

INTERNATIONAL STANDARD



**Household and similar electrical appliances –
Test code for the determination of airborne acoustical noise –
Part 2-7: Particular requirements for fans**

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Part 2-7: Particular requirements for fans**

INTERNATIONAL
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CONTENTS

FOREWORD	3
1 Scope and object.....	7
2 Normative references	8
3 Terms and definitions	9
4 Measurement methods and acoustical environments	9
5 Instrumentation.....	12
6 Operation and location of appliances under test	12
7 Measurement of sound pressure levels.....	13
8 Calculation of sound pressure and sound power levels	15
9 Information to be recorded.....	15
10 Information to be reported	15
Annexes	17
Annex B (normative) Test enclosure	17
Bibliography.....	17
Figure 101 – Measurement surface – hemisphere – with 10 microphone positions for partition (wall and window) fans and for wall-mounted table fans	16
Table 101 – Standard deviations of sound power levels	8
Table 102 – Standard deviations for declaration and verification	8

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
TEST CODE FOR THE DETERMINATION OF
AIRBORNE ACOUSTICAL NOISE –****Part 2-7: Particular requirements for fans**

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.
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International Standard IEC 60704-2-7 has been prepared by subcommittee 59L: Small household appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This second edition cancels and replaces the first edition published in 1997. This edition constitutes a technical revision.

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

- a) it includes additional fan categories as defined in IEC 60879:2019 and IEC 60665:2018;
- b) it includes standard deviations of sound power levels in 1.3;
- c) a comparison method has been added;
- d) the normative references have been updated (ISO 3744:2010 and ISO 3743-1:2010);
- e) it has been adjusted with regard to IEC 60704-1:2010.

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

CDV	Report on voting
59L/168/CDV	59L/174/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.

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

A list of all 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.

This International Standard is to be used in conjunction with IEC 60704-1:2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*.

NOTE When "Part 1" is mentioned in this standard, it refers to IEC 60704-1:2010.

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

This Part 2-7 supplements or modifies the corresponding clauses in IEC 60704-1:2010, so as to establish the test code for fans. When a particular subclause of Part 1 is not mentioned in this Part 2-7, 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 Part 1 should be adapted accordingly.

Subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1.

Unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause.

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INTRODUCTION

The measuring conditions specified in this Part 2-7 provide for sufficient accuracy in determining the noise emitted and the comparison of the results of measurements taken by different laboratories, whilst simulating as far as possible the practical use of household fans.

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 fans.

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

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

Part 2-7: Particular requirements for fans

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

This document applies to electrical fans (including their accessories and their component parts) for household and similar use, designed for AC or DC supply.

The motor, the impeller and their housing, if any, form a single unit.

These particular requirements apply to:

- conventional fans,
- table fans,
- pedestal fans,
- ceiling fans,
- bladeless fans,
- wall bracket fans,
- ceiling bracket fans,
- louver fans,
- tower fans,
- ventilating and partition ventilating fans.

This standard does not apply to:

- fans that are part of a ventilation system,
- fans designed exclusively for industrial purposes,
- fans that are part of an appliance (for example cooling fans),
- fans with additional functions (for example heating, humidifying).

Limitations for the use of this test code are given in the scope of IEC 60704-1.

1.1.2 Type of noise

Replacement:

The methods specified in ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by fans.

1.1.3 Size of 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 to ensure that the maximum size of the appliance under test fulfils the requirements specified in 1.2 of ISO 3743-1:2010 and 1.3 of ISO 3743-2:1994.

1.2 Object

Addition:

This document describes the determination of the noise emission of household fans in normal operation at maximum speed. Other speeds can, in addition, be used. Requirements for the declaration of noise emission values are not within the scope of this document.

The aim of this document is to ~~measure~~ give direction for measuring the noise in a room resulting from the operation of a fan.

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

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

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 in Table 102 apply:

Table 102 – Standard deviations for declaration and verification

Standard deviation (dB)		
σ_p (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	1,0 to 1,4	1,5

2 Normative references

This clause of Part 1 is applicable except as follows:

Replacement:

ISO 3743-1:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

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*

Addition:

~~IEC 60665:1980, A.C. electric ventilating fans and regulators for household and similar purposes~~

IEC 60704-1:1997/2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*¹⁾

~~IEC 60879:1986, Performance and construction of electric circulating fans and regulators~~

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

Addition:

~~3.101 **table fan:** A smaller diameter propeller bladed fan having two or more blades, intended for use with free inlet and outlet of air. It may be a table fan or bracket mounted fan for wall or ceiling mounting. [IEC 60879]~~

