IEC 60704-2-17

Edition 1.0 2020-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien – Partie 2-17: Exigences particulières pour les robots de nettoyage à sec

IEC 60704-2-17:2020-10(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

IEC 60704-2-17

Edition 1.0 2020-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien – Partie 2-17: Exigences particulières pour les robots de nettoyage à sec

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.140.20 ISBN 978-2-8322-8479-7

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.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

Part 2-17: Particular requirements for dry-cleaning robots

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.

International Standard IEC 60704-2-17 has been prepared by subcommittee 59F: Surface cleaning appliances of IEC technical committee 59: Performance of household and similar electrical appliances.

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

FDIS	Report on voting
59F/395/FDIS	59F/400/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Part 2-17 is intended to be used in conjunction with the third edition (2010) of IEC 60704-1, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*.

The relevant text of IEC 60704-1:2010 as amended by this publication establishes the test code for dry-cleaning robots.

This Part 2-17 supplements or modifies the corresponding clauses in IEC 60704-1:2010. When a particular subclause of IEC 60704-1:2010 is not mentioned in this Part 2-17, 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 IEC 60704-1:2010 should be adapted accordingly.

Subclauses and tables that are additional to those in IEC 60704-1:2010 are numbered starting from 101.

Unless notes are in a new subclause or involve notes in IEC 60704-1:2010, they are numbered starting from 101, including those in a replaced clause or subclause.

In this document, the following print types are used:

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

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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://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.

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.

INTRODUCTION

The measuring conditions specified in this Part 2-17 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 dry-cleaning robots.

It is recommended to consider the determination of noise levels as part of a comprehensive testing procedure covering many aspects of the properties and performance of dry-cleaning robots.

NOTE As stated in the introduction to IEC 60704-1:2010, this test code is concerned with airborne noise only.

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

Part 2-17: Particular requirements for dry-cleaning robots

1 Scope and object

This clause of IEC 60704-1:2010 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

These particular requirements apply to electrical dry-cleaning robots (including their accessories and their component parts) for household use or under conditions similar to those in households. This part of IEC 60704-2 applies to electrical dry-cleaning robots operating in dry conditions only.

NOTE Some additions and modifications for dry-cleaning robots operating in wet conditions are under consideration.

This part of IEC 60704-2 does not apply to dry-cleaning robots for industrial or professional purposes.

This document does not apply to

– manually operated vacuum cleaners, and
– dry-cleaning robots for outdoor use.

1.1.2 Types of noise

Replacement:

The methods specified in ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by electric dry-cleaning robots.

1.1.3 Size of the source

Replacement:

The method specified in ISO 3744 is applicable to noise sources of any size. Limitations for the size of the source are given in Clause 5 of ISO 3743-2:2018. Although the dry-cleaning robot itself is a relatively small source, the covered floor area during the measurement comprises a much larger effective source.

1.2 Object

Addition:

This part of IEC 60704 describes the determination of the noise emission of dry-cleaning robots under normal operating conditions on carpet and hard floors.

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

1.3 Measurement uncertainty

Replacement:

The estimated values of standard deviations of sound power levels, determined in accordance with this document, are given in Table 101.

Table 101 – Standard deviations of sound power levels[1]

Standard deviation (dB)	
σ_r (repeatability)	σ_R (reproducibility)
0,4	1,2

Addition:

1.101 Standard deviation for declaration and verification

For the purpose of determining and verifying declared noise emission values in accordance with IEC 60704-3, the values are given in Table 102.

Table 102 – Standard deviations for declaration and verification[1]

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

2 Normative references

This clause of IEC 60704-1:2010 is applicable except as follows:

Addition:

IEC 60704-1:2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*

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

Replacement:

ISO 3743-2:2018, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering methods for small, movable sources in reverberant fields – Part 2: Methods for special reverberation test rooms*

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*

---

1 The values in the standard deviation tables will be further considered and improved.

3 Terms and definitions

This clause of IEC 60704-1:2010 is applicable except as follows:

Addition:

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

3.101
standard Wilton test carpet
Wilton carpet on which the robot is moving during the test

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

3.102
standard hard floor
floor of the test room on which the robot is moving during the test

3.103
fenced area
area of the floor of the test room, limited by a fence, in which the robot can move around during the test

4 Measurement methods and acoustical environments

This clause of IEC 60704-1:2010 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 can increase. In such cases, additional microphone positions or source positions can be necessary, as specified in ISO 3743-2.

