

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electroacoustics – Audiometric equipment –
Part 6: Instruments for the measurement of otoacoustic emissions**

**Electroacoustique – Equipements audiométriques –
Partie 6: Instruments pour la mesure des émissions otoacoustiques**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – AUDIOMETRIC EQUIPMENT –

Part 6: Instruments for the measurement of otoacoustic emissions

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International Standard IEC 60645-6 has been prepared by IEC technical committee 29: Electroacoustics.

The text of this standard is based on the following documents:

FDIS	Report on voting
29/673/FDIS	29/681/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all the parts of the IEC 60645 series, under the general title *Electroacoustics – Audiometric equipment*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site 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- withdrawn;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

Developments in the field of diagnostic hearing measurement have resulted in a number of instruments designed to evaluate the otoacoustic emissions of the human ear evoked by acoustic test signals having different spectral and temporal characteristics.

The practical use of such instruments concerns the measurement of sound energy emitted by the inner ear and its separation from sounds emerging from other physiological or artificial sources.

ELECTROACOUSTICS – AUDIOMETRIC EQUIPMENT –

Part 6: Instruments for the measurement of otoacoustic emissions

1 Scope

This part of IEC 60645 applies to instruments designed primarily for the measurement of otoacoustic emissions in the human external acoustic meatus evoked by acoustic probe pulses or tones. This standard defines the characteristics to be specified by the manufacturer, lays down performance specifications for two types of instruments¹ and specifies the functions to be provided on these types. This part of IEC 60645 describes methods of test to be used for approval testing and guidance on methods for undertaking routine calibration.

The purpose of this part of IEC 60645 is to ensure that measurements made under comparable test conditions with different instruments complying with the standard will be consistent. Instruments which provide a measurement function not specifically within the scope of the standard shall still comply with any relevant requirements. This standard is not intended to restrict development or incorporation of new features, nor to discourage innovative approaches.

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 60318-4, *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*²

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 60601-1, *Medical electrical equipment – Part 1: General requirements for basic safety and essential performance*

IEC 60601-1-2, *Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic compatibility – Requirements and tests*

IEC 60601-1-4, *Medical electrical equipment – Part 1-4: General requirements for safety – Collateral standard: Programmable electrical medical systems*

IEC 60645-1:2001, *Electroacoustics – Audiological equipment – Part 1: Pure-tone audiometers*

¹ Screening and full diagnostics.

² To be published.

IEC 60645-3:2007, *Electroacoustics – Audiometric equipment – Part 3: Test signals of short duration*

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.

3.1 otoacoustic emissions

OAE

general term covering all types of acoustic signals generated in the inner ear which can be recorded in the external acoustic meatus

NOTE The spontaneous otoacoustic emissions (SOAE) and stimulus frequency otoacoustic emissions (SFOAE) which are also a part of the otoacoustic emissions are not covered by this standard.

3.2 transient-evoked otoacoustic emissions

TEOAE

acoustic signals emitted by the inner ear after stimulation with a stimulus of short duration

3.3 distortion product otoacoustic emissions

DPOAE

acoustic signals generated in the inner ear during stimulation with two pure tones (frequencies f_1 and f_2 , f_1 being the lower frequency)

NOTE The frequencies of the DPOAE are given by the formulas for distortions $3f_1$, $2f_1-f_2$, $2f_2-f_1$, $3f_2$, etc.

3.4 nominal test frequency

the frequency for which a DPOAE measurement is reported

3.5 primary tones

pure tone stimuli used to evoke DPOAEs

3.6 probe

part of the instrument, usually containing transducers, interfacing the instrument to the ear

3.7 ear tip

device used to provide a seal between the probe and the external acoustic meatus

3.8 probe signal

acoustic signal that is emitted into the external auditory meatus by means of a probe

3.9 peak-to-peak equivalent sound pressure level peSPL

r.m.s. value of a long-duration sinusoidal sound signal which, when compared under the same test conditions with a short-duration output signal from the transducer under test, has the