~~NOTE — Adjustment of height, position and oscillation may be possible.~~

~~3.102 **pedestal fan:** A propeller type fan having two or more blades mounted on a pedestal of fixed or variable height and intended for use with free inlet and outlet of air. [IEC 60879]~~

~~NOTE — Adjustment of position and oscillation may be possible.~~

~~3.103 **ceiling fan:** A propeller bladed fan having two or more blades, and provided with a device for suspension from the ceiling of a room so that the blades rotate in a horizontal plane. [IEC 60879]~~

~~3.104 **partition (wall and window) fans:** Fans designed for installation in wall or window openings. The air is displaced from one room to another or to atmosphere, or vice versa (see also IEC 60665).~~

3.101

conventional fan

comfort fan with a propeller having two or more blades, with free inlet and outlet of air

[SOURCE: IEC 60879:2019, 3.2]

3.102

tower fan

comfort fan for use directly on the floor having a vertically elongated design of the cross flow type, tangential type or centrifugal type or impeller type with a free inlet and outlet of air

¹⁾ ~~To be published.~~

[SOURCE: IEC 60879:2019, 3.3]

3.103

bladeless fan

comfort fan of any type that is not fitted with a propeller

[SOURCE: IEC 60879:2019, 3.4]

3.104

ceiling fan

conventional fan provided with a device for suspension from the ceiling of a room so that the blades rotate in a horizontal plane with the diameter of the blade not larger than 1800 mm

[SOURCE: IEC 60879:2019, 3.5]

3.105

table fan

comfort fan intended for use on a table

Note 1 to entry: Table fans have a maximum adjustable or non-adjustable height not greater than 1200mm

Note 2 to entry: Adjustment of height, position and oscillation can be possible.

Note 3 to entry: It can be a table fan or bracket-mounted fan for wall or ceiling mounting.

[SOURCE: IEC 60879:2019, 3.6, modified – Note 2 to entry and Note 3 to entry added]

3.106

pedestal fan

comfort fan mounted on a pedestal of fixed or variable height

Note 1 to entry: Pedestal fans have a maximum adjustable height or non-adjustable height greater than 1 200 mm

Note 2 to entry: Adjustment of position and oscillation can be possible.

[SOURCE: IEC 60879:2019, 3.7, modified – Note 2 to entry added]

3.107

wall bracket fan

comfort fan for mounting on the wall

[SOURCE: IEC 60879:2019, 3.8]

3.108

ceiling bracket fan

comfort fan for mounting on the ceiling

[SOURCE: IEC 60879:2019, 3.9]

3.109

louvre fan

comfort fan having a moving louvre which provides a continuously changing multi-directional air flow

[SOURCE: IEC 60879:2019, 3.10]

3.110**ventilating fan**

fan intended to displace air either from one side of a partition to the other, or within a duct installed either on the fan inlet or on the fan outlet or both

[SOURCE: IEC 60665:2018, 3.2]

3.111**partition ventilating fan****type A ventilating fan**

ventilating fan installed in or upon the aperture of a partition in order to displace air from one side of the partition to the other side, both the sides being free spaces

[SOURCE: IEC 60665:2018, 3.3]

3.112**free inlet partition ventilating fan****type B ventilating fan**

ventilating fan with a direct inlet from free space and with ducted outlet

[SOURCE: IEC 60665:2018, 3.4]

3.113**free outlet partition ventilating fan****type C ventilating fan**

ventilating fan with ducted inlet, and with direct outlet to free space

[SOURCE: IEC 60665:2018, 3.5]

3.114**fully ducted ventilating fan****type D ventilating fan**

ventilating fan with ducted inlet and ducted outlet

[SOURCE: IEC 60665:2018, 3.6]

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 3743-1, ISO 3743-2 and ISO 3744.~~

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, such as those specified in ISO 3743-2.

4.3 Comparison method

~~*Modification:*~~

~~The comparison method described in ISO 3743-1 is not applicable.~~

NOTES

1—Measurement according to ISO 3743-1 is under consideration.

2—If pure components are present in the noise emitted, proper precautions should be taken as specified in ISO 3743-1, ISO 3743-2 and ISO 3744.

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 hard-walled test room or in the special reverberation room can increase. In such cases, additional microphone positions or source positions can be necessary, such as those specified in ISO 3743-1 or ISO 3743-2.

5 Instrumentation

This clause of Part 1 is applicable except as follows:

Addition:

The use of a windscreen is mandatory, and necessary 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:

6.2 Supply of electricity and of water or gas

6.2.3

Not applicable.

6.2.4

Not applicable.

