

ICS 13.340.20
CCS C 73



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 7584-1987

Replacing GB/T 7584.1-2004

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

(English Translation)

Issued on: February 27, 2026

Implemented on: September 1, 2026

Issued by: State Administration for Market Regulation

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 1 of GB/T (Z)7584 "Acoustic Hearing Protectors". GB/T (Z)7584 has the following parts published.

---Part 1: Subjective Methods for Sound Attenuation Measurement;

---Part 2: Effective A-weighted sound pressure level estimation when wearing hearing protection;

---Part 3: Measurement of Insertion Loss of Over-Ear Hearing Protectors Using Dedicated Acoustic Testing Equipment;

---Part 5: Methods for evaluating noise attenuation by inexperienced subjects wearing the device;

---Part 6: Measurement of sound attenuation in active noise-canceling earmuffs.

This document supersedes GB/T 7584.1-2004 "Acoustic Hearing Protectors - Part 1: Subjective Methods for Sound Attenuation Measurement", and is consistent with...

Compared with GB/T 7584.1-2004, apart from structural adjustments and editorial changes, the main technical changes are as follows.

---The requirements for the sound field have been changed (see 4.1, 4.2, 4.3; 4.1, 4.2, 4.3 in the 2004 edition);

---Added requirements for the specifications of testing equipment (see 4.4);

---Added testing procedures and participant instructions (see 4.5);

---Added content on "Measurement Uncertainty" (see Appendix A).

This document is equivalent to ISO 4869-1:2018 "Acoustic hearing aids - Part 1: Subjective method for measuring sound attenuation".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the National Acoustics Standardization Technical Committee (SAC/TC17).

Introduction

Hearing protectors are typically used to reduce noise exposure to the ears. Based on their construction, hearing protectors can be classified into earplugs, earmuffs, and helmets, among others.

According to their working method, hearing protectors can be divided into passive noise

cancellation (also known as passive noise cancellation) and active noise cancellation (also known as active noise cancellation).

GB/T (Z)7584 "Acoustic Hearing Protectors" aims to specify a standardized method for measuring the sound attenuation of hearing protectors, so as to compare similar conditions in different situations.

The product performance data obtained under the specified conditions are compared. GB/T (Z)7584 is proposed to consist of 6 parts.

---Part 1: Subjective Methods for Measuring Sound Attenuation. The aim is to specify the methods for measuring the sound attenuation of hearing aids at the hearing threshold under laboratory conditions.

The subjective method of reduction.

---Part 2: Effective A-weighted sound pressure level estimation while wearing hearing aids. The aim is to provide several estimation methods based on Part 1.

The sound attenuation test results are used to assess the equivalent exposure sound pressure level experienced when wearing hearing protectors.

---Part 3: Measurement of Insertion Loss of Over-Ear Hearing Protectors Using Dedicated Acoustic Testing Equipment. The purpose is to conduct specialized acoustic testing...

The equipment is standardized so that product performance consistency can be investigated during product type approval testing or certification procedures.

---Part 4: Measurement of the effective sound pressure level of the acoustic restoration earmuffs in relation to sound level. The purpose is to specify the acoustics used in Part 3.

A physical testing method for determining the sound level-dependent acoustic restoration earmuff attenuation using a testing device or head and torso simulator.

---Part 5: Methods for evaluating noise attenuation through inexperienced participants wearing the device. The aim is to provide an assessment of noise attenuation in occupational environments.

Methods for measuring the sound attenuation performance of a body system (including hearing protectors, subjects, wearers, and instructors).

---Part 6: Measurement of Sound Attenuation in Active Noise-Canceling Hearing Muffs. The aim is to provide information on the active insertion loss of active noise-canceling hearing muffs.

Loss testing methods and total sound attenuation calculation methods.

Acoustic hearing protection Part 1.

Subjective methods for measuring sound attenuation

1 Scope

This document describes a subjective method for measuring the sound attenuation of a hearing aid at the hearing threshold. This method is a laboratory method used in a controlled measurement environment.

The reproducible sound attenuation value was obtained under quantitative conditions to reflect the sound attenuation performance when the user wore the hearing protector in the same way as the subject.

To obtain more representative field performance, the method in ISO/T S4869-5 can be used to obtain this performance.

This testing method yields data at low sound pressure levels (close to the hearing threshold), which also reflects the attenuation of hearing protectors at higher sound pressure levels.

Impairment. However, for sound pressure level-sensitive hearing protectors, this method is not suitable when the sound pressure level exceeds the critical amplitude at which its sound pressure-dependent characteristics take effect.

This is because at these sound pressure levels, the methods specified in this document often underestimate the sound attenuation of the hearing aid.

Note: When testing low-frequency sound attenuation below 500Hz with the ear blocked, the sound attenuation value will be overestimated due to the masking effect of physiological noise on the hearing threshold of the blocked ear.

decibel.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 8253-2 Acoustic audiometry methods - Part 2: Audiometry of sound fields using pure tones and narrowband signals (Acoustics-nals) Note. GB/T 16296.2-2016 Acoustic audiometry methods-Part 2: Audiometry of sound fields using pure tones and narrowband test signals (ISO 8253-2:2009) IDT) Note. GB/T 3769-2010 Electroacoustics - Scale and dimensions for plotting frequency response diagrams and polar graphs (IEC 60263:1982, IDT) IEC 61260-1 Electroacoustic octave and fractional octave filters - Part 1: Specifications Note. GB/T 3241.1-2025 Electroacoustic octave and fractional octave filters - Part 1: