

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Sound system equipment –
Part 7: Headphones and earphones

Équipements pour systèmes électroacoustiques –
Partie 7: Casques et écouteurs

STANDARD PREVIEW
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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,
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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.

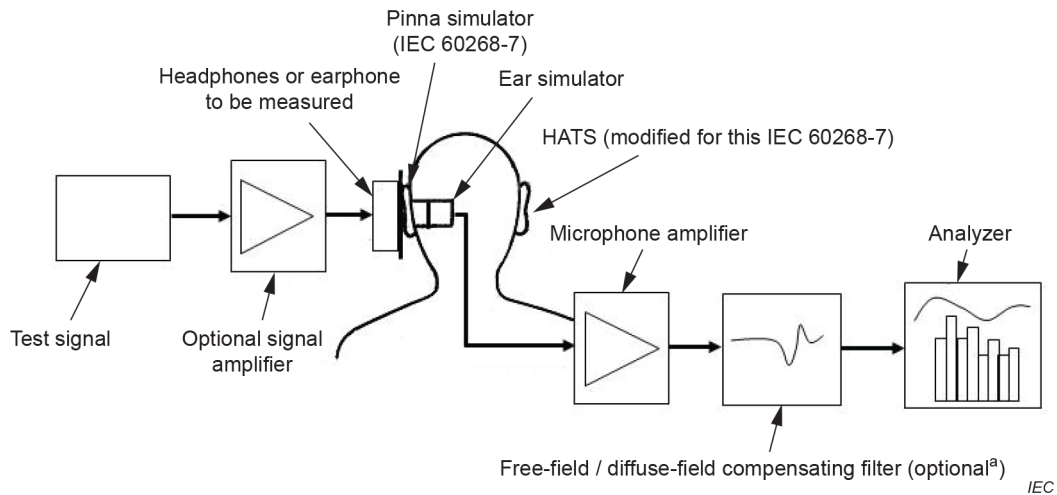
NOTE For use of a HATS outside the scope of IEC TS 60318-7, that scope recommends that a statistical analysis of the measurement data be carried out to determine the level of repeatability that can be achieved. This is especially necessary for measurements at frequencies higher than 16 kHz. Detailed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

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Replace the existing entire bibliographical references with the following:

Bibliography

IEC 60118-0, *Hearing aids – Part 0: Measurement of the performance characteristics of hearing aids*

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

IEC 60268-4, *Sound system equipment – Part 4: Microphones*

IEC 60268-5, *Sound system equipment – Part 5: Loudspeakers*

IEC 60318-1, *Electroacoustics – Simulators of human head and ear – Part 1: Ear simulator for the measurement of supra-aural and circumaural earphones*

IEC 60318-2, *Electroacoustics – Simulators of human head and ear – Part 2: An interim acoustic coupler for the calibration of audiometric earphones in the extended high-frequency range*

IEC 60318-3, *Electroacoustics – Simulators of human head and ear – Part 3: Acoustic coupler for the calibration of supra-aural earphones used in audiometry*

IEC 60318-5, *Electroacoustics – Simulators of human head and ear – Part 5: 2 cm³ coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts*

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

IEC 62368-1, *Audio/Video, information and communication technology equipment – Part 1: Safety requirements*

ISO 7029, *Acoustics – Statistical distribution of hearing thresholds as a function of age and gender*

ISO 18233, *Acoustics – Application of new measurement methods in building and room acoustics*

ITU-T Recommendation P.57, *Artificial ear*

ITU-T Recommendation P.58, *Head and torso simulator for telephonometry*

ANSI/ASA S3.7, American National Standard – Method for Measurement and Calibration of Earphones

Kiyofumi Inanaga, Takeshi Hara, Gunnar Rasmussen and Yasuhiro Riko: “Research on a measuring method of headphones and earphones using HATS”, 7529, *Proceedings of AES 125th Convention, San Francisco, CA, USA (2008 October)*

IEEE 1652, *IEEE Standard for Translating Head and Torso Simulator Measurements from Eardrum to Other Acoustic Reference Points*

JEITA RC-8140B-1:2016, *Headphones and Earphones*

C.J. Struck, “*Refinements in the Electroacoustic Testing of Headphones*”, and proceedings of the Audio Engineering Society International Conference on Headphone Technology – Aalborg, Denmark (2016 August 24–26)

N. Tsunoda et al., *A Headphone Measurement System for Audible Frequency and beyond 20kHz.*, AES Paper 9375; AES Convention 139; October 2015

N. Tsunoda et al., *A Headphone Measurement System Covers both Audible Frequency and beyond 20kHz (Part 2)*; AES Paper 9530; AES Convention 140; May 2016

N. Tsunoda et al., *A Headphone Measurement System Covers both Audible Frequency and beyond 20kHz (Part 3)*; AES Paper 9873; AES Convention 143; October 2017

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AVANT-PROPOS

Le présent amendement a été établi par le domaine technique 20: Audio analogique et numérique, du comité d'études 100 de l'IEC: Systèmes et équipements audio, vidéo et services de données.

La présente version bilingue (2021-03) correspond à la version anglaise monolingue publiée en 2020-09.

La version française de cet amendement n'a pas été soumise au vote.

Le comité a décidé que le contenu de cet amendement et de la publication de base 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 à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

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(standards.iteh.ai) INTRODUCTION à l'Amendement 1

Le présent Amendement 1 inclut les modifications techniques majeures suivantes par rapport à l'IEC 60268-7:2010: <https://standards.iteh.ai/catalog/standards/sist/0db0794a-264a-414c-87c3-29eda09712af/iec-60268-7-2010-amd1-2020>

- l'évaluation de la réponse en fréquence compensée en champ libre a été ajoutée;
- l'évaluation de la réponse en fréquence compensée en champ diffus a été ajoutée;
- la Bibliographie a été mise à jour;
- certaines références normatives ont été mises à jour;
- le terme "HATS" et sa définition ont été ajoutés.

1 Domaine d'application

Au point a), remplacer "IEC 60065" par "IEC 62368-1".

2 Références normatives

Ajouter la nouvelle référence suivante:

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* (disponible en anglais seulement)