6.4 Loading and operating of appliances during tests

6.4.1

Replacement:

Load and operation should simulate normal use. Fans that can be tilted during normal use shall be located in the position with the highest emitted noise level, and the duration of the measurement shall be at least 10 s.

Fans that can oscillate automatically ~~will~~ shall operate when oscillating. In the case of oscillating appliances, the A-weighted sound pressure level shall be averaged on at least one complete cycle.

6.4.3

Not applicable.

6.5 Location and mounting of appliances

6.5.1

Addition:

Ceiling fans may be hung from a special support instead of from the ceiling. In this case, care shall be taken to ensure that the means of suspension or clamping do not change the sound output of the appliance. In order not to restrict the airflow, the distance between the lowest edge of the appliance and the reflecting plane (usually the floor) shall be at least 1,5 m.

Alternatively, ceiling fans can be mounted in the reverse working position on the reflecting plane, providing this does not affect sound radiation.

6.5.2

Not applicable.

6.5.3

Not applicable.

6.5.4

Replacement:

Partition (wall and window) fans shall be mounted in an opening made either:

- in a wall of the special reverberation test room; or
- on the second reflecting plane of the free field over a reflecting plane environment.

The height between the centre of the appliance and the floor shall be $1,5 \text{ m} \pm 0,05 \text{ m}$.

In all cases, care shall be taken to follow the instructions given by the manufacturer and to avoid any structure-borne noise.

Care shall be taken to avoid any restriction of the airflow.

Attention shall be paid to avoid any difference of pressure between the rooms concerned (or atmosphere), in order to avoid an unwanted load on the fan.

6.5.5

Not applicable.

6.5.7

Not applicable.

7 Measurement of sound pressure levels

This clause of Part 1 is applicable except as follows:

~~*Addition:*~~

~~The use of a windscreen is mandatory.~~

7.1 Microphone array, measurement surface and RSS location for essentially free-field conditions over reflecting plane(s)

7.1.1

Addition:

This measurement surface shall be used for table, pedestal, louver, tower, bladeless, ceiling bracket and ceiling fans. Table fans are placed on the floor.

This measurement surface shall not be used for wall bracket fans and window fans.

The use of a windscreen is mandatory.

7.1.2

Not applicable.

7.1.3

Not applicable.

7.1.4

Replacement:

For partition (wall and window) fans and wall-mounted table fans, the measurement surface is a hemisphere, with 10 microphone positions as specified in Figure 101, centred in the projection of the geometrical centre of the reference box on the vertical plane, the coordinate system describing the microphone positions being located with the x - and y -axes in the vertical reflecting plan and the z -axis horizontally perpendicular to it. The x -axis lies in the horizontal central plane of the reference box. The front of the fan is directed towards the z -axis.

The area of this measurement surface is $S = 2\pi R^2$.

The radius of the hemisphere is 1 m.

7.1.5

Not applicable.

7.1.6

Addition:

This measurement surface shall be used for tall pedestal fans.

7.2 Microphone array and RSS location in hard-walled test rooms

Not applicable.

7.4 Measurements

7.4.4

Not applicable.

8 Calculation of sound pressure and sound power levels

This clause of Part 1 is applicable.

9 Information to be recorded

This clause of Part 1 is applicable except as follows:

9.7 Electric supply, water supply, etc.

9.7.3

Not applicable.

9.7.4

Not applicable.

10 Information to be reported

This clause of Part 1 is applicable, except as follows:

10.3 Test conditions for the appliance

10.3.4

Not applicable.

10.3.5

Not applicable.

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Coordinates of microphone positions:

N°	x/R	y/R	z/R
1	0	-0,99	0,15
2	0,86	0,50	0,15
3	-0,86	0,50	0,15
4	-0,77	-0,45	0,45
5	0,77	-0,45	0,45
6	0	0,89	0,45
7	-0,57	0,33	0,75
8	0	-0,66	0,75
9	0,57	0,33	0,75
10	0	0	1,0

