

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Appareils électrodomestiques et analogues – Code d’essai pour la détermination
du bruit aérien –
Partie 1: Exigences générales**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 1: General requirements

FOREWORD

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International Standard IEC 60704-1 has been prepared by IEC technical committee 59: Performance of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 1997 and constitutes an update and an editorial revision. It also includes the description of an appropriate test enclosure for appliances to be built in.

The text of this standard is based on the following documents:

FDIS	Report on voting
59/546/FDIS	59/549/RVD

Full information on the voting for the approval of this 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.

A list of all the parts in the IEC 60704 series, 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- withdrawn,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.

INTRODUCTION

Although the noise emitted by household appliances does not generally present a hazard to the hearing of the operator and other exposed persons, the need for standardization procedures for the determination of the noise emitted has been recognized for a long time. Such procedures should be specified, not only for special types of appliances, but also the principles should be applicable to the majority of appliances in general use.

Generally, the determination of noise levels is only part of a comprehensive testing procedure covering many aspects of the properties and performances of the appliance. It is therefore important that the requirements for noise measurements (such as test environment, instrumentation, and amount of labour involved) should be kept at a modest level.

The results of noise measurements will be used for many purposes, for example for noise declaration, as well as for comparing the noise emitted by a specific appliance to the noise emitted by other appliances of the same family. In other cases, the results will be taken as a basis for engineering action in the development stages of new pieces of equipment, or in deciding on means for sound insulation. For all purposes, it is important to specify procedures with known accuracy so that the results of measurements taken by different laboratories can be compared.

These conditions have, as far as possible, been taken into account in the preparation of this test code. The acoustic measuring methods are based on those described in ISO 3743-1, ISO 3743-2 and ISO 3744.

The adoption of these methods permits the use of semi-anechoic rooms, special reverberation test rooms and hard-walled test rooms. The result of the measurements is the sound power level of the appliance. Within the measuring uncertainty specific to these methods, the results from the determination under free field conditions over a reflecting plane are equal to those obtained in reverberant fields. The use of intensity methods as described in ISO 9614-1 and ISO 9614-2 is subject to a specific part 2.

It should be emphasized that this test code is concerned with airborne noise only. In some cases, structure-borne noise, for example transmitted to the adjoining room, may be of importance.

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

Part 1: General requirements

1 Scope and object

1.1 Scope

1.1.1 General

This part of IEC 60704 applies to electric appliances (including their accessories or components) for household and similar use, supplied from mains or from batteries.

By similar use is understood the use in similar conditions as in households, for example in inns, coffee-houses, tea-rooms, hotels, barber or hairdresser shops, launderettes, etc., if not otherwise specified in part 2.

This standard does not apply to

- appliances, equipment or machines designed exclusively for industrial or professional purposes;
- appliances which are integrated parts of a building or its installations, such as equipment for air conditioning, heating and ventilating (except household fans, cooker hoods and free standing heating appliances), oil burners for central heating, pumps for water supply and for sewage systems;
- separate motors or generators;
- appliances for outdoor use.

1.1.2 Types of noise

A classification of different types of noise is given in ISO 12001. The method specified in ISO 3744 is suitable for measurements of all types of noise emitted by household appliances. The methods specified in ISO 3743-1 and ISO 3743-2 are suitable for all types of noise, except for sources of impulsive noise consisting of short duration noise bursts. This will be taken into account in the preparation of parts 2.

1.1.3 Size of the source

The method specified in ISO 3744 is applicable to noise sources of any size. Limitations for the size of the source are given in 1.3 of ISO 3743-1 and ISO 3743-2. This will be taken into account in the preparation of parts 2.

1.2 Object

This standard is concerned with objective methods of engineering accuracy (grade 2 according to ISO 12001) for determining sound power levels L_W , expressed in decibels (dB) with reference to a sound power of one picowatt (1 pW), of airborne acoustical noise within the specified frequency range of interest (generally including the octave bands with centre frequencies from 125 Hz to 8 000 Hz), and for prescribed operating conditions of the appliance to be measured.

The following quantities are used:

- A-weighted sound power level, L_{WA} ; and
- octave band sound power levels.

In general, the described methods are specified for appliances without an operator present. A part 2 can specify that an operator will be present only for the (rare) cases where an appliance can only be operated, or must be fed, by an operator.

Methods for determining sound power levels with precision accuracy (grade 1 according to ISO 12001), specified for example in ISO 3741 and ISO 3745, are not included in this standard. They may, however, be applied if the appropriate test environment and instrumentation are available.

NOTE 1 The noise values obtained under the described conditions of this part will not necessarily correspond with the noise experienced under the operational conditions of practical use.

NOTE 2 For quality control during production etc., simplified methods may be appropriate. For noise reduction purposes, other measurement methods employing, for example, narrow-band analysis or intensity techniques usually will have to be applied. These methods are not covered by this part.

1.3 Measurement uncertainty

The estimated values of the standard deviations of reproducibility of sound power levels determined according to this part are given in 1.4 of ISO 3743-1 and of ISO 3743-2, and in 1.4 of ISO 3744. But for a particular family of appliances of similar size with similar operating conditions, the standard deviations of reproducibility may be smaller than these values. Hence, in part 2, standard deviations smaller than those listed in ISO standards may be stated if substantiation is available from the results of suitable interlaboratory tests.

IEC 60704-3 gives values of standard deviations of reproducibility for several categories of appliances.

In case of discrepancies between the measurements where the results normally remain inside the foreseen standard deviation, it will be necessary to perform measurements according to the upper grade of accuracy: grade 1, laboratory or precision, as described in ISO 3741 or ISO 3745.

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 60038:2009, *IEC standard voltages*

IEC 60704-3:2006, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 3: Procedure for determining and verifying declared noise emission values*

IEC 61260:1995, *Electroacoustics – Octave-band and fractional-octave-band filters*

IEC 61672-1:2002, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO 3741:1999, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Precision methods for reverberation rooms*

ISO 3743-1:1994, *Acoustics – Determination of sound power levels of noise sources – Engineering methods for small, movable sources in reverberant fields – Part 1: Comparison method for hard-walled test rooms*

ISO 3743-2:1994, *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 3744:1994, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane*

ISO 3745:2003, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Precision method for anechoic and hemi-anechoic rooms*

ISO 6926:1999, *Acoustics – Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels*

ISO 12001:1996, *Acoustics – Noise emitted by machinery and equipment – Rules for the drafting and presentation of a noise test code*

3 Terms and definitions

For the purposes of this document, the following definitions apply. Terms and definitions pertinent to the determination of sound power levels may be found in ISO 3743-1, ISO 3743-2 and ISO 3744.

3.1 measurement time interval

portion or a multiple of an operational period or operational cycle for which the sound power levels are determined

3.2 operational period

an interval of time during which a specified process is accomplished by the appliance under test (for example washing or rinsing or drying for a dishwasher)

3.3 operational cycle

a specific sequence of operational periods occurring while the appliance under test performs a complete work cycle. During the operational cycle, each operational period is associated with a specific process that may occur only once, or may be repeated (for example, for a dishwasher, washing and rinsing and drying)

3.4 time history

a continuous recording of the sound pressure level (for a distinct microphone position) as a function of time, which is obtained during one or more operational periods of an operational cycle

3.5 standard test operator

a person necessary for operating or feeding the appliance under test, not wearing abnormally sound absorptive clothing which might influence the sound measurements

3.6 centre of location or position of a source

the term used for describing the location or position of the source (appliance) to be tested within the test environment and, in free field environment, with respect to the co-ordinate system of microphone positions