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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Sound system equipment – Part 24: Headphones and earphones – Active acoustic noise cancelling characteristics

Équipements pour systèmes électroacoustiques – Partie 24: Casques et écouteurs – Caractéristiques d'annulation active du bruit acoustique



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SOUND SYSTEM EQUIPMENT –

Part 24: Headphones and earphones – Active acoustic noise cancelling characteristics

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

Draft	Report on voting
100/3880/CDV	100/3981/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 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 parts in the IEC 60268 series, published under the general title *Sound system equipment*, 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- withdrawn, or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

This document specifies both methods of measurement and reporting of data for noise cancelling characteristics on active acoustic noise cancelling headphones and earphones.

Active acoustic noise cancelling headphones and earphones are commonly used to reduce the ambient acoustic noise to which the ear is exposed.

However, to date, there is no International Standard for evaluating the noise cancelling performance of active acoustic noise cancelling headphones and earphones. Manufacturers currently measuring noise cancelling performance only use proprietary methods, and the resulting metrics are neither uniform nor comparable.

This document provides measurement methods and metrics for the noise cancelling performance of active acoustic noise cancelling headphones and earphones. The resulting measured and calculated values enable comparison of performance data obtained in different locations.

SOUND SYSTEM EQUIPMENT –

Part 24: Headphones and earphones – Active acoustic noise cancelling characteristics

1 Scope

This document is applicable to active acoustic noise-cancelling headphones and earphones which have the function of reducing the noise heard by the user by the output sound from the transducer generated by the environment noise detection microphone and the noise reduction signal processing circuit.

This document specifies the terms and definitions of this type of headphones or earphones, the characteristics to be specified, and the measurement and evaluation methods.

The noise detection microphone or microphones are mounted in the body, on the surface, or on an accessory of the headphones or earphones. Signal processing circuits are analogue and digital electronic circuits.

This document does not deal with equipment intended for hearing protection.

The noise cancelling characteristic measurement methods can be applied to headphones and earphones having no active noise cancelling function.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60268-7, *Sound system equipment – Part 7: Headphones and earphones* IEC 61260-1:2014, *Electroacoustics – Octave-band and fractional-octave-band filters – Part 1: Specifications*

IEC 60318-4, *Electroacoustics – Simulators of human head and ear – Part4: Occluded-ear simulator for the measurement of earphones coupled to the ear by means of ear inserts*

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

IEC 61260-1, *Electroacoustics – Octave-band and fractional-octave-band filters – Part 1: Specifications*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO 532-1:2017, *Acoustics – Method for calculating loudness – Part 1: Zwicker method*

ISO 3741:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Precision methods for reverberation test rooms*

ANSI/ASA S12.42:2010, *Methods for the Measurement of Insertion Loss of Hearing Protection Devices in Continuous or Impulsive Noise Using Microphone-in-Real-Ear or Acoustic Test Fixture Procedures*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60268-7, in IEC 60318-4, in IEC 60318-7 and the following 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

3.1
active noise cancellation
ANC
characteristic of reducing the noise level in the user's ear canal by the output sound from the driver, which is generated by the noise detection microphone and the signal processing circuit

3.2
noise cancelling headphones
ANC headphones
headphones or earphones that have the characteristics of active noise cancelling

3.3
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 60318-7:2022, 3.1, modified – The abbreviated term "HATS" has been added.]

3.4
acoustic test fixture
ATF
inanimate device that approximates certain physical characteristics and dimensions of a representative human head, pinnae, and ear canal and is used for measuring the insertion loss of ambient noise by a headphone

[SOURCE: ANSI/ASA S12.42, modified – "of a hearing protection device" replaced with "of ambient noise by a headphone"]

3.5
passive insertion loss
insertion loss determined from the difference between the sound pressure levels with and without the ANC headphones attached to the HATS or ATF, measured in the condition of the ANC function turned off

Note 1 to entry: Passive insertion loss is measured in dB.