Measurement surface area:

$$S = 2\pi R^2$$

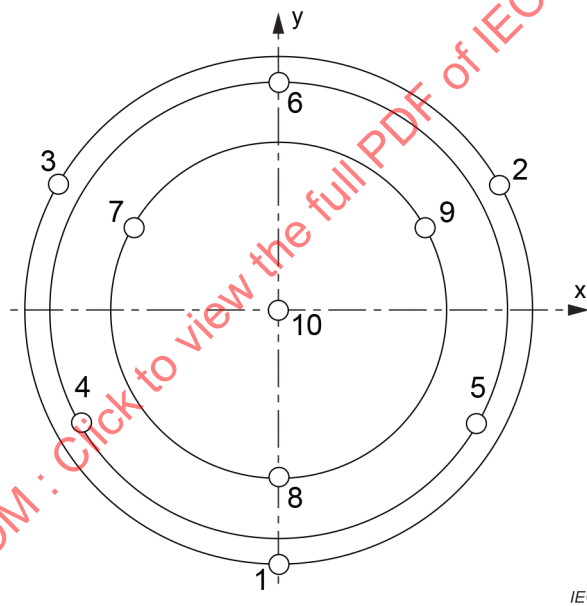
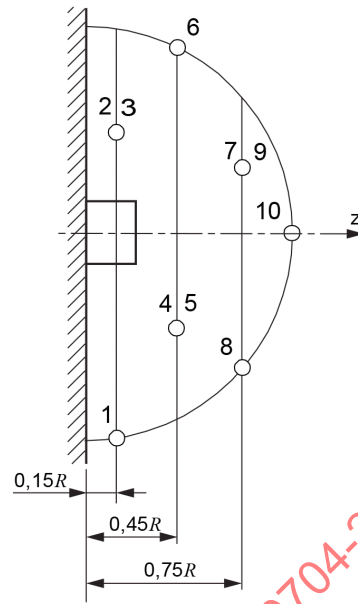


Figure 101 – Measurement surface – hemisphere – with 10 microphone positions for partition (wall and window) fans and for wall-mounted table fans

Annex A
(informative)

**Guidelines for the design of simple test rooms
with essentially free-field conditions**

~~This annex of Part 1 is applicable.~~

Annex B
(normative)

Standard test table

~~This annex of Part 1 is applicable.~~

Annexes

The annexes of Part 1 apply with the following exception:

Annex B
(normative)

Test enclosure

This annex of Part 1 is not applicable.

Bibliography

Addition:

IEC 60665:2018, *A.C. ventilating fans and regulators for household and similar purposes – Methods for measuring performance*

IEC 60879:2019, *Comfort fans and regulators for household and similar purposes – Methods for measuring performance*

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Part 2-7: Particular requirements for fans**

**Appareils électrodomestiques et analogues –
Code d'essai pour la détermination du bruit aérien –
Partie 2-7: Exigences particulières pour les ventilateurs**

CONTENTS

FOREWORD	3
1 Scope and object.....	6
2 Normative references	7
3 Terms and definitions	8
4 Measurement methods and acoustical environments	10
5 Instrumentation.....	10
6 Operation and location of appliances under test	10
7 Measurement of sound pressure levels.....	12
8 Calculation of sound pressure and sound power levels	13
9 Information to be recorded.....	13
10 Information to be reported	13
Annexes	15
Annex B (normative) Test enclosure	15
Bibliography.....	15
Figure 101 – Measurement surface – hemisphere – with 10 microphone positions for partition (wall and window) fans and for wall-mounted table fans	14
Table 101 – Standard deviations of sound power levels	7
Table 102 – Standard deviations for declaration and verification	7

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NOTE When "Part 1" is mentioned in this standard, it refers to IEC 60704-1:2010.

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

This Part 2-7 supplements or modifies the corresponding clauses in IEC 60704-1:2010, so as to establish the test code for fans. When a particular subclause of Part 1 is not mentioned in this Part 2-7, 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 Part 1 should be adapted accordingly.

Subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1.

Unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause.

Additional annexes are lettered AA, BB, etc.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The measuring conditions specified in this Part 2-7 provide for sufficient accuracy in determining the noise emitted and the comparison of the results of measurements taken by different laboratories, whilst simulating as far as possible the practical use of household fans.

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 fans.

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

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

Part 2-7: Particular requirements for fans

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

1.1.1 General

Replacement:

This document applies to electrical fans (including their accessories and their component parts) for household and similar use, designed for AC or DC supply.

The motor, the impeller and their housing, if any, form a single unit.

These particular requirements apply to:

- conventional fans,
- table fans,
- pedestal fans,
- ceiling fans,
- bladeless fans,
- wall bracket fans,
- ceiling bracket fans,
- louver fans,
- tower fans,
- ventilating and partition ventilating fans.

This standard does not apply to:

- fans that are part of a ventilation system,
- fans designed exclusively for industrial purposes,
- fans that are part of an appliance (for example cooling fans),
- fans with additional functions (for example heating, humidifying).

Limitations for the use of this test code are given in the scope of IEC 60704-1.

1.1.2 Type of noise

Replacement:

The methods specified in ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by fans.

