

Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances —

Part 2: Particular requirements —

Section 2.1 Vacuum cleaners

The European Standard EN 60704-2-1:1994 has the status of a
British Standard

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee LEL/59, Performance of household electrical appliances, upon which the following bodies were represented:

Association of Manufacturers of Domestic Electrical Appliances
 Consumer Policy Committee of BSI
 Consumers' Association
 Department of the Environment (Energy Efficiency Office)
 Electricity Association
 Portable Electric Tool Manufacturers' Association
 Rotating Electrical Machines Association (BEAMA Ltd.)

The following body was also represented in the drafting of the standard, through subcommittees and panels:

Department of Health

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 April 1995

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The following BSI references relate to the work on this standard:
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Amendments issued since publication

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 60704-2-1	3
National annex NA (informative) Original IEC text amended by CENELEC common modifications	8
List of references	Inside back cover

National foreword

This British Standard has been prepared by Technical Committee LEL/59 and is the English language version of EN 60704-2-1:1994 *Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances — Part 2: Particular requirements for vacuum cleaners*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is related to IEC 704-2-1:1984 published by the International Electrotechnical Commission (IEC) with the common modifications accepted as A1:1989 to HD 423.2.1. S1:1987.

This Part should be read in conjunction with BS EN 60704-1:1994. It supplements or modifies the corresponding clauses of Part 1. When a particular subclause is not mentioned in this Part 2, the subclause in Part 1 is applicable. Where this standard states “addition”, “modification” or “replacement”, the relevant requirement, test specification or explanatory matter in Part 1 should be adopted accordingly.

This standard supersedes BS 6686-2.1:1990 (implementation of CENELEC HD 423.2.1 S1) which is withdrawn.

References to IEC page numbers should be ignored.

Cross-references

Publication referred to	Corresponding British Standard
	BS 3999 <i>Methods of measuring the performance of household electrical appliances</i>
IEC 312:1981	Part 12:1982 <i>Vacuum cleaners</i>

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS EN ISO 9000.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Descriptors: Acoustic, acoustical measurement, test code, airborne noise, emission, noise of machinery, household electrical appliance, vacuum cleaner, particular requirement

English version

Test code for the determination of airborne acoustical noise
emitted by household and similar electrical appliances
Part 2: Particular requirements for vacuum cleaners

(IEC 704-2-1:1984, modified)

Code d'essai pour la détermination du bruit
aérien émis par les appareils
électrodomestiques et analogues
Deuxième partie:
Règles particulières pour les aspirateurs de
poussière
(CEI 704-2-1:1984, modifiée)

Prüfvorschrift für die Bestimmung der
Luftschallemission von elektrischen Geräten
für den Hausgebrauch und ähnliche Zwecke
Teil 2: Besondere Anforderungen an
Staubsauger
(IEC 704-2-1:1984, modifiziert)

This European Standard was approved by CENELEC on 1994-07-05. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

At the request of CENELEC Technical Committee TC 59X, Consumer information related to household electrical appliances, HD 423.2.1 S1:1987 (IEC 704-2-1:1984) and its amendment A1:1989 were submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard together with the common modifications accepted as A1:1989 to HD 423.2.1 S1:1987 was approved by CENELEC as EN 60704-2-1 on 5 July 1994.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-07-15
- latest date of withdrawal of conflicting national standards (dow) —

Annexes designated “normative” are part of the body of the standard. In this standard, Annex ZA is normative.

Endorsement notice

The text of the International Standard IEC 704-2-1:1984 was approved by CENELEC as a European Standard with agreed common modifications as given below.

Common modifications

1 Scope and object

1.1 Editorial change in the French version only.

1.2 Object:

Replace the text of the addition by:

The purpose of this standard is to define the methods to be used for measuring the level of noise of vacuum cleaners and for informing consumers of it. It does not cover the way of checking and sampling.

6 Operating and location of appliances under test

6.1.1 Editorial change in the French version only.

6.2.1 Delete the addition.

6.5.7 Editorial change in the French version only.

Contents

	Page
Foreword	2
Introduction	3
1 Scope and object	3
2 References	3
3 Terms and definitions	3
4 Measurement methods and acoustical environments	3
5 Instrumentation	4
6 Operating and location of appliances under test	4
7 Measurement of noise levels	5
8 Calculation of sound pressure and sound power levels	5
9 Information to be recorded	5
10 Information to be reported	5
Annex ZA (normative) Other international publications quoted in this standard with the references of the relevant European publications	7
Figure 101 — Appliance with cleaning head connected directly	5
Figure 102 — Appliance with cleaning head connected by a hose and an extension tube	6

Introduction

The measuring conditions specified in this standard provide for sufficient steadiness in the noise emitted and reproducibility in different laboratories, whilst simulating as far as possible the practical use of vacuum cleaners.

It is recommended to consider noise data as part of performance data.

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

Replacement:

This standard applies to dry pick-up portable electric vacuum cleaners for household and similar use, supplied from mains or from batteries.

By similar use, is understood the use in hotels, hospitals, shops, offices, etc.

This standard does not apply to:

- centrally sited vacuum cleaners,
- vacuum cleaners designed exclusively for industrial purposes,
- the wet pick-up function of multi-purpose vacuum cleaners,
- suction floor polishers.

1.2 Object

Addition:

The purpose of this standard is to define the methods to be used for measuring the level of noise of vacuum cleaners and for informing consumers of it. It does not cover the way of checking and sampling.

2 References

This clause of Part 1 is applicable except as follows:

Addition:

- IEC Publication 312: *Methods of Measurement of Performance of Vacuum Cleaners for Household and Similar Use.*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

Additional sub-clauses:

3.101 cleaning head

that part of a vacuum cleaner which is applied to the surface to be cleaned, for example a nozzle, a brush or a power nozzle

3.102 upright vacuum cleaner

a cleaner constructed primarily for carpet cleaning, normally having a nozzle which is either an integral part of the cleaner housing or permanently connected thereto, the nozzle as a rule being provided with a motor-driven rotating part to assist dirt removal. In use, the complete cleaner housing is moved over the area to be cleaned by means of an attached handle

3.103 power nozzle

an attachment for vacuum cleaners which is provided with a rotating part (brush) to assist dirt removal, driven by an incorporated separate electric motor (motorized nozzle), an incorporated turbine powered by the air stream of the cleaner (air turbine nozzle) or an incorporated friction or gear mechanism powered by moving the nozzle in use back and forth (mechanical nozzle)

3.104 standard test carpet

type and quality of the standard test carpet shall be according to the following general specifications. For acoustical reasons, the size of the carpet shall be 1 m × 1 m.

type	Wilton
weight	2.9 kg/m ²
colour	dark, one colour
backing	cotton, wool and raffia fibres, impregnated
pile material	100 % virgin wool
pile weight	1.0 kg/m ² to 1.1 kg/m ²
pile height	7 mm à 7.5 mm
pile apparent density	0.145 g/cm ³ to 0.140 g/cm ³
tufts per length	37/10 cm
tufts per width	45/10 cm

NOTE The carpet according to the specification is available from:

Statens Provningsanstalt
Box 857
S-501 15 BORÅS
Sweden

4 Measurement methods and acoustical environments

This clause of Part 1 is applicable except as follows:

4.2 Direct method

Addition:

NOTE If pure tone components are present in the noise emitted, proper precautions should be taken as specified in ISO Standard 3743 and ISO Standard 3744.

4.3 Comparison method

Addition:

NOTE If pure tone components are present in the noise emitted, proper precautions should be taken as specified in ISO Standard 3743 and ISO Standard 3744.

5 Instrumentation

This clause of Part 1 is applicable.

6 Operating 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 and the necessary attachments, for example hoses and extension tubes. 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.

The appliance is adjusted for the highest suction.

Air by-pass openings (for reduction of suction), if any, are closed.

Electrical controls, if any, are set for the highest motor speed for normal use.

If the manufacturer recommends their use, the appliance is fitted with a new disposable filter (bag) of the type specified and supplied by the manufacturer.

If a textile filter or filter bag is provided (as the sole filter, as the sole dust receptacle or as an enclosure for disposable filter bags), it shall be cleaned before measurements, for example by shaking and beating. Brushing or washing is not allowed.

NOTE If the vacuum cleaner is equipped with a device such as a high-speed switch for short-term use, additional measurements shall be made.

6.1.3 *Replacement:*

Prior to noise measurements on a particular vacuum cleaner with or without power nozzle, the vacuum cleaner and the power nozzle, if any, shall have been running with unrestricted extension tube or unrestricted nozzle or unrestricted inlet opening of upright cleaners or power nozzles for a total of 2 h to ensure adequate running-in. During this period rotating brushes or similar devices of upright cleaners or power nozzles shall be running, but not in contact with the floor.

6.2 Supply of electric energy and water or gas

6.2.3 and 6.2.4 Not applicable.

6.4 Loading and operating of appliances

6.4.2 *Replacement:*

Before commencing the measurement procedure, ensure that the cleaning head is adjusted correctly in accordance with the manufacturer's instructions or in the absence of such instructions such that the bristles of rotating brushes engage approximately 2 mm into the carpet pile.

Lift the cleaning head off the carpet, switch on the appliance, replace the cleaning head and push into the measurement position taking care that no excessive pressure is exerted. Other conditions shall be as specified in Sub-clauses 6.1.1, 6.2 and 6.3.

