IEC 60318-8

Edition 1.0 2022-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electroacoustics – Simulators of human head and ear –
Part 8: Acoustic coupler for high-frequency measurements of hearing aids and earphones coupled to the ear by means of ear inserts

Électroacoustique – Simulateurs de tête et d'oreille humaines –
Partie 8: Coupleur acoustique pour les mesurages à hautes fréquences des appareils de correction auditive et des écouteurs couplés à l'oreille par des embouts

IEC 60318-8:2022-04

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

Draft	Report on voting
29/1111/FDIS	29/1117/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

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A list of all parts in the IEC 60318 series, published under the general title *Electroacoustics – Simulators of human head and ear*, can be found on the IEC website.

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INTRODUCTION

Advancement in hearing aid design makes it possible to increase the bandwidth of hearing aids up to 16 kHz.

The 2 cm^3 coupler as described in IEC 60318-5 [1][1] is suitable for measurements up to 8 kHz. At frequencies above 8 kHz, high measurement uncertainty will occur in earphone responses, due to acoustic resonances in the coupler.

The occluded-ear simulator as described in IEC 60318-4 [2] simulates the human external ear up to 10 kHz and can be used as an acoustic coupler up to 16 kHz. It is designed with a principal cavity length which produces a half-wavelength resonance of the sound pressure at approximately 13,5 kHz. This resonance, which is also present in a person's ear canal but not controlled by the tympanic membrane, can also cause measurement uncertainty in earphone responses above 10 kHz.

Accordingly, there is a need for a well-defined and robust acoustic coupler to be used by designers of transducers (receiver, earphone), and by the designer and dispensers of hearing aids when making measurements on earphones in the frequency range 8 kHz to 16 kHz.

The sound pressure developed by an earphone is, in general, not the same in an acoustic coupler as in a person's ear. However, results obtained with an acoustic coupler can be used as a simple and ready means for the exchange of specifications and test data on hearing aids and insert earphones used in audiometry.

This document describes an acoustic coupler for loading a hearing aid or insert earphone with a specified acoustic impedance when testing acoustic performance, in the frequency range up to 16 kHz, as required in IEC 60118-0 [3].

[1] Numbers in square brackets refer to the Bibliography.

ELECTROACOUSTICS – SIMULATORS OF HUMAN HEAD AND EAR –

Part 8: Acoustic coupler for high-frequency measurements of hearing aids and earphones coupled to the ear by means of ear inserts

1 Scope

This part of IEC 60318 describes an acoustic coupler for loading a hearing aid or insert earphone with a specified acoustic impedance when testing its acoustic performance, in the frequency range up to 16 kHz. It is suitable for air-conduction hearing aids and earphones, coupled to the ear by means of ear inserts, earmoulds or similar devices.

The acoustic coupler does not simulate the human ear. However, it has an effective volume of only 0,4 cm^3, which is small enough not to produce significant resonances in the coupler in the frequency range below 16 kHz. Therefore, it will load the earphone with a known acoustic impedance, which allows repeatable measurements with low uncertainty to be obtained on earphones used in extended high-frequency audiometry.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

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

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

3.1 Terms and definitions

3.1.1
acoustic coupler
device for measuring the acoustic output of sound sources where the sound pressure is measured by a calibrated microphone coupled to the source by a cavity of predetermined shape and volume which does not necessarily approximate the acoustic impedance of the normal human ear

3.1.2
earmould simulator
ear insert simulator
insert which terminates the entrance of the acoustic coupler and provides for passage of sound into the acoustic coupler through an opening on its axis

3.1.3
reference plane
plane perpendicular to the axis of the cavity of the acoustic coupler, chosen to pass through the position normally occupied by the tip of an earmould