1.1.3 Size of 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 to ensure that the maximum size of the appliance under test fulfils the requirements specified in 1.2 of ISO 3743-1:2010 and 1.3 of ISO 3743-2:1994.

1.2 Object

Addition:

This document describes the determination of the noise emission of household fans in normal operation at maximum speed. Other speeds can, in addition, be used. Requirements for the declaration of noise emission values are not within the scope of this document.

The aim of this document is to give direction for measuring the noise in a room resulting from the operation of a fan.

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

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

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 in Table 102 apply:

Table 102 – Standard deviations for declaration and verification

Standard deviation (dB)		
σ_P (production)	σ_t (total)	σ_M (reference)
0,5 to 1,0	1,0 to 1,4	1,5

2 Normative references

This clause of Part 1 is applicable except as follows:

Replacement:

ISO 3743-1:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room*

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*

Addition:

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

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

Addition:

3.101

conventional fan

comfort fan with a propeller having two or more blades, with free inlet and outlet of air

[SOURCE: IEC 60879:2019, 3.2]

3.102

tower fan

comfort fan for use directly on the floor having a vertically elongated design of the cross flow type, tangential type or centrifugal type or impeller type with a free inlet and outlet of air

[SOURCE: IEC 60879:2019, 3.3]

3.103

bladeless fan

comfort fan of any type that is not fitted with a propeller

[SOURCE: IEC 60879:2019, 3.4]

3.104

ceiling fan

conventional fan provided with a device for suspension from the ceiling of a room so that the blades rotate in a horizontal plane with the diameter of the blade not larger than 1800 mm

[SOURCE: IEC 60879:2019, 3.5]

3.105

table fan

comfort fan intended for use on a table

Note 1 to entry: Table fans have a maximum adjustable or non-adjustable height not greater than 1200mm

Note 2 to entry: Adjustment of height, position and oscillation can be possible.

Note 3 to entry: It can be a table fan or bracket-mounted fan for wall or ceiling mounting.

[SOURCE: IEC 60879:2019, 3.6, modified – Note 2 to entry and Note 3 to entry added]

3.106**pedestal fan**

comfort fan mounted on a pedestal of fixed or variable height

Note 1 to entry: Pedestal fans have a maximum adjustable height or non-adjustable height greater than 1 200 mm

Note 2 to entry: Adjustment of position and oscillation can be possible.

[SOURCE: IEC 60879:2019, 3.7, modified – Note 2 to entry added]

3.107**wall bracket fan**

comfort fan for mounting on the wall

[SOURCE: IEC 60879:2019, 3.8]

3.108**ceiling bracket fan**

comfort fan for mounting on the ceiling

[SOURCE: IEC 60879:2019, 3.9]

3.109**louvre fan**

comfort fan having a moving louvre which provides a continuously changing multi-directional air flow

[SOURCE: IEC 60879:2019, 3.10]

3.110**ventilating fan**

fan intended to displace air either from one side of a partition to the other, or within a duct installed either on the fan inlet or on the fan outlet or both

[SOURCE: IEC 60665:2018, 3.2]

3.111**partition ventilating fan
type A ventilating fan**

ventilating fan installed in or upon the aperture of a partition in order to displace air from one side of the partition to the other side, both the sides being free spaces

[SOURCE: IEC 60665:2018, 3.3]

3.112**free inlet partition ventilating fan
type B ventilating fan**

ventilating fan with a direct inlet from free space and with ducted outlet

[SOURCE: IEC 60665:2018, 3.4]

3.113**free outlet partition ventilating fan
type C ventilating fan**

ventilating fan with ducted inlet, and with direct outlet to free space

[SOURCE: IEC 60665:2018, 3.5]

3.114

fully ducted ventilating fan type D ventilating fan

ventilating fan with ducted inlet and ducted outlet

[SOURCE: IEC 60665:2018, 3.6]

4 Measurement methods and acoustical environments

This clause of Part 1 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, such as those specified in ISO 3743-2.

4.3 Comparison 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 hard-walled test room or in the special reverberation room can increase. In such cases, additional microphone positions or source positions can be necessary, such as those specified in ISO 3743-1 or ISO 3743-2.

5 Instrumentation

This clause of Part 1 is applicable except as follows:

Addition:

The use of a windscreen is mandatory, and necessary 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:

6.2 Supply of electricity and of water or gas

6.2.3

Not applicable.

6.2.4

Not applicable.

6.4 Loading and operating of appliances during tests

6.4.1

Replacement:

Load and operation should simulate normal use. Fans that can be tilted during normal use shall be located in the position with the highest emitted noise level, and the duration of the measurement shall be at least 10 s.