4.3 Comparison method

Replacement:

The comparison method for measurement is explicitly described in ISO 3743-2.

NOTE 101 The term "comparison method" is not explicitly given in ISO 3744, but when applying the "absolute comparison test" for the determination of the environmental correction given in Clause A.3 of ISO 3744:2010, by using a reference sound source, the procedure is, in fact, a comparison method.

With this method, the sound power level is determined by comparing the averaged values (on a mean-square basis) of the sound pressure levels produced by the source in the test room to the averaged values of the sound pressure levels produced in the same room by a calibrated reference sound source (RSS) of known sound power output, complying with the requirements of ISO 6926. The difference in sound pressure levels is equal to the difference in sound power levels when conditions are the same for both sets of measurements.

This method yields results expressed in octave-band sound power levels, and the A-weighted sound power level is calculated from the octave-band sound power levels.

To check whether there is a systematic difference between results obtained in different environments, the use of the comparison method is recommended.

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 can increase. In such cases, additional microphone positions or source positions may be necessary, as specified in ISO 3743-2.

4.4 Acoustical environments

4.4.1 General requirements and criterion for adequacy of the test environment

Replacement:

They are given in Clause 4 of

– ISO 3743-2:2018 for special reverberation test rooms;
– ISO 3744:2010 for free-field conditions over reflecting plane.

NOTE 101 For free-field conditions over a reflecting plane, the absolute comparison test for the qualification of the environment, described in Clause A.3 of ISO 3744:2010, is preferred.

Guidelines for the design of simple test rooms with free field conditions are given in Annex C of IEC 60704-1:2010.

4.4.2 Criterion for background noise level

Replacement:

Requirements for the background noise level are given in Clause 4 of ISO 3743-2:2018 and ISO 3744:2010. Averaged over the microphone positions, the background noise level shall be at least 6 dB below, and preferably more than 15 dB below, the sound pressure level to be measured.

NOTE 101 If the difference between the sound pressure levels of the background noise and the appliance noise is less than 6 dB, see 8.2 of IEC 60704-1:2010.

5 Instrumentation

This clause of IEC 60704-1:2010 is applicable except as follows:

5.1 Instrumentation for measuring acoustical data

Addition:

The use of a microphone 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 IEC 60704-1:2010 is applicable except as follows:

6.1 Equipping and pre-conditioning of appliances

Replacement:

6.1.1 The robot is to be fitted for cleaning carpets or hard floors, in accordance with the manufacturer's instructions. The robot shall be free of dust or particles from previous usage to the extent that a normal end user could achieve. If the cleaning robot 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 cleaning robot. If the cleaning robot 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.

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

NOTE 101 Sounds produced from a docking device are not part of the sound measurement.

Replacement:

6.1.4 Prior to the first test, the robot shall have been in operation for at least two full charge/discharge cycles for the purpose of running in.

Before the noise test, the robot shall not have been in operation (i.e. no motors shall be running) for at least 1 h, to ensure a cool starting condition. This means that there is no stabilisation period prior to the sound measurement.

6.2 Supply of electric energy and water or gas

Replacement:

Prior to a series of measurements, the robot shall have been in its docking station for at least 24 h or until the charging is completed in accordance with the manufacturer's instructions to ensure full batteries. The docking station shall have been supplied with electrical energy during this period.

6.4 Loading and operating of appliances during tests

Replacement:

6.4.2 The loading of the robot consists of the **standard hard floor** or the **standard Wilton test carpet** bounded by a fence. This **fenced area** is where the robot will move. Before the noise test starts, the robot is placed inside the fence, at a random position leaving a gap between the robot and the fence of at least 15 cm.

For dry-cleaning robots using cameras for navigation the measurements shall be carried out under the following lighting conditions.

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

Replacement:

6.4.3

Replacement: