IEC 60704-2-2

Edition 2.0 2009-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien –
Partie 2-2: Exigences particulières pour les appareils de chauffage soufflants

IEC 60704-2-2:2009

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FOREWORD

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International Standard IEC 60704-2-2 has been prepared by subcommittee 59C: Heating appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This second edition cancels and replaces the first edition published in 1985 and constitutes a technical revision. The main changes from the previous edition are as follows: provisions with regard to measurement uncertainty and standard deviation for declaration and verification have been included in the scope.

This bilingual version (2013-07) corresponds to the monolingual English version, published in 2009-07.

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

CDV	Result on voting
59C/134/CDV	59C/140/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with ISO/IEC Directives, Part 2.

This part 2-2 is intended to be used in conjunction with IEC 60704-1, 2nd 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 publication establishes the test code for fan heaters.

This part 2-2 supplements or modifies the corresponding clauses in IEC 60704-1:1997. When a particular subclause of part 1 is not mentioned in this part 2-2, that subclause applies as far as reasonable. Where this standard states "addition", "modification" or "replacement", the relevant requirement, test specifications 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.

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 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 2-2 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 fan heaters.

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 fan heaters.

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

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

Part 2-2: Particular requirements for fan heaters

1 Scope and object

This clause of part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

This standard applies to electric fan heaters, designed for placing on the floor, table or counter, etc., or for wall-mounting.

This standard does not apply to

– electric storage room heaters;
– room humidifiers;
– room dehumidifiers;

– air cleaners;
– heaters designed exclusively for industrial purposes.

1.1.2 Types of noise

Replacement:

ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by fan heaters.

1.1.3 Size of the source

Replacement:

The method specified in ISO 3744 is applicable to noise sources of any size. When applying ISO 3743-1 and ISO 3743-2, care should be taken that the maximum size of the appliance under test fulfils the requirements specified in Subclause 1.3 of ISO 3743-1 and ISO 3743-2.

1.2 Object

Addition:

The frequency range of interest for sound power determination on fan heaters includes at least the octave bands with centre frequencies from 63 Hz to 8000 Hz.

NOTE 1 In many cases, the 63 Hz octave band level does not participate significantly to the A-weighted level.

NOTE 2 When measuring this 63 Hz octave band, a special attention should be paid to the room effect.

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 estimated values of standard deviations of sound power levels, determined according to this standard, are as follows:

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 following values apply:

Standard deviation, dB		
σ_P (production)	σ_t (total)	σ_M (reference)
0,3 – 1,1	1,0 – 1,6	1,5

2 Normative references

This clause of part 1 is applicable.

3 Terms and definitions

This clause of part 1 is applicable.

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 3743-2.

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 3743-1 and 3743-2.

5 Instrumentation

This clause of part 1 is applicable except as follows:

5.1 *Addition:*

Windscreens should be used and the relevant corrections for changes in the microphone sensitivity shall be added to the observed sound pressure levels.

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:*

Air filters, if any, shall be clean.

6.1.3 *Replacement:*

Prior to noise measurements, the appliance equipped in accordance with Subclause 6.1.1, shall have been in operation for a total period of at least 2 h for running-in at the highest speed setting with the maximum heating switched on for normal permanent use.

Oscillating function if available shall be switched on.

During the running-in procedure air filters, if any, may be removed. If filters remain in the appliances during this running-in period, they shall be clean or renewed after this period.

6.1.4 *Replacement:*

Immediately before each series of noise measurements, the appliance equipped in accordance with Subclause 6.1.1 shall be operated for stabilizing at the highest speed setting and maximum heating switched on for normal permanent use for 5 min.

6.2 Supply of electric energy and of water or gas

6.2.1 *Modification:*

The voltage tolerance shall be ± 0,5 %.

6.2.2 Not applicable

6.2.3 *Replacement:*

The appliance shall be operated with the heating elements switched on.

Special attention is required to be given to the possible effect of the temperature rise on the acoustical behaviour of the test room.

6.2.4 Not applicable

6.4 Loading and operating of appliances during tests

6.4.2 *Replacement:*

The appliance shall be equipped according to 6.1.1.

The noise emission shall be determined with the appliance at the highest speed setting and maximum heating for normal permanent use. Oscillating mechanism, if any, shall be switched on.

NOTE Other possible speed settings (minimum heat output, boost position,...) can be measured in addition. The respective noise levels should be linked to the relevant heat output.

Appropriate adjustment of air intake or exhaust openings shall be done taking into account manufacturer's instructions if any, or otherwise selecting the configuration that gives the highest noise emission.

6.4.3 Not applicable

6.5 Location and mounting of appliances

6.5.1 *Addition:*

The tests under the conditions stated in Subclause 6.5.3 shall be repeated for floor standing-appliances which may be placed either against or away from the wall.

For such appliances both sets of results shall be recorded and the measurement that gives highest noise is then chosen.

6.5.2 Not applicable

6.5.3 *Replacement:*

For measurements on floor-standing appliances intended for placing against a wall, including those for building in, a vertical reflecting plane having an acoustic absorption coefficient of less than 0,06 must be used.

When measurements are made in a reverberation test room, a part of the wall of the room will serve for this purpose. The minimum area of this part of the wall should be determined by the projection of the appliance extended by at least 0,5 m upwards and to both sides. The minimum distance between any surface of the appliance or its cabinet and the nearest corner of the room shall be 1 m.

When measurements are made in a free-field environment, the size of the vertical reflecting plane (supported by the horizontal reflecting plane) shall be at least equal to the size of the projection of the measurement surface.

For both types of test environment the following requirements shall be complied with:

– the appliance shall be placed in the test environment without any resilient means of support other than those incorporated in the appliance;
– care should be taken to avoid any direct contact between the appliance (including protruding parts, worktops, spacers, etc.) and the vertical reflecting wall;
– the distance between the wall and the appliance shall be established by placing the appliance in direct contact with the wall and moving it away for a distance not exceeding 10 cm ± 1 cm.

6.5.4 *Modification:*

The height of the lowest edge of the appliance from the floor shall be 25 cm ± 1 cm.

NOTE For appliances intended for mounting close to the ceiling with the air stream directed towards the floor, measurements problems may be caused when the appliance is mounted as specified in Subclause 6.5.4. It may be necessary to mount such an appliance in an inverted position, with the top of the appliance facing towards the floor