Fans that can oscillate automatically shall operate when oscillating. In the case of oscillating appliances, the A-weighted sound pressure level shall be averaged on at least one complete cycle.

6.4.3

Not applicable.

6.5 Location and mounting of appliances

6.5.1

Addition:

Ceiling fans may be hung from a special support instead of from the ceiling. In this case, care shall be taken to ensure that the means of suspension or clamping do not change the sound output of the appliance. In order not to restrict the airflow, the distance between the lowest edge of the appliance and the reflecting plane (usually the floor) shall be at least 1,5 m.

Alternatively, ceiling fans can be mounted in the reverse working position on the reflecting plane, providing this does not affect sound radiation.

6.5.2

Not applicable.

6.5.3

Not applicable.

6.5.4

Replacement:

Partition (wall and window) fans shall be mounted in an opening made either:

- in a wall of the special reverberation test room; or
- on the second reflecting plane of the free field over a reflecting plane environment.

The height between the centre of the appliance and the floor shall be $1,5 \text{ m} \pm 0,05 \text{ m}$.

In all cases, care shall be taken to follow the instructions given by the manufacturer and to avoid any structure-borne noise.

Care shall be taken to avoid any restriction of the airflow.

Attention shall be paid to avoid any difference of pressure between the rooms concerned (or atmosphere), in order to avoid an unwanted load on the fan.

6.5.5

Not applicable.

6.5.7

Not applicable.

7 Measurement of sound pressure levels

This clause of Part 1 is applicable except as follows:

7.1 Microphone array, measurement surface and RSS location for essentially free-field conditions over reflecting plane(s)

7.1.1

Addition:

This measurement surface shall be used for table, pedestal, louver, tower, bladeless, ceiling bracket and ceiling fans. Table fans are placed on the floor.

This measurement surface shall not be used for wall bracket fans and window fans.

The use of a windscreen is mandatory.

7.1.2

Not applicable.

7.1.3

Not applicable.

7.1.4

Replacement:

For partition (wall and window) fans and wall-mounted table fans, the measurement surface is a hemisphere, with 10 microphone positions as specified in Figure 101, centred in the projection of the geometrical centre of the reference box on the vertical plane, the coordinate system describing the microphone positions being located with the x - and y -axes in the vertical reflecting plan and the z -axis horizontally perpendicular to it. The x -axis lies in the horizontal central plane of the reference box. The front of the fan is directed towards the z -axis.

The area of this measurement surface is $S = 2\pi R^2$.

The radius of the hemisphere is 1 m.

7.1.5

Not applicable.

7.1.6

Addition:

This measurement surface shall be used for tall pedestal fans.

7.2 Microphone array and RSS location in hard-walled test rooms

Not applicable.

7.4 Measurements

7.4.4

Not applicable.

8 Calculation of sound pressure and sound power levels

This clause of Part 1 is applicable.

9 Information to be recorded

This clause of Part 1 is applicable except as follows:

9.7 Electric supply, water supply, etc.

9.7.3

Not applicable.

9.7.4

Not applicable.

10 Information to be reported

This clause of Part 1 is applicable, except as follows:

10.3 Test conditions for the appliance

10.3.4

Not applicable.

10.3.5

Not applicable.

Coordinates of microphone positions:

N°	x/R	y/R	z/R
1	0	-0,99	0,15
2	0,86	0,50	0,15
3	-0,86	0,50	0,15
4	-0,77	-0,45	0,45
5	0,77	-0,45	0,45
6	0	0,89	0,45
7	-0,57	0,33	0,75
8	0	-0,66	0,75
9	0,57	0,33	0,75
10	0	0	1,0

Measurement surface area:

