
Acoustics — Hearing protectors —

Part 3:

**Measurement of insertion loss of ear-muff
type protectors using an acoustic test
fixture**

Acoustique — Protecteurs individuels contre le bruit —

*Partie 3: Mesurage de l'affaiblissement acoustique des protecteurs du
type serre-tête au moyen d'un montage d'essai acoustique*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 4869-3 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This first edition of ISO 4869-3 cancels and replaces ISO/TR 4869-3:1989, which has been technically revised. The technical changes are as follows:

- a) the title has been changed and the standard has been revised;
- b) the content of the former subclause on “test signal” has been included in the subclause “Measuring system”;
- c) the subclause “Measuring system” no longer contains specific requirements concerning the measuring system;
- d) Annex B, dealing with uncertainty, has been added.

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: Estimation of effective A-weighted sound pressure levels when hearing protectors are worn*
- *Part 3: Measurement of insertion loss of ear-muff type protectors using an acoustic test fixture*
- *Part 4: Measurement of effective sound pressure levels for level-dependent sound-restoration ear-muffs* [Technical Report]
- *Part 5: Method for estimation of noise reduction using fitting by inexperienced test subjects* [Technical Specification]

Part 6, *Measurement of the active noise reduction of hearing protectors*, is under preparation.

Introduction

A Technical Report describing the use of an acoustic test fixture (ATF) to measure the insertion loss of ear-muff type protectors was published as ISO/TR 4869-3 in 1989. As testing laboratories around the world commonly use the ATF, it was decided that this Technical Report should be revised and changed into an International Standard.

Compared to the original Technical Report, the most important aspect of this part of ISO 4869 is the specification of the ATF. The ATF specified herein is not intended to supplant those dummy heads which include simulation of various anatomical features and which are used, for example, for development testing purposes.

The method specified in this part of ISO 4869 does not provide results which are the same as those obtained by the subjective method, ISO 4869-1.

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Acoustics — Hearing protectors —

Part 3:

Measurement of insertion loss of ear-muff type protectors using an acoustic test fixture

1 Scope

This part of ISO 4869 specifies a method for measuring the insertion loss of ear-muff type hearing protectors using an acoustic test fixture. The method is applicable to the investigation of production spreads of performance as part of type approval or certification procedures, and to the investigation of the change of performance with age. It is intended to ensure that ear-muff hearing protector samples submitted for subjective testing of attenuation according to ISO 4869-1 have performances typical of the type.

The method specified in this part of ISO 4869 is not applicable as the basic test for type approval. Performance data obtained by this method are not intended to be quoted as representing the real-ear sound attenuation of an ear-muff, nor the protection provided by the ear-muff.

For the testing of certain ear-muffs (such as those attached to safety helmets, or those with contoured ear-cups or ear-cushions, or supra-aural ear-muffs), the procedure described in this part of ISO 4869 might need to be modified.

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.

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 4869-1, *Acoustics — Hearing protectors — Part 1: Subjective method for the measurement of sound attenuation*

ISO/IEC Guide 98:1995, *Guide to the expression of uncertainty in measurement (GUM)*

IEC 60263, *Scales and sizes for plotting frequency characteristics and polar diagrams*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

IEC 61094-4, *Measurement microphones — Part 4: Specifications for working standard microphones*