BS EN 60312-1:2013
Incorporating corrigendum April 2015

BSI Standards Publication

Vacuum cleaners for household use

Part 1: Dry vacuum cleaners — Methods for measuring the performance

National foreword

This British Standard is the UK implementation of EN 60312-1:2013. It is derived from IEC 60312-1:2010, incorporating amendment 1:2011. Together with BS EN 62885-3 it supersedes BS EN 60312:2008, which will be withdrawn upon publication of BS EN 62885-3.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by [C〉 〈C].

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by [A1〉 〈A1].

BSI, as a member of CENELEC, is obliged to publish BS EN 60312-1 as a British Standard. However, attention is drawn to the fact that the UK committee voted against its approval as a European standard.

The principal reason is that parts of EN 60312-1:2013 are not using the same formulae or the same methods given in the draft European Commission Communication on the Measurement Methods to be used for Vacuum Cleaner Energy Label and Ecodesign. The UK committee requested that modifications to Clauses 5.2.3 and 5.3.4 bring EN 60312-1 into alignment with the European Commission's Annex on measurement and calculation methods, set out in draft Ecodesign and Energy labelling Regulations, which addresses full head width for pick up testing and the calculations for energy efficiency. This concern is only relevant to the CENELEC implementation of IEC 60312-1.

The UK committee also advises users that Clause 4.Z1, regarding a reference vacuum cleaner system, including its calibration and use, is, in the opinion of the committee, not sufficiently defined and therefore may lead to high repeatability and reproducibility variations.

The UK committee also notes that due to the modification to Clause 5.11.3, and omission of clauses 5.11.4 and 5.11.5 by CENELEC common modification, EN 60312-1 does not reflect the measurement methods agreed at IEC, creating divergence, and will reduce the reliability, accuracy and reproducibility of the Filtration Efficiency of the Vacuum Cleaner (Dust Re-emission) test method.

An issue that has not been addressed by the CENELEC implementation of IEC 60312-1 is that further development of the Wilton carpet specification is required, as at time of publication there are currently high reproducibility variations between carpet batches.

The UK participation in its preparation was entrusted by Technical Committee CPL/59, Performance of household electrical appliances, to Subcommittee CPL/59/6, Floor treatment appliances.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2013.

Amendments/corrigenda issued since publication

Date	Text affected
30 April 2015	Correction to supersession details in National Foreword

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60312-1

May 2013

ICS 97.080

Supersedes EN 60312:2008 (partially)

English version

Vacuum cleaners for household use - Part 1: Dry vacuum cleaners - Methods for measuring the performance

(IEC 60312-1:2010, modified + A1:2011, modified)

Aspirateurs de poussière à usage domestique -
Partie 1: Aspirateurs a sec -
Méthodes de mesure de l'aptitude à la fonction
(CEI 60312-1:2010, modifiée + A1:2011, modifiée)

Staubsauger für den Hausgebrauch -
Teil 1: Trockensauger -
Prüfverfahren zur Bestimmung der Gebrauchseigenschaften
(IEC 60312-1:2010, modifiziert + A1:2011, modifiziert)

This European Standard was approved by CENELEC on 2013-03-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60312-1:2013 E

Foreword

This document (EN 60312-1:2013) consists of the text of IEC 60312-1:2010+A1:2011 prepared by SC 59F, "Surface cleaning appliances", of IEC TC 59, "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X, "Performance of household and similar electrical appliances".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-03-04
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2016-03-04

This document partly supersedes EN 60312:2008.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 60312-1:2010 are prefixed “Z”.

EN 60312 is divided into 3 parts:

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

- prEN 60312-2, *Vacuum cleaners for household use – Part 2: Wet cleaning appliances – Methods of measuring the performance*

- prEN 60312-3, *Vacuum cleaners for household use – Part 3: Cleaning robots for household use – Dry cleaning – Methods of measuring performance*

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This European Standard also specifies, as far as necessary, the test methods which shall be applied in accordance with the standardisation mandate M353 related to Council Directive 92/75 of the European Commission.

Endorsement notice

The text of the International Standard IEC 60312-1:2010+A1:2011 was approved by CENELEC as a European Standard with agreed common modifications.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