$$S = 2\pi R^2$$

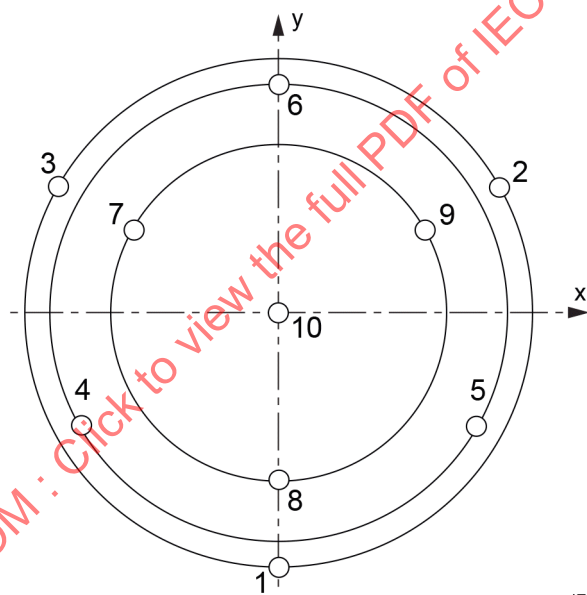
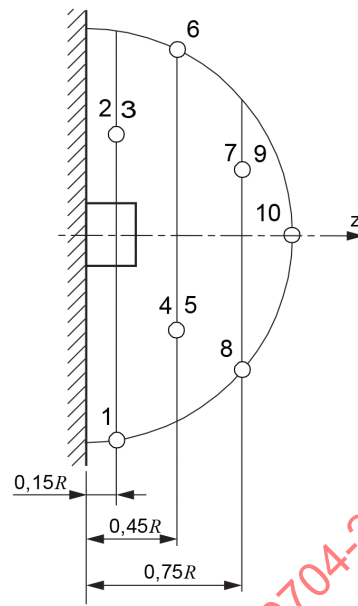


Figure 101 – Measurement surface – hemisphere – with 10 microphone positions for partition (wall and window) fans and for wall-mounted table fans

Annexes

The annexes of Part 1 apply with the following exception:

Annex B (normative)

Test enclosure

This annex of Part 1 is not applicable.

Bibliography

Addition:

IEC 60665:2018, *A.C. ventilating fans and regulators for household and similar purposes – Methods for measuring performance*

IEC 60879:2019, *Comfort fans and regulators for household and similar purposes – Methods for measuring performance*

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SOMMAIRE

AVANT-PROPOS	17
INTRODUCTION.....	19
1 Domaine d'application et objet.....	20
2 Références normatives	21
3 Termes et définitions	22
4 Méthodes de mesure et environnements acoustiques	24
5 Appareillage	24
6 Fonctionnement et emplacement des appareils en essai	24
7 Mesure des niveaux de pression acoustique.....	26
8 Calcul des niveaux de pression acoustique et de puissance acoustique	27
9 Informations à enregistrer.....	27
10 Informations à fournir	27
Annexes	30
Annexe B (normative) Enveloppe d'essai	30
Bibliographie.....	30
Figure 101 – Surface de mesure – hémisphère – avec 10 positions de microphone pour les aérateurs de cloison (mur et fenêtre) et les ventilateurs de table fixés sur un mur	29
Tableau 101 – Écarts-types des niveaux de puissance acoustique	21
Tableau 102 – Écarts-types pour la déclaration et la vérification	21

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES –
CODE D'ESSAI POUR LA DÉTERMINATION DU BRUIT AÉRIEN –****Partie 2-7: Exigences particulières pour les ventilateurs**

AVANT-PROPOS

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- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
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La Norme internationale IEC 60704-2-7 a été établie par le sous-comité 59L: Petits appareils domestiques, du comité d'études 59 de l'IEC: Aptitude à la fonction des appareils électrodomestiques et analogues.

Cette deuxième édition annule et remplace la première édition parue en 1997. Cette édition constitue une révision technique.

Cette édition inclut les modifications majeures suivantes par rapport à l'édition précédente:

- a) elle inclut des catégories de ventilateurs supplémentaires, définies dans l'IEC 60879:2019 et l'IEC 60665:2018;
- b) des écarts-types sont fournis pour les niveaux de puissance acoustique en 1.3;
- c) une méthode comparative a été ajoutée;

- d) les références normatives ont été mises à jour (ISO 3744:2010 et ISO 3743-1:2010);
- e) le présent document a fait l'objet de réajustements par rapport à l'IEC 60704-1:2010.

Le texte de cette norme est issu des documents suivants:

CDV	Rapport de vote
59L/168/CDV	59L/174/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60704, publiées sous le titre général *Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien*, peut être consultée sur le site web de l'IEC.

Cette Norme Internationale doit être utilisée conjointement avec l'IEC 60704-1:2010, *Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien – Partie 1: Règles générales*.

NOTE L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60704-1:2010.

Le texte correspondant de la Partie 1 modifié par la présente norme établit le code d'essai pour les ventilateurs.

La présente Partie 2-7 complète ou modifie les articles correspondants de l'IEC 60704-1:2010 de façon à établir le code d'essai pour les ventilateurs. Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2-7, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", il convient d'adapter les exigences, spécifications d'essai ou explications correspondantes de la Partie 1 en conséquence.

Les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101.

A l'exception de celles qui figurent dans un nouveau paragraphe ou de celles de la Partie 1, les notes sont numérotées à partir de 101, y compris celles figurant dans un article ou paragraphe remplacé.

