IEC 60704-2-13

Edition 1.2 2008-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Test code for the determination of airborne acoustical noise –
Part 2-13: Particular requirements for range hoods

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien –
Partie 2-13: Règles particulières pour les hottes de cuisine

IEC 60704-2-13:2000+A1:2005+A2:2008

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX CH

ICS 17.140.20; 97.040.20

ISBN 2-8318-9736-X

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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International Standard IEC 60704-2-13 has been prepared by IEC technical committee 59: Performance of household electrical appliances.

This consolidated version of IEC 60704-2-13 consists of the first edition (2000) [documents 59/230/FDIS and 59/234/RVD], its amendment 1 (2005) [documents 59/422/FDIS and 59/432A/RVD] and its amendment 2 (2008) [documents 59/428/CDV and 59/443A/RVC].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

Annex AA is for information only.

This part 2-13 is intended to be used in conjunction with IEC 60704-1, second edition, 1997: *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements.*

The relevant text of Part 1 as amended by this standard establishes the test code for range hoods.

Clauses in this part 2-13 supplement or modify the corresponding clauses in IEC 60704-1. When a particular subclause of part 1 is not mentioned in this part 2-13, that subclause applies as far as reasonable. Where this standard states "addition", "modification" or "replacement", the relevant requirement, test specification or explanatory matter in part 1 shall be adapted accordingly.

Subclauses or figures which are additional to those in part 1 are numbered starting from 101.

Additional annexes are lettered AA, BB, etc.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result 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

The measuring conditions specified in this part 2-13 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 household range hoods.

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 household range hoods.

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

INTRODUCTION
(to amendment 1)

This amendment introduces a description of the intensimetric method for the determination of sound power levels of range hoods in addition to the other methods described in the standard, for the use of which the text of IEC 60704-2-13 remains unchanged. According to the method described here, the sound power level is obtained by measuring the component of sound intensity normal to a measurement surface that surrounds the range hood.

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

Part 2-13: Particular requirements for range hoods

1 Scope and object

This clause of part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

These particular requirements apply to electrical range hoods (including their accessories and their component parts) for household and similar use.

By similar use is understood the use in similar conditions as in households, for example in inns, coffee-houses, tea-rooms.

These particular requirements apply to range hoods intended for filtering the air of the room or for exhausting the air out of the room. It also applies to range hoods with an external fan.

These particular requirements do not apply to:

– range hoods for industrial or professional purposes.

Intensimetric method for the determination of sound power levels shall not be used for the purpose of verification.

1.1.2 Types of noise

Addition:

The method is applicable to any source for which a physically stationary measurement surface can be defined, and on which the noise generated by the source is stationary in time (as defined in Clause 3), therefore it is not suitable for sources of impulsive noise consisting of short duration noise bursts. This method is not suitable if the source under test has significant noise over 6,3 kHz in one-third-octave band centre frequencies and over 4 kHz in one-octave band centre frequencies.

1.1.3 Size of the source

Replacement:

The size of the noise source is unrestricted. The extent of the source is defined by the choice of the measurement surface.

1.2 Object

Addition:

This standard describes the determination of the noise emission of household range hoods under normal operating conditions and at the highest fan speed setting for normal use (see notes 1 and 2). If desired, this test method may be used at any fan speed setting.

NOTE 1 If a boost position is incorporated, this is not taken into account. (See 6.5 of IEC 61591.)

NOTE 2 A boost position is a setting of a control for occasional use which results in a higher temporary fan speed (see 6.5 of IEC 61591).

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

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

1.3 Measurement uncertainty

Replacement:

The uncertainty in the determination of the sound power level of a noise source is related:

– to the nature of the sound field of the source;
– to the nature of the extraneous sound field;
– to the absorption of the source under test;
– to the type of intensity-field sampling and measurement procedure employed.

The normal range for A-weighted data is covered by the one-octave bands from 63 Hz to 4 kHz, and the one-third-octave bands from 50 Hz to 6,3 kHz. The estimated values of standard deviations of sound power levels, determined according to this standard, are as indicated in Table 101.

Table 101 – Standard deviations of sound power levels

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

1.101 Standard deviation for declaration and verification

For the purpose of determining and verifying declared noise emission values, according to IEC 60704-3, the values of standard deviations given in Table 102 apply.

Table 102 – Standard deviations for determination and verification

Standard deviation dB		
σ_p (production)	σ_t (total)	σ_M (reference)
1,5 – 1,7	1,8 – 2,0	2,0

2 Normative references

This clause of part 1 is applicable except as follows:

Addition:

IEC 61043:1993, *Electroacoustics – Instruments for the measurement of sound intensity – Measurement with pairs of pressure sensing microphones*

IEC 61591:1997, *Household range hoods – Methods for measuring performance*

ISO 7235:1991, *Acoustics – Measurement procedures for ducted silencers – Insertion loss, flow noise and total pressure loss*

ISO 9614-1:1993, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*

ISO 9614-2:1996, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 2: Measurement by scanning*

3 Terms and definitions

This clause of part 1 is applicable except as follows:

3.1
terms and definitions pertinent to determination of sound power levels

Replacement:

These may be found in ISO 9614-1 and ISO 9614-2.

Addition:

3.101
range hood
appliance installed over a hob and through which air is passed to remove contaminants from the room

[IEC 61591, definition 3.1]

3.102
recirculating-air range hood
range hood containing filters to remove contaminants after which the cleaned air is discharged back into the room

[IEC 61591, definition 3.2]

3.103
air-extraction range hood
range hood which discharges the collected air to another room or to the outside of the building by means of ducting

The range hood can incorporate an internal or external fan.

4 Measurement methods and acoustical environments

This clause of part 1 is applicable except as follows:

4.1 General

Replacement:

The total noise emitted by machinery or equipment, and radiated in all directions to the space surrounding the machine, can be characterized by the sound power of the machine. The sound power of a machine is essentially independent of the environment in which the machine is installed.

Therefore, the concept of sound power level has been chosen for expressing the noise emission of appliances for household and similar purposes.

The preferred noise emission quantity is the A-weighted sound power level, in decibels (re. 1 pW).

According to this standard, one method is used, the direct method as described in 4.2 below.

4.2 Direct method

Addition:

The measurement can be performed according to two intensimetric methods, the "discrete points method" and the "scanning method", as described below.

4.2.101 Discrete points method

Define, as the measurement surface, a parallelepiped-shaped surface around the range hood; then divide it in partial areas (segment) so as to obtain a grid. The dimension of the parallelepiped depends on the dimension of the range hood: the distance between each face of the parallelepiped and the range hood under test depends on the value of F_2 and F_3 indicators (see Annexes A and B of ISO 9614-1) but shall be at least 10 cm. The density of measurement positions on parallelepiped faces depends on extraneous noise and on the value of the F_4 indicator (see Annexes A and B of ISO 9614-1). The total sound power of the source is obtained from calculation of the partial sound power of each segment of the parallelepiped, by multiplying the "local" intensity sound by its partial area, and then by adding all the partial sound powers (absolute value).

4.2.102 Scanning method

This method is very similar to the previous one (4.2.101), with the only difference being that each face of the parallelepiped is not divided in partial areas, but is continuously scanned with the intensimetric probe, and the space and time average of intensity sound is multiplied by its area; then the total sound power of the range hood is obtained by adding the partial sound powers of each face of the parallelepiped.

NOTE The distance of 20 cm between each face of the parallelepiped and the range hood is usually acceptable.

4.3 Comparison method

Addition:

Not applicable.

4.4 Acoustical environments

4.4.1 General requirements and criterion for adequacy of the test environment

Replacement:

For the discrete points method, the general requirements and criterion for adequacy of the test environment are given in Clauses 4 and 5 of ISO 9614-1.

For the scanning method, they are given in Clauses 4 and 5 of ISO 9614-2.

4.4.2 Criterion for background noise level

Not applicable.

5 Instrumentation

This clause of part 1 is applicable except as follows:

5.1 Instrumentation for measuring acoustical data

Addition:

The use of a windscreen is recommended and, if necessary, corrections for changes in the microphone sensitivity shall be added to the observed sound pressure levels.

Sound intensity measurement instruments and probes that meet the requirements of IEC 61043 shall be used. Class 1 instruments shall be used.

To check the instrumentation for proper operation prior to each series of measurements, the field-check procedure specified by the manufacturer shall be applied.

6 Operation 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 *Addition:*

Recirculating-air range hoods should be fitted with a clean filter(s).

Air-extraction range hoods shall be fitted with the pipe coupling ring, if any, having the largest diameter among those provided by the manufacturer. If the range hood is designed to accommodate additional filters, those filters shall be clean and appropriately fitted.

6.1.3 *Replacement:*

Prior to noise measurements, the range hood shall have been in operation for running in for at least 4 h at the highest speed setting for normal use (see notes in 1.2).

6.1.4 *Replacement:*

Immediately before each series of noise measurements, the range hood equipped for its intended use is operated for stabilizing at the highest speed setting for normal use (see notes in 1.2) for 30 min.