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

GB/T 7584.2-2026

Replacing GB/T 7584.2-1999

**Acoustics - Hearing protectors - Part 2: Estimation of effective
A-weighted sound pressure levels when hearing protectors are
worn**

声学 护听器 第2部分：戴护听器时有效的A计权声压级估算
(English Translation)

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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 2 of GB/T 7584 "Acoustic Hearing Protectors". GB/T 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: Measuring 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 replaces GB/T 7584.2-1999 "Acoustic Hearing Protectors - Part 2: Effective A-weighted Sound Pressure Level When Wearing Hearing Protectors".

Compared with GB/T 7584.2-1999, the main technical changes in the "Estimation" standard, apart from structural adjustments and editorial modifications, are as follows.

---The definition of "protection rate" has been changed (see 3.1, 1999 edition 3.1);

---The term "assumed protection value" and its definition have been added (see 3.4);

---The term "pink noise" and its definition have been removed (see 3.8 of the 1999 edition);

---The calculation formulas for high, mid, and low frequency sound attenuation have been modified (see 7.2, 7.1 in the 1999 edition);

---The calculation formula for the single-value assessment method has been changed (see 8.2, 8.1 in the 1999 edition).

This document is equivalent to ISO 4869-2:2018 "Acoustic hearing protection - Part 2: Effective A-weighted sound pressure level when wearing hearing protection".

Estimate.

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 sound 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.

This document assesses the "effective" sound level when wearing hearing aids, that is, in the absence of the listener, using the center of the head as the measurement point.

The equivalent exposure sound pressure level is obtained by subtracting the hearing protection attenuation value from the A-weighted sound pressure level. Assessing the

effective sound level is necessary because it needs to be based on noise exposure...

The exposure limit standard is used to assess the degree of noise hazard. The difference between the effective sound level and the actual sound pressure level in the ear canal lies in the fact that the former is transmitted through the open ear's free field.

The recursive function is converted into a sound field value. The effective sound level is usually 5 dB to 10 dB lower than the sound pressure level in the ear canal, depending on the difference in the incident noise spectrum.

Ideally, the effective A-weighted sound pressure level when wearing hearing protectors is based on the octave band sound attenuation data of the hearing protector (according to...).

The estimation is based on the method specified in ISO 4869-1 (measurement) and the octave band sound pressure level of its noise. However, in many cases, humans...

We may not be able to obtain octave band sound pressure level information for the noise. Therefore, for many practical applications, we can only use simple methods, i.e., only...

This document uses A-weighted and C-weighted sound pressure levels to estimate the effective A-weighted sound pressure level while wearing hearing aids. It addresses the two applications described above.

Furthermore, the regulations specify an octave band calculation method and two optional simplified calculation methods. the high, medium, and low frequency attenuation method (HML method) and the single-value evaluation method (simplified method).

(Referred to as SNR method).

The octave band method requires knowledge of the octave band sound pressure level at the work location and the sound attenuation data of the hearing aid under test. Although this method can be considered...

An "accurate" reference method, however, uses the average sound attenuation and standard deviation of the entire subject group, rather than the sound attenuation of a single subject.

Since the attenuation is based on the data, this method has inherent inaccuracies.

The HML method specifies three sound attenuation values. H (high-frequency attenuation), M (mid-frequency attenuation), and L (low-frequency attenuation). These values are derived from...

The sound pressure level is determined from the octave band sound attenuation data of the hearing aid. These values, along with C-weighted and A-weighted sound pressure levels, are used to calculate the sound pressure level when wearing hearing aids.

Effective A-weighted sound pressure level.