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

Publication	Year	Title	EN/HD	Year
IEC 60688	-	Electrical measuring transducers for converting A.C. and D.C. ectrical quantities to analogue or digital signals	EN 60688	-
IEC 60704-1	-	Household and similar electrical appliances - Test code for the determination of airborne noise - Part 1: General requirements	EN 60704-1	-
IEC 60704-2-1	-	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-1: Particular requirements for vacuum cleaners	EN 60704-2-1	-
ISO 554	-	Standard atmospheres for conditioning and/or testing - Specifications	-	-
ISO 679	-	Methods of testing cements - Determination of strength	-	-
ISO 1763	-	Carpets - Determination of number of tufts and/or loops per unit length and per unit area	-	-
ISO 1765	-	Machine-made textile floor coverings - Determination of thickness	-	-
ISO 1766	-	Textile floor coverings - Determination of thickness of pile above the substrate	-	-
ISO 2424	-	Textile floor coverings - Vocabulary	-	-
ISO 2439	-	Flexible cellular polymeric materials - Determination of hardness (indentation technique)	EN ISO 2439	-
ISO 3386-1	-	Polymeric materials, cellular flexible - Determination of stress-strain characteristics in compression - Part 1: Low-density materials	EN ISO 3386-1	-
ISO 5167-1	-	Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full - Part 1: General principles and requirements	EN ISO 5167-1	-
ISO 8543	-	Textile floor coverings - Methods for determination of mass	-	-
ISO 12103-1	-	Road vehicles - Test dust for filter evaluation - Part 1: Arizona test dust	-	-

Annex ZB
(normative)

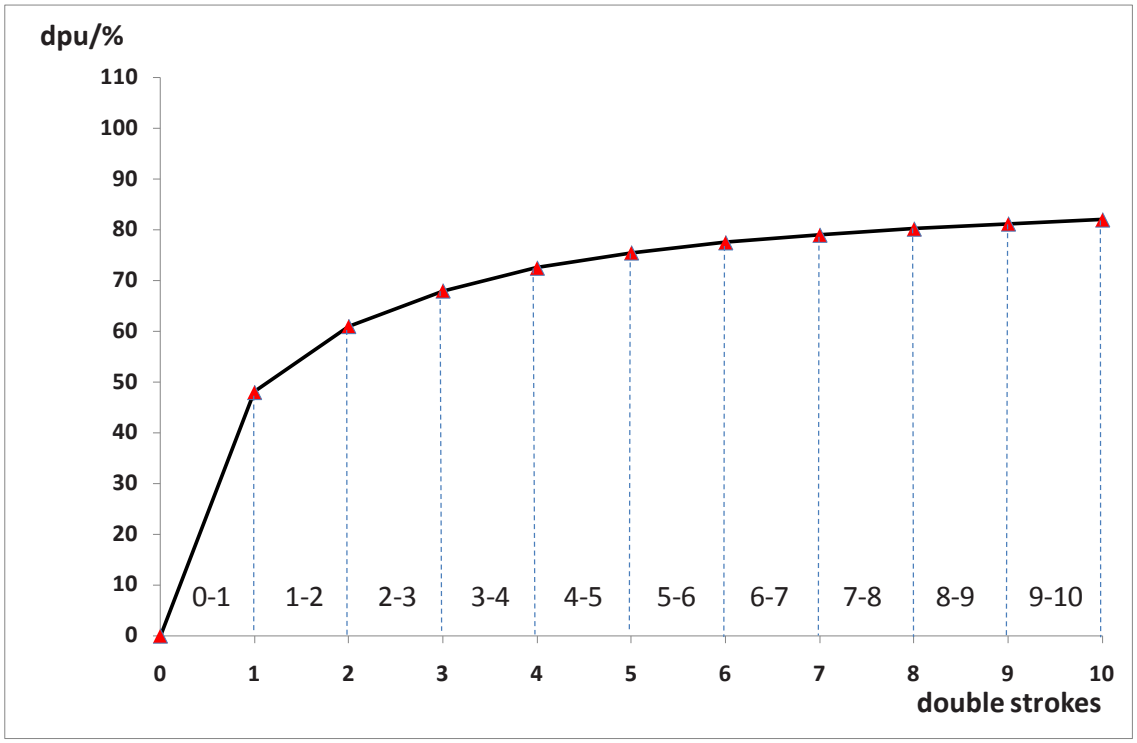
Calculation of the number of double strokes X_{calc} to reach the reference level K_{ref} for hard floor with crevice and normalised reference level K_{calc} for carpet.

All dust pick up measurements from zero to ten will be plotted on a graph and the points connected by straight lines as shown in figure below. Each section is described by a linear equation as follows:

$$dpu_{calc} = mX + k$$

where
dpu_{calc} is the calculated dust pick up by linear equation in %
m is the slope of the linear equation
k is the intersection of each section with the y-axis

double stroke	dust pick up	section	slope	intersection	argument
1	dpu_1	0-1	m_1	k_1	X_1
2	dpu_2	1-2	m_2	k_2	X_2
3	dpu_3	2-3	m_3	k_3	X_3
4	dpu_4	3-4	m_4	k_4	X_4
5	dpu_5	4-5	m_5	k_5	X_5
6	dpu_6	5-6	m_6	k_6	X_6
7	dpu_7	6-7	m_7	k_7	X_7
8	dpu_8	7-8	m_8	k_8	X_8
9	dpu_9	8-9	m_9	k_9	X_9
10	dpu_{10}	9-10	m_{10}	k_{10}	X_{10}