Les annexes qui sont ajoutées sont désignées AA, BB, etc.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Les conditions de mesure spécifiées dans la présente Partie 2-7 garantissent une précision suffisante pour la détermination du bruit émis et la comparaison des résultats des mesures effectuées par différents laboratoires, tout en simulant autant que possible l'usage courant des ventilateurs domestiques.

Il est recommandé d'envisager la détermination des niveaux de bruit dans le cadre d'une procédure d'essai complète couvrant de nombreux aspects des propriétés et caractéristiques d'aptitude à la fonction des ventilateurs domestiques.

NOTE Comme indiqué dans l'introduction de l'IEC 60704-1, ce code d'essai ne concerne que le bruit aérien.

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – CODE D'ESSAI POUR LA DÉTERMINATION DU BRUIT AÉRIEN –

Partie 2-7: Exigences particulières pour les ventilateurs

1 Domaine d'application et objet

L'article correspondant de la Partie 1 s'applique avec les exceptions suivantes:

1.1 Domaine d'application

1.1.1 Généralités

Remplacement:

Le présent document s'applique aux ventilateurs électriques (y compris leurs accessoires et composants) qui sont destinés à des usages domestiques et analogues et conçus pour une alimentation en courant alternatif ou en courant continu.

Le moteur, les pales et leur boîtier, le cas échéant, constituent un bloc.

Ces exigences particulières s'appliquent aux:

- ventilateurs conventionnels;
- ventilateurs de table;
- ventilateurs sur pied;
- ventilateurs de plafond;
- ventilateurs sans pales;
- ventilateurs à applique murale;
- ventilateurs à applique au plafond;
- ventilateurs rotatifs;
- ventilateurs à colonne;
- aérateurs et aérateurs de cloison.

La présente norme ne s'applique pas aux:

- ventilateurs qui font partie intégrante d'un système de ventilation;
- ventilateurs conçus exclusivement pour des usages industriels;
- ventilateurs qui font partie d'un appareil (par exemple les ventilateurs de refroidissement);
- ventilateurs avec des fonctions supplémentaires (par exemple chauffage, humidification).

Les limites d'utilisation de ce code d'essai sont données dans le domaine d'application de l'IEC 60704-1.

1.1.2 Type de bruit

Remplacement:

Les méthodes spécifiées dans l'ISO 3743-1, l'ISO 3743-2 et l'ISO 3744 peuvent être utilisées pour mesurer le bruit émis par les ventilateurs.

1.1.3 Dimensions de la source

Remplacement:

La méthode spécifiée dans l'ISO 3744 s'applique aux sources de bruit, quelles que soient leurs dimensions. Lorsque l'ISO 3743-1 et l'ISO 3743-2 sont appliquées, il convient de s'assurer que les dimensions maximales de l'appareil en essai respectent les exigences spécifiées au 1.2 de l'ISO 3743-1:2010 et au 1.3 de l'ISO 3743-2:1994.

1.2 Objet

Addition:

Le présent document décrit la détermination de l'émission sonore des ventilateurs domestiques en fonctionnement normal à la vitesse maximale. D'autres vitesses peuvent en outre être utilisées. Les exigences relatives à la déclaration des valeurs d'émission sonore ne relèvent pas du domaine d'application du présent document.

Le présent document a pour objet de donner des instructions pour mesurer le bruit dû au fonctionnement d'un ventilateur à l'intérieur d'une pièce.

Note 101 Pour la détermination et la vérification des valeurs d'émission sonore déclarées dans les spécifications du produit, se référer à l'IEC 60704-3.

1.3 Incertitude de mesure

Remplacement:

Les valeurs estimées des écarts-types des niveaux de puissance acoustique déterminés conformément au présent document sont données dans le Tableau 101:

Tableau 101 – Écarts-types des niveaux de puissance acoustique

Écart-type (dB)	
σ_r (répétabilité)	σ_R (reproductibilité)
0,4	1,0

Addition:

1.101 Écart-type pour la déclaration et la vérification

Pour les besoins de la détermination et de la vérification des valeurs d'émission sonore déclarées conformément à l'IEC 60704-3, les valeurs du Tableau 102 s'appliquent:

Tableau 102 – Écarts-types pour la déclaration et la vérification

Écart-type (dB)		
σ_p (production)	σ_t (total)	σ_M (référence)
0,5 à 1,0	1,0 à 1,4	1,5

2 Références normatives

L'article correspondant de la Partie 1 s'applique avec les exceptions suivantes: