

**Electroacoustics - Simulators of human head and ear -
Part 4: Occluded-earsimulator for the measurement of
earphones coupled to the ear by means of earinserts**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60318-4:2010 sisaldab Euroopa standardi EN 60318-4:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.05.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 13.03.2009.

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This standard is ratified with the order of Estonian Centre for Standardisation dated 31.05.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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English version

**Electroacoustics -
Simulators of human head and ear -
Part 4: Occluded-ear simulator for the measurement of earphones coupled
to the ear by means of ear inserts
(IEC 60318-4:2010)**

Electroacoustique -
Simulateurs de tête et d'oreille humaines -
Partie 4: Simulateur d'oreille occluse
pour la mesure des écouteurs couplés
à l'oreille par des embouts
(CEI 60318-4:2010)

Akustik -
Simulatoren des menschlichen Kopfes
und Ohres -
Teil 4: Simulator für den abgeschlossenen
Gehörgang zur Messung an mittels
Ohreinsätzen an das Ohr angekoppelten
Ohrhörern
(IEC 60318-4:2010)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 29/662/CDV, future edition 1 of IEC 60318-4, prepared by IEC TC 29, Electroacoustics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60318-4 on 2010-05-01.

This standard supersedes HD 443 S1:1983.

The main changes with respect to the previous edition are listed below:

- extension of the usable frequency range to 100 Hz – 16 000 Hz;
- addition of values of maximum permitted expanded uncertainties to all tolerances.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2011-02-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2013-05-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60318-4:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- | | | |
|---------------|------|-----------------------------|
| [1] ISO 389-2 | NOTE | Harmonized as EN ISO 389-2. |
| [2] ISO 389-5 | NOTE | Harmonized as EN ISO 389-5. |
| [3] ISO 389-6 | NOTE | Harmonized as EN ISO 389-6. |
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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61094-4	-	Measurement microphones - Part 4: Specifications for working standard microphones	EN 61094-4	-
ISO/IEC Guide 98-3	-	Uncertainty of measurement - Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)	-	-

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ELECTROACOUSTICS – SIMULATORS OF HUMAN HEAD AND EAR –

Part 4: Occluded-ear simulator for the measurement of earphones coupled to the ear by means of ear inserts

1 Scope

This part of IEC 60318 describes an occluded-ear simulator intended for the measurement of insert earphones in the frequency range from 100 Hz to 10 000 Hz. It is suitable for air conduction hearing aids and earphones, coupled to the ear by means of ear inserts e.g. ear moulds or similar devices. The occluded-ear simulator is also suitable as the basis for an extension intended to simulate the complete ear canal and the outer ear (for instance in head simulators).

The occluded-ear simulator simulates the acoustic transfer impedance for the occluded normal adult human ear. However, it does not simulate the leakage between an earmould and a human ear canal; therefore, the results obtained with the occluded-ear simulator may deviate from the performance of an insert earphone on a real ear, especially at low frequencies. Moreover, large performance variations among individual ears will occur which should be considered when using the ear simulator.

Above 10 kHz the device does not simulate a human ear, but can be used as an acoustic coupler at additional frequencies up to 16 kHz. Below 100 Hz, the device has not been verified to simulate a human ear, but can be used as an acoustic coupler at additional frequencies down to 20 Hz.

NOTE Due to resonances in the acoustic transfer impedance of the occluded-ear simulator above 10 kHz, high measurement uncertainties, e.g. in the order of 10 dB, can occur in earphone responses. Repeatable results mainly are obtained for insert earphones with high acoustic damping (used for instance in the extended high-frequency audiometry, see the earphones listed in ISO 389-6)[3]¹ coupled to the occluded-ear simulator by means of a simple, symmetrically designed and air tight coupling device.

2 Normative references

The following referenced documents are indispensable for the application 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 61094-4, *Measurement microphones – Part 4: Specifications for working standard microphones*

ISO/IEC Guide 98-3, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

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

¹ Figures in square brackets refer to the Bibliography.