6.4.3 and 6.4.4 Not applicable.

6.5 Location and mounting of appliances

6.5.1 to 6.5.6 inclusive Not applicable.

6.5.7 *Replacement:*

The cleaning head is located approximately in the centre of a piece of a standard test carpet (see Sub-clause 3.104) being placed directly without any resilient means other than that of the carpet:

- either on the floor of the reverberation test room with a minimum clearance 1 m between any part of the appliance or attachments and the nearest wall,
- or on the reflecting plane of the free-field environment.

The vertical projection of the shape of the appliance under test, with accessories (Reference box), shall be within the carpet area (see Figure 101, page 5).

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

Handles of hand-supported and upright vacuum cleaners are resiliently suspended or supported in normal position of use, the cleaning head being in full contact with the carpet.

If the cleaning head is connected by a hose and extension tube(s) to the appliance, the cleaning head is placed close to the appliance on the carpet such that the projection of the axis of longitudinal travelling of the cleaning head and that of the longitudinal axis of the appliance are parallel and the projections of the appropriate transverse axes coincide and the clearance between the projection of the appliance and the projection of the cleaning head is approximately 2 cm (see Figure 102, page 6).

The hose and extension tube(s) are resiliently suspended or supported in normal position of use.

NOTE 1 Sound radiation due to possible vibrations of the piece of standard test carpet should be prevented.

NOTE 2 The piece of standard test carpet 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 of the absorption (reverberation time) of the reverberant test room should not be taken into account.

7 Measurement of noise levels

This clause of Part 1 is applicable except as follows:

7.1 Microphone array and measurement surface for free-field conditions

7.1.1 to 7.1.4 inclusive Not applicable.

7.1.5 Addition:

The reference box shall include the appliance and the cleaning head. For appliances with dimensions of the reference box exceeding 0.7 m, the clearance between the reference box and the measurement surface shall be at least 1 m.

7.1.6 to 7.1.8 inclusive Not applicable.

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.

10 Information to be reported

This clause of Part 1 is applicable except as follows:

10.3 Test conditions for the appliance

10.3.2 Addition:

If the test voltage differs from the rated voltage, this shall be reported (see Sub-clause 6.2.1).

