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INTERNATIONAL STANDARD

AMENDMENT 1

Sound system equipment –
Part 7: Headphones and earphones

IEC 60268-7:2010-01/AMD1:2020-09(en)

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FOREWORD

This amendment has been prepared by technical area 20: Analogue and digital audio, of IEC technical committee 100: Audio, video and multimedia systems and equipment

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

CDV	Rapport de vote
100/3316/CDV	100/3437/RVC

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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 to Amendment 1

This Amendment 1 contains the following significant technical changes with respect to IEC 60268-7:2010:

- evaluation of free-field compensated frequency response has been added;
- evaluation of diffuse-field compensated frequency response has been added;
- the Bibliography has been updated;
- some normative references have been updated;
- the term "HATS" and its definition has been added.

1 Scope

In item a), replace “IEC 60065” *with* “IEC 62368-1”.

2 Normative references

Add the following new reference:

IEC TS 60318-7, *Electroacoustics – Simulators of human head and ear – Part 7: Head and torso simulator for the measurement of air-conduction hearing aids*

3 Terms and definitions

Add, after the existing term 3.16, the following new term.

3.17
head and torso simulator
HATS
simulator of a median adult human head and part of the torso extending in total from the top of the head to the waist and designed to simulate the sound pick-up characteristics and acoustic diffraction

Note 1 to entry: The head simulator includes two pinna simulators, and at least one occluded-ear simulator.

[SOURCE: IEC TS 60318-7:2017, 3.1, modified – The preferred term "manikin" has been omitted.]

Add, after 8.6.6, the following new Subclauses 8.6.7, 8.6.8 and Figure 4.

8.6.7 Free-field compensated frequency response

8.6.7.1 Characteristics to be specified

The frequency response measured at the ear simulator of the HATS is compensated either during the measurement by inverse filtering with the 0° free-field response of the HATS, or by subtracting (in dB) the 0° free-field frequency response of the HATS from the uncompensated measured headphone response at the ear simulator of the HATS as a post-process operation.

8.6.7.2 Method of measurement

- The headphone is brought under standard conditions for measurement, and a test signal at the rated source voltage is applied in series with the rated source impedance.
- The frequency is then varied over at least the rated frequency range of the headphone (see 8.6.6), and the sound pressure (level) at each frequency is noted for both the right and the left ear.

  NOTE Ideally, the values for both ears are equal. Reasons for differences in practice can include non-symmetrical positioning of the headphone or wider tolerances of the headphone transducers.
- The output of the ear simulator of the HATS with or without compensation shall be at least 10 dB above the noise floor of the measurement system at all measured frequencies.

The nominal frequency response is obtained from a power average of the five measurements and finally graphically presented in decibels referred to the value at the standard reference frequency. The headphones shall be removed and remounted to the HATS before each measurement.

8.6.7.3 HATS

The HATS used for measurement shall comply with IEC TS 60318-7, however with the pinna simulator specified in IEC 60268-7:2010, Annex A. Otherwise, the type of pinna simulator shall be stated with the measurement results.

NOTE For use of a HATS outside the scope of IEC TS 60318-7, that scope recommends that a statistical analysis of the measurement data be carried out to determine the level of repeatability that can be achieved. This is especially necessary for measurements at frequencies higher than 16 kHz. Detailed requirements for these are under consideration.

8.6.7.4 Characteristics to be stated

Measured free-field compensated frequency response should be stated together with at least one of the following characteristics:

- the free-field response of the HATS used in the measurements;
- the frequency response of the headphones measured with the HATS without free-field compensation.

An example of a setup for the measurement of free-field compensated frequency response is shown in Figure 4.

8.6.8 Diffuse-field compensated frequency response

8.6.8.1 Characteristics to be specified

The frequency response measured at the ear simulator of the HATS is compensated either during the measurement by inverse filtering with the diffuse-field response of the HATS, or by subtracting (in dB) the diffuse-field frequency response of the HATS from the uncompensated measured headphone response at the ear simulator of the HATS as a post-process operation.

