

International Standard



4869

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Acoustics — Measurement of sound attenuation of hearing protectors — Subjective method

Acoustique — Mesurage d'affaiblissement acoustique des protecteurs individuels contre le bruit — Méthode subjective

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4869 was developed by Technical Committee ISO/TC 43, *Acoustics*, and was circulated to the member bodies in May 1977.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
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The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
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Acoustics — Measurement of sound attenuation of hearing protectors — Subjective method

0 Introduction

Hearing protectors are commonly used to reduce to acceptable levels the noise to which the ear is exposed. Hearing protectors are manufactured as ear-plugs, ear-muffs or helmets. Standardized methods of measurement of sound attenuation allow the comparison of performance data obtained in different locations under similar conditions, the rank ordering and selection of various models and the evaluation of design and construction features that may significantly affect performance.

NOTE — Methods other than the one described in this International Standard do not necessarily yield values which are equal to those obtained according to the present International Standard.

1 Scope and field of application

This International Standard specifies a subjective method for the measurement of sound attenuation of hearing protectors determined at the threshold of audibility.

2 References

ISO 266, *Acoustics — Preferred frequencies for measurements*.

ISO 389, *Acoustics — Standard reference zero for the calibration of pure-tone audiometers*.

IEC Publication 225, *Octave, half-octave and third-octave band filters for the analysis of sounds and vibrations*.

IEC Publication 263, *Scales and sizes for plotting frequency characteristics*.

IEC Publication 645, *Audiometers*.

3 Definitions

3.1 hearing protector : A device worn by a person to prevent unwanted auditory effects from acoustic stimuli.

NOTE — Hearing protectors may also include electronic devices for communication or devices designed to play an active role in the reduction of the noise level between the hearing protector and the ear-drum.

3.2 ear-muff : A hearing protector consisting of an ear-cup to be pressed against each pinna or of a circumaural ear-cup to be pressed against the head around the pinna. The ear-cups can be pressed against the head with a special headband or neckband or by means of a device attached to a safety helmet or other equipment.

3.3 ear-plug : A hearing protector worn within the external ear canal (aural) or in the concha against the entrance to the external ear canal (semi-aural).

3.4 helmet : A device which may or may not include hearing protection and which covers a substantial part of the head.

3.5 hearing threshold level : For a given ear and for a specified signal, the number of decibels by which the threshold of hearing for that ear differs from the normal threshold of hearing as given in ISO 389.

3.6 threshold of audibility : For a given listener, the minimum sound pressure level of a specified sound that is capable of evoking an auditory sensation in a specified fraction of trials.

NOTE — For the purpose of this International Standard, the threshold of audibility is measured without and with the hearing protector.

3.7 sound attenuation : At a given test signal, the mean value of the differences, in decibels, between the thresholds of audibility with and without the hearing protector in place for all test subjects.

3.8 pink noise : Noise whose sound pressure spectral density is inversely proportional to frequency.

4 Measurement of the sound attenuation of hearing protectors

4.1 Test signals

The test signals shall consist of a signal from pink noise filtered through one-third octave bands with centre frequencies in