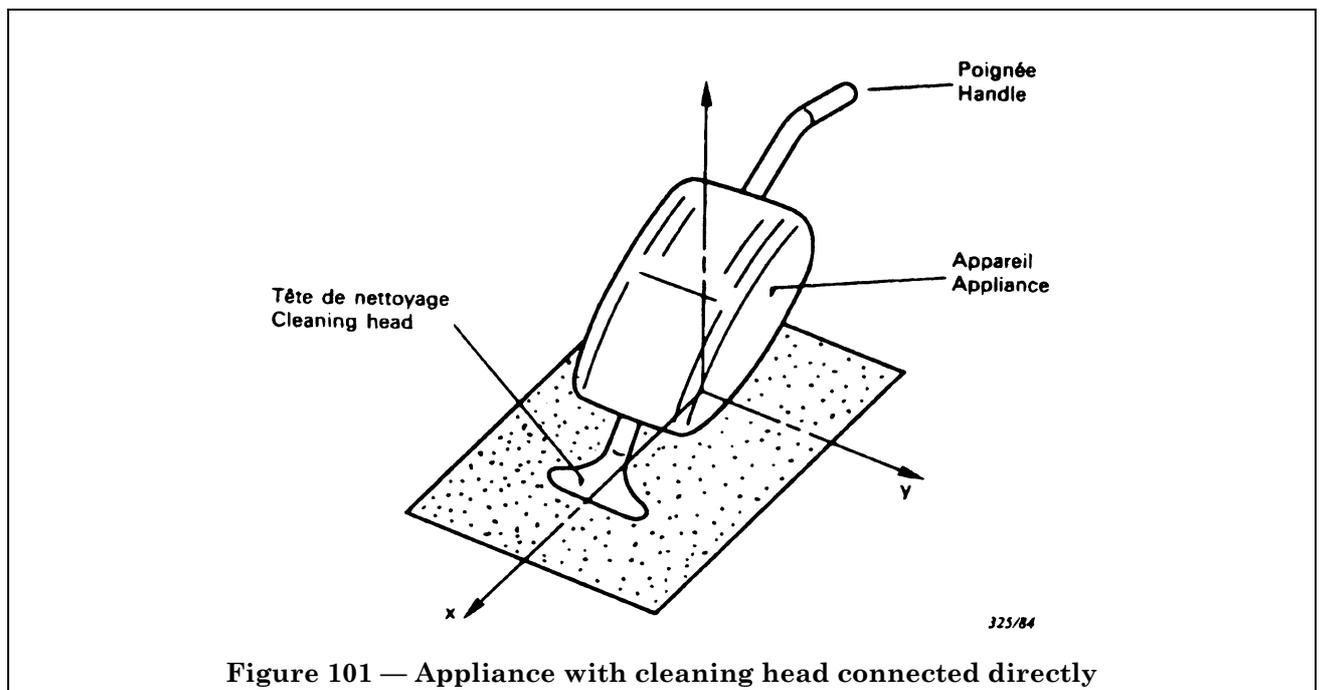


Figure 101 — Appliance with cleaning head connected directly

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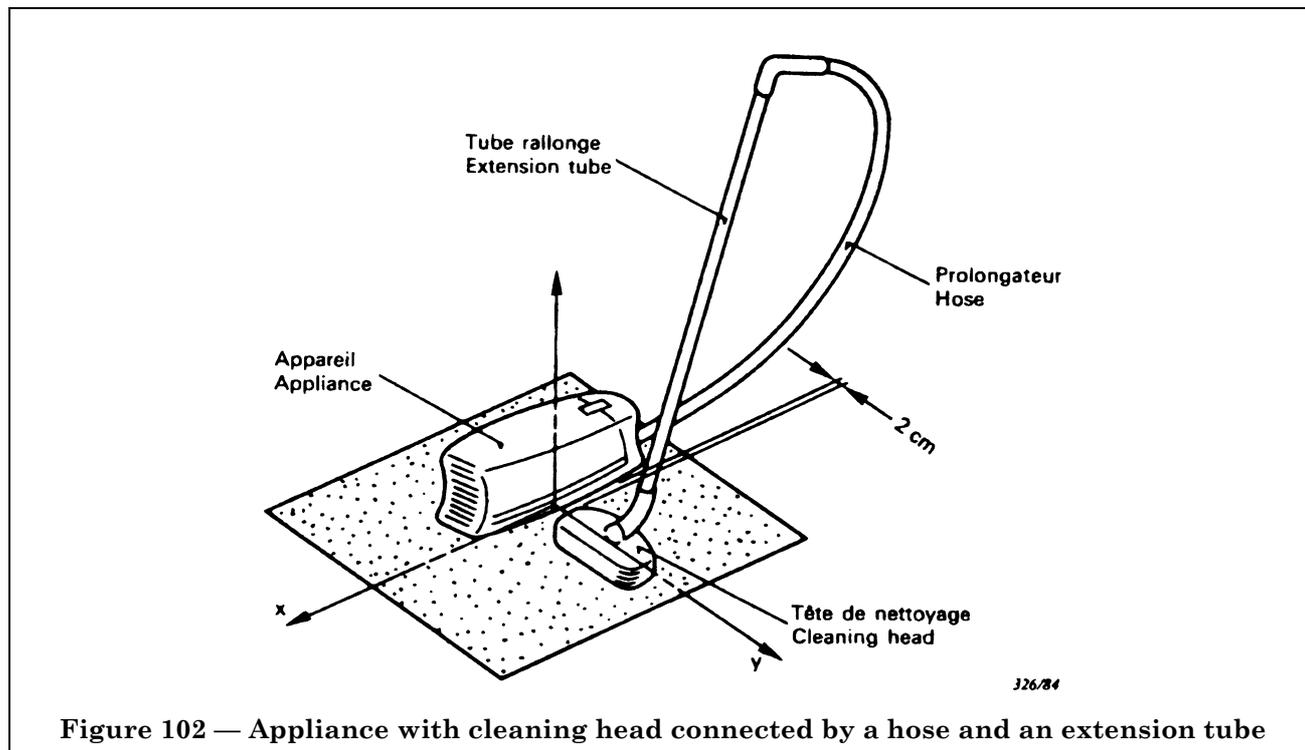


Figure 102 — Appliance with cleaning head connected by a hose and an extension tube

Annex ZA (normative)**Other international publications quoted in this standard with the references of the relevant European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

IEC publication	Date	Title	EN/HD	Date
312	1981	<i>Methods of measurement of performance of vacuum cleaners for household and similar use</i>	—	—

National annex NA (informative)

Original IEC text amended by CENELEC common modifications

1 Scope and object

In 1.2 the addition has been replaced. It reads as follows:

Requirements for the declaration of noise emission values are not within the scope of this standard.

NOTE Procedures for verifying stated noise emission values are being developed by ISO and may be considered for application to vacuum cleaners.

6 Operating and location of appliances under test

In 6.2.1 the addition has been deleted. It reads as follows:

NOTE If the rated voltage differs from the nominal system voltage of the country concerned, measurements carried out at rated voltage may be misleading. In this case, additional measurements at nominal system voltage are necessary.

List of references

See national foreword.

BSI — British Standards Institution

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