8.6.8.2 Method of measurement

- The headphone is brought under standard conditions for measurement, and a test signal at the rated source voltage is applied in series with the rated source impedance.
- The frequency is then varied over at least the rated frequency range of the headphones (see 8.6.6), and the sound pressure (level) at each frequency is noted for both the right and the left ear.

  NOTE Ideally, the values for both ears are equal. Reasons for differences in practice can include non-symmetrical positioning of the headphones or wider tolerances of the headphone transducers.

- The output of the ear simulator of the HATS with or without compensation shall be at least 10 dB above the noise floor of the measurement system at all measured frequencies.

The nominal frequency response is obtained from a power average of the five measurements and finally graphically presented in decibels referred to the value at the standard reference frequency. The headphones shall be removed and remounted to the HATS before each measurement.

8.6.8.3 HATS

The HATS used for measurement shall comply with IEC TS 60318-7, however with the pinna simulator specified in IEC 60268-7:2010, Annex A. Otherwise, the type of pinna simulator shall be stated with the measurement results.

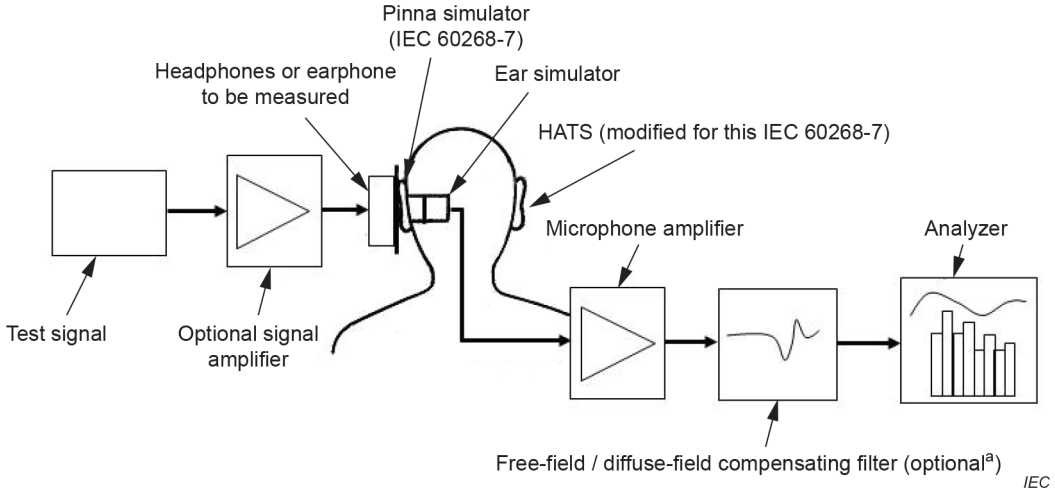
NOTE For use of a HATS outside the scope of IEC TS 60318-7, that scope recommends that a statistical analysis of the measurement data be carried out to determine the level of repeatability that can be achieved. This is especially necessary for measurements at frequencies higher than 16 kHz. Detailed requirements for these are under consideration.

8.6.8.4 Characteristics to be stated

Measured diffuse-field compensated frequency response should be stated together with at least one of the following characteristics:

- the diffuse-field response of the HATS used in the measurements;
- the frequency response of the headphones measured with the HATS without diffuse-field compensation.

An example of a setup for the measurement of diffuse-field compensated frequency response is shown in Figure 4.



[a] Free-field/diffuse-field compensation can also be done by post processing.

Figure 4 – Example of a setup for the measurement of free-field/ diffuse-field compensated frequency response

Replace the existing entire bibliographical references with the following:

Bibliography

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IEC 60268-3, *Sound system equipment – Part 3: Amplifiers*

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IEC 61938, *Multimedia systems – Guide to the recommended characteristics of analogue interfaces to achieve interoperability (GMT)*

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