〈C〉 Calculation of all slopes, intersections and arguments as follow:

NOTE In case of carpet K_{ref} is to be replaced by k_{calc}

$m_1 = dpu_1$ $\quad X_1 = (K_{ref}/ m_1$ $\quad k_1 = 0$

$m_2 = dpu_2 - dpu_1$ $\quad X_2 = (K_{ref} – k_2) / m_2$ $\quad k_2 = dpu_1 – m_2$

$m_3 = dpu_3 - dpu_2$ $\quad X_3 = (K_{ref} – k_3) / m_3$ $\quad k_3 = dpu_2 – 2 \times m_3$

$m_4 = dpu_4 - dpu_3$ $\quad X_4 = (K_{ref} – k_4) / m_4$ $\quad k_4 = dpu_3 – 3 \times m_4$

$m_5 = dpu_5 - dpu_4$ $\quad X_5 = (K_{ref} – k_5) / m_5$ $\quad k_5 = dpu_4 – 4 \times m_5$

$m_6 = dpu_6 - dpu_5$ $\quad X_6 = (K_{ref} – k_6) / m_6$ $\quad k_6 = dpu_5 – 5 \times m_6$

$m_7 = dpu_7 – dpu_6$ $\quad X_7 = (K_{ref} – k_7) / m_7$ $\quad k_7 = dpu_6 – 6 \times m_7$

$m_8 = dpu_8 – dpu_7$ $\quad X_8 = (K_{ref} – k_8) / m_8$ $\quad k_8 = dpu_7 – 7 \times m_8$

$m_9 = dpu_9 – dpu_8$ $\quad X_9 = (K_{ref} – k_9) / m_9$ $\quad k_9 = dpu_8 – 8 \times m_9$

$m_{10} = dpu_{10} – dpu_9$ $\quad X_{10} = (K_{ref} – k_{10}) / m_{10}$ $\quad k_{10} = dpu_9 – 9 \times m_{10}$

The choice of the right section, where the reference level K_{ref} for hard floor with crevice and normalised reference level K_{calc} for carpet is located has to be done as follows:

when	$dpu_1 > K_{ref}$		then $X_{calc} = X_1$
when	$dpu_2 >= K_{ref}$	and $dpu_1 < K_{ref}$	then $X_{calc} = X_2$
when	$dpu_3 >= K_{ref}$	and $dpu_2 < K_{ref}$	then $X_{calc} = X_3$
when	$dpu_4 >= K_{ref}$	and $dpu_3 < K_{ref}$	then $X_{calc} = X_4$
when	$dpu_5 >= K_{ref}$	and $dpu_4 < K_{ref}$	then $X_{calc} = X_5$
when	$dpu_6 >= K_{ref}$	and $dpu_5 < K_{ref}$	then $X_{calc} = X_6$
when	$dpu_7 >= K_{ref}$	and $dpu_6 < K_{ref}$	then $X_{calc} = X_7$
when	$dpu_8 >= K_{ref}$	and $dpu_7 < K_{ref}$	then $X_{calc} = X_8$
when	$dpu_9 >= K_{ref}$	and $dpu_8 < K_{ref}$	then $X_{calc} = X_9$
when	$dpu_{10} >= K_{ref}$	and $dpu_9 < K_{ref}$	then $X_{calc} = X_{10}$
when	$dpu_{10} <= K_{ref}$		then $X_{calc} = X_{10}$" 〈C〉

CONTENTS

INTRODUCTION
(to amendment 1)

The following changes to IEC 60312-1 concern Subclauses 5.5 and 5.9 and the related specifications in Subclauses 7.2.2 and 7.2.6.

The reason for this is due to the tightening of the specification to the cotton linters used in the test dust. In order to reproduce the airflow restricting conditions expected during the development of this test it is necessary to use more test dust when Condition 3 is used as a stopping point. Further, it provides a specification for the cellulose dust.

In addition to this an updated specification of the cushion slip material is available.

VACUUM CLEANERS FOR HOUSEHOLD USE –

Part 1: Dry vacuum cleaners – Methods for measuring the performance

1 Scope

This International Standard is applicable for measurements of the performance of dry vacuum cleaners for household use in or under conditions similar to those in households.

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

NOTE 1 Due to influence of environmental conditions, variations in time, origin of test materials and proficiency of the operator, most of the described test methods will give more reliable results when applied for comparative testing of a number of appliances at the same time, in the same laboratory and by the same operator.

NOTE 2 This standard is not intended for battery-operated vacuum cleaners.

For safety requirements, reference is made to IEC 60335-1 and IEC 60335-2-2.

2 Normative references

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

IEC 60688, *Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals*

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

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

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

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