

# INTERNATIONAL STANDARD

**ISO**  
**4869-1**

First edition  
1990-12-15

---

---

## **Acoustics — Hearing protectors —**

### **Part 1:**

Subjective method for the measurement of sound  
attenuation

*Acoustique — Protecteurs individuels contre le bruit —*

*Partie 1: Méthode subjective de mesurage de l'affaiblissement  
acoustique*



Reference number  
ISO 4869-1:1990(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4869-1 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

This first edition of ISO 4869-1 cancels and replaces ISO 4869:1981, of which it constitutes a technical revision.

ISO 4869 consists of the following parts, under the general title *Acoustics — Hearing protectors*:

- *Part 1: Subjective method for the measurement of sound attenuation*
- *Part 2: Estimated noise reduction of hearing protectors*
- *Part 3: Simplified method for the measurement of insertion loss of ear-muff type protectors for quality inspection purposes*  
[Technical Report]

Annexes A and B of this part of ISO 4869 are for information only.

© ISO 1990

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization  
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

This document is a preview generated by EVS

## Introduction

Hearing protectors are commonly used to reduce the noise to which the ear is exposed. Hearing protectors are manufactured as ear-plugs, ear-muffs or helmets. A standardized method of sound attenuation measurement allows performance data obtained in different locations under similar conditions to be compared. The data may be used for rank ordering and selection of different models and the evaluation of design and construction features that affect performance.

This document is a preview generated by EVS

This page intentionally left blank

## Acoustics — Hearing protectors —

### Part 1:

### Subjective method for the measurement of sound attenuation

#### 1 Scope

This International Standard specifies a subjective method for measuring sound attenuation of hearing protectors at the threshold of hearing. The method and procedures are designed to yield values close to the maximum attenuation which are not normally attained under field conditions. This approach has been adopted because the attenuation values can then be consistently reproduced. The values reflect the attenuating characteristics of the hearing protector only to the extent that users wear the device in the same manner as did the test subjects.

This test method yields data which are collected at low sound pressure levels (close to the threshold of hearing) but which are also representative of the attenuation values of hearing protectors at higher sound pressure levels. An exception occurs in the case of amplitude-sensitive hearing protectors for sound pressure levels above the point at which their level-dependent characteristics become effective. At those sound pressure levels the method specified in this International Standard is inapplicable; it will usually underestimate sound attenuation for these devices.

**NOTE 1** At low frequencies (below 500 Hz) the sound attenuation may be overestimated by a few decibels as a result of masking the occluded ear thresholds caused by physiological noise during the occluded ear tests.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4869. At the time of publication, the editions indicated were valid. All standards are

subject to revision, and parties to agreements based on this part of ISO 4869 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 354:1985, *Acoustics — Measurement of sound absorption in a reverberation room*.

ISO 8253-2:—<sup>1)</sup>, *Acoustics — Audiometric test methods — Part 2: Sound field audiometry with pure tone and narrow-band test signals*.

IEC 225:1966, *Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations*.

IEC 263:1982, *Scales and sizes for plotting frequency characteristics and polar diagrams*.

IEC 645-1:—<sup>2)</sup>, *Audiometers — Part 1: Pure tone audiometers*.

IEC 651:1979, *Sound level meters*.

IEC 804:1985, *Integrating/averaging sound level meters*.

#### 3 Definitions

For the purposes of this part of ISO 4869, the following definitions apply.

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

1) To be published.

2) To be published. (Revision of IEC 645:1979.)