 – List of described mobility tests 29

Table 6 – Reported results for each mobility test 33

Table 7 – Overview of duration and the values that should be reported 40

Table 8 – Dimensions of furniture and obstacles 52

Table 9 – Wall and ceiling furniture 57

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SURFACE CLEANING APPLIANCES –

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC/ASTM 62285-7 edition 1.1 contains the first edition (2020-10) [documents 59F/393/FDIS and 59F/401/RVD] and its amendment 1 (2022-06) [documents 59F/424/CDV and 59F/432A/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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 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.

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 the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under 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.

<p>IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.</p>

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.

INTRODUCTION to Amendment 1

The following changes to IEC 62885-7:2020 concern Clause 1, and Subclauses 8.3.2.1 and 9.1.2.

The reason for this is to clarify the area of application of this standard and to align the specification on carpets with IEC 62885-2. A new annex on test materials is added as Annex D.

IEC/ASTM documents is a preview generated by EVS

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.

Due to the nature of the way this product operates in the home, comparisons with other types of surface cleaning appliances (e.g. dry vacuum cleaners) should not be made unless otherwise indicated. The cleaning performance methods, in particular, are only used to make comparisons with other **dry cleaning robots** and not with manually operated vacuum cleaner products.

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

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.