

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Test code for the determination of airborne acoustical noise –

Part 2-4: Particular requirements for washing machines and spin extractors

Appareils électrodomestiques et analogues – Code d'essai pour la détermination du bruit aérien –

Partie 2-4: Exigences particulières pour les machines à laver le linge et lesessoreuses centrifuges



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
TEST CODE FOR THE DETERMINATION
OF AIRBORNE ACOUSTICAL NOISE –****Part 2-4: Particular requirements for washing machines
and spin extractors**

FOREWORD

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IEC 60704-2-4 has been prepared by subcommittee 59D: Performance of household and similar electrical laundry appliances, of IEC technical committee 59: Performance of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011. This edition constitutes a technical revision.

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

- a) alignment to IEC 60704-1:2021;
- b) alignment to Edition 6 of IEC 60456:2024, especially regarding test programme and detergent;
- c) considering multi-compartment washing machines;
- d) considering wall-mounted washing machines;
- e) definition of the drum speed measurement;
- f) adapting parts for standard test load and test programme.

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

Draft	Report on voting
59D/526/FDIS	59D/528/RVD

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 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.

This document 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*.

<https://www.iec.ch/standards/iec-60704-2-4-2025>
The relevant text of IEC 60704-1:2021 as amended by this document establishes the test code for washing machines and spin extractors.

This document 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 document, 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 IEC 60704-1:2021 should be adapted accordingly.

Subclauses, tables and figures that are additional to those in IEC 60704-1:2021 are numbered starting from 101. Additional annexes are lettered AA, BB, etc.

Unless notes are in a new subclause or involve notes in IEC 60704-1:2021, they are numbered starting from 101, including those in a replaced clause or subclause.

Words in **bold** in the text are defined in Clause 3.

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.

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INTRODUCTION

The measuring conditions specified in this document 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 **washing machines** and **spin extractors**.

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 **washing machines** and **spin extractors**.

NOTE As stated in the introduction to IEC 60704-1:2021, 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 2-4: Particular requirements for washing machines and spin extractors

1 Scope

Addition:

These particular requirements apply to single unit electrical **washing machines** and the washing and spinning function of combined appliances for household and similar use and to **spin extractors** for household and similar use.

NOTE 101 For washer-dryers, see IEC 60704-2-16:2019.

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

NOTE 102 For determining and verifying noise emission values declared in product specifications, see IEC 60704-3:2019.

2 Normative references

Addition:

IEC 60456:2024, *Washing machines for household use – Methods for measuring the performance*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.101

washing machine

appliance for cleaning and rinsing of textiles using water, which can also have a means of extracting excess water from the textiles

[SOURCE: IEC 60456:2024, 3.1.1]

3.102

multi-compartment washing machine

washing machine equipped with more than one drum, whether in separate units or in the same casing

[SOURCE: IEC 60456:2024, 3.1.11]

3.103**wall-mounted washing machine**

washing machine which is intended to be mounted to a wall and cannot be placed on the floor

3.104**spin extractor**

separate water-extracting appliance that removes water from textiles by centrifugal action (spin extraction)

[SOURCE: IEC 60456:2024, 3.1.5]

3.105**rated capacity**

maximum mass in kg of dry textiles of a particular type that the manufacturer declares can be treated in the **washing machine** on the programme selected

Note 1 to entry: When a **multi-compartment washing machine** operates in multi-drum mode, the **rated capacity** is considered for each individual drum.

[SOURCE: IEC 60456:2024, 3.1.29]

3.106**cotton towels**

towels only of the cotton base load defined in IEC 60456

3.107**standard test load**

batch of textile load consisting of a specific number of **cotton towels** only

3.108**simultaneous programme**

series of operations which are pre-defined within the **multi-compartment washing machine** and which are declared by the manufacturer as suitable for washing certain textile types in two or more drums at the same time

Note 1 to entry: This programme can be also used for drums that can be operated separately.

[SOURCE: IEC 60456:2024, 3.1.21]

3.109**rinsing operation**

operation intended to remove detergent and dirt from the textiles by washing with clean water

3.110**washing period**

operating period that begins at the first water filling and ends at the start of the drainage pump before the first **rinsing operation**

3.111**rinsing and spinning period**

operating period that begins at the start of the drainage pump before the first **rinsing operation** and ends with the **end of programme**

3.112 end of programme

when the **washing machine** indicates programme completion and the load is accessible to the user

Note 1 to entry: Where there is no **end of programme** indicator and the door is locked during operation, the programme is complete when the load is accessible to the user.

Note 2 to entry: Where there is no **end of programme** indicator and the door is not locked during operation, the programme is complete when the electric power of the appliance falls to a steady state condition.

Note 3 to entry: An indication of the **end of programme** can be in the form of a light (on or off), a sound, an indicator shown on a display or the release of a door or latch. Some **washing machines** can have a short delay from an **end of programme** indicator until the load is accessible to the user.

Note 4 to entry: Electronic checks of the status of safety components are not considered as function or operation and can occur after the **end of the programme**.

[SOURCE: IEC 60456:2024, 3.1.33]

4 Measurement methods and acoustical environments

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 as 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 as specified in ISO 3743-1 or ISO 3743-2.

4.4 Acoustical environments

4.4.1 General requirements and criterion for adequacy of the test environment

Addition:

Add after the first paragraph:

The methods specified in ISO 3743-1, ISO 3743-2 and ISO 3744 can be used for measuring noise emitted by **washing machines** and **spin extractors**.

The method specified in ISO 3744 is applicable to noise sources of any size. When applying ISO 3743-1 and ISO 3743-2, it shall be ensured that the maximum size of the **washing machine** or **spin extractor** under test fulfils the requirements specified in ISO 3743-1:2010, 4.2 and ISO 3743-2:2018, Clause 5.

4.5 Measurement uncertainties

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

Replacement:

For **washing machines**, the estimated values of standard deviations of sound power levels, determined according to this document, are as indicated in Table 1:

Table 1 – Standard deviations of sound power levels for washing machines

Standard deviation dB	
σ_r (repeatability)	σ_R (reproducibility)
0,6	1,0

For **spin extractors**, the estimated values of standard deviations of sound power levels, determined according to this document, are as indicated in Table 2:

Table 2 – Standard deviations of sound power levels for spin extractors

Standard deviation dB	
σ_r (repeatability)	σ_R (reproducibility)
0,5	1,0

For the purpose of determining and verifying noise emission values for **washing machines** according to IEC 60704-3, the values indicated in Table 101 apply:

Table 101 – Standard deviations for washing machines

Standard deviation dB		
σ_p (production)	σ_t (total)	σ_M (reference)
1,0 to 2,2	1,4 to 2,4	2,5

For the purpose of determining and verifying noise emission values for **spin extractors** according to IEC 60704-3, the values indicated in Table 102 apply:

Table 102 – Standard deviations for spin extractors

Standard deviation dB		
σ_p (production)	σ_t (total)	σ_M (reference)
1,0 to 1,2	1,4 to 1,6	2,0