

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**

<https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

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

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



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**

<https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.140.20, 97.100.10

ISBN 978-2-8322-7974-8

**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

| | |
|---|----|
| FOREWORD..... | 3 |
| INTRODUCTION..... | 5 |
| 1 Scope..... | 6 |
| 2 Normative references | 6 |
| 3 Terms and definitions | 6 |
| 4 Measurement methods and acoustical environments | 6 |
| 5 Instrumentation..... | 7 |
| 6 Operation and location of appliances under test | 8 |
| 7 Measurement of sound pressure levels..... | 10 |
| 8 Calculation of sound pressure and of sound power levels | 10 |
| 9 Information to be recorded..... | 10 |
| 10 Information to be reported | 11 |
| Annexes | 12 |
| Bibliography..... | 13 |
| Table 1 – Standard deviations of sound power levels..... | 7 |
| Table 2 – Standard deviations for declaration and verification..... | 7 |

<https://standards.iteh.ai>
Document Preview

[IEC 60704-2-2:2023](https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023)

<https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
TEST CODE FOR THE DETERMINATION OF
AIRBORNE ACOUSTICAL NOISE –****Part 2-2: Particular requirements for fan heaters**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60704-2-2 has been prepared by subcommittee 59C: Electrical heating appliances for household and similar purposes, of IEC technical committee 59: Performance of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- alignment with the latest edition of IEC 60704-1:2021,
- addition of several ISO standards,
- revision of built-in-conditions,
- addition of requirements on climatic conditions and on background noise.

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

| Draft | Report on voting |
|-------------|------------------|
| 59C/284/CDV | 59C/286/RVC |

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

The language used for the development of this International Standard is English.

This part 2-2 is intended to be used in conjunction with the fourth edition of IEC 60704-1:2021, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*.

The relevant text of IEC 60704-1:2021 as amended by this publication establishes the test code for fan heaters.

This part 2-2 supplements or modifies the corresponding clauses in IEC 60704-1:2021.

When a particular subclause of IEC 60704-1:2021 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 IEC 60704-1:2021 shall be adapted accordingly.

Subclauses or figures which are additional to those in IEC 60704-1:2021 are numbered starting from 101.

Additional annexes are lettered AA, BB, etc.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC 60704-2-2:2023](https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023)

<https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023>

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

Part 2-2: Particular requirements for fan heaters

1 Scope

Replacement:

This part of IEC 60704 applies to electric fan heaters, designed for placing on the floor, table or counter, etc., or for mounting.

This document does not apply to

- electric storage room heaters;
- room humidifiers;
- room dehumidifiers;
- air cleaners;
- heaters designed exclusively for industrial purposes.

For determining and verifying noise emission values declared in product specifications, refer to IEC 60704-3:2019.

2 Normative references

[IEC 60704-2-2:2023](https://standards.iteh.ai/standards/iec-60704-2-2-2023)

<https://standards.iteh.ai/standards/iec-60704-1-2021> is applicable.

3 Terms and definitions

This clause of IEC 60704-1:2021 is applicable.

4 Measurement methods and acoustical environments

This clause IEC 60704-1:2021 is applicable except as follows:

4.2 Direct method

Addition:

NOTE If pure tone components are present in the noise emitted, proper precautions need to 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 need to be taken as specified in ISO 3743-1 and 3743-2.

4.4 Acoustical environments

4.4.1 General requirements and criterion for adequacy of the test environment

Replacement:

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

The method specified in ISO 3744 is applicable to noise sources of any size. When applying ISO 3743-1 and ISO 3743-2, care shall be taken that the maximum size of the appliance under test fulfils the requirements specified in ISO 3743-1:2010, 1.3 and ISO 3743-2.

4.5 Measurement uncertainties

4.5.2 Standard deviations on repeatability and reproducibility and standard deviations related to declaration and verification

Replacement:

The estimated values of standard deviations of sound power levels determined according to this document are given in Table 1:

Table 1 – Standard deviations of sound power levels

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

For the purpose of determining and verifying declared noise emission values according to IEC 60704-3, the values given in Table 2 apply:

Table 2 – Standard deviations for declaration and verification

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

5 Instrumentation

This clause of IEC 60704-1:2021 is applicable except as follows:

5.1 Instrumentation for measuring acoustical data

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 IEC 60704-1:2021 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 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, shall be removed, if possible. If filters remain in the appliances during this running-in period, they shall be cleaned or renewed after this period.

6.1.4 *Replacement:*

Immediately before each series of noise measurements, the appliance equipped in accordance with 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:*

[IEC 60704-2-2:2023](https://standards.iteh.ai/catalog/standards/iec/fbb98dc7-cc7f-4dad-b64e-67ceab65c3da/iec-60704-2-2-2023)

The voltage tolerance shall be $\pm 0,5$ %.

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 function, if any, shall be switched on.

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

6.5.2 Addition:

The tests under the conditions stated in 6.5.4 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.

6.5.3 Not applicable.

6.5.4 Replacement:

For measurements on floor-standing appliances intended for placing against a wall, including those for building-in into a cabinet, a vertical reflecting plane having an acoustic absorption coefficient of less than 0,06 shall 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 \pm 1 cm.

6.5.5 Modification:

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

NOTE For appliances intended for mounting close to the ceiling with the air stream directed towards the floor, measurements problems can be caused when the appliance is mounted as specified in 6.5.5. It can be necessary to mount such an appliance in an inverted position, with the top of the appliance facing towards the floor at a height of 0,25 m, or at the distance specified by the manufacturer for mounting close to the ceiling. The manufacturer's approval needs to be obtained before operating the appliance under the proposed test conditions.

6.5.6 Modification:

Built-in heaters such as plinth heaters shall be installed according to manufacturer's instructions.