



**SLOVENSKI STANDARD**  
**oSIST prEN 458:2025**

**01-januar-2025**

---

**Varovala sluha - Priporočila za izbiro, uporabo, nego in vzdrževanje - Navodilo**

Hearing protectors - Recommendations for selection, use, care and maintenance -  
Guidance document

Gehörschützer - Empfehlungen für Auswahl, Einsatz, Pflege und Instandhaltung -  
Leitfaden

Protecteurs individuels contre le bruit - Recommandations relatives à la sélection, à  
l'utilisation, aux précautions d'emploi et à l'entretien - Document guide

**Ta slovenski standard je istoveten z: prEN 458**

---

<https://standards.iteh.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025>

**ICS:**

13.340.20 Varovalna oprema za glavo Head protective equipment

**oSIST prEN 458:2025**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 458**

November 2024

ICS 13.340.20

Will supersede EN 458:2016

English Version

**Hearing protectors - Recommendations for selection, use,  
care and maintenance - Guidance document**

Protecteurs individuels contre le bruit -  
Recommandations relatives à la sélection, à  
l'utilisation, aux précautions d'emploi et à l'entretien -  
Document guide

Gehörschützer - Empfehlungen für Auswahl, Einsatz,  
Pflege und Instandhaltung - Leitfaden

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 159.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword .....	4
Introduction .....	5
5.1 Design forms.....	9
5.2 Function mode .....	10
6.1 Principles.....	11
6.2 Selection according to sound attenuation .....	12
6.3 Selection according to work environment .....	16
6.4 Communication .....	20
6.5 Compatibility with other Personal Protective Equipment (PPE) .....	20
6.6 Selection according to hearing protector type and situation of use.....	20
6.7 Medical factors.....	21
6.8 Ergonomics and fitting.....	22
7.1 General.....	22
7.2 Availability of hearing protectors.....	22
7.3 Correct fitting .....	22
7.4 Simultaneous use of hearing protector with other PPE.....	24
7.5 Speech intelligibility and signal audibility.....	25
7.6 Instruction and training .....	25
7.7 Period of use .....	26
7.8 Leisure activities .....	27
8.1 General.....	27
8.2 Hygiene and cleaning .....	27
8.3 Inspection and replacement .....	27
8.4 Storage .....	27
8.5 Disposal .....	27
<b>Annex A (normative) Methods for estimating the level effective to the ear when selecting a hearing protector based on the national regulation level <math>L'_{NR}</math></b> .....	<b>29</b>
A.1 General.....	29
A.2 Octave band method .....	32
A.3 <i>HML</i> method.....	33
A.4 <i>HML</i> check method .....	34
A.5 <i>SNR</i> method.....	36
<b>Annex B (informative) Method for estimating the level effective to the ear when selecting a hearing protector based on the national peak regulation level <math>L'_{NR, peak}</math></b> .....	<b>38</b>
B.1 General.....	38
B.2 Method.....	38
<b>Annex C (informative) Selection method for sound-restoration level-dependent hearing protectors intended for all types of noise environment using <i>HML</i>-criterion values</b> .....	<b>40</b>
C.1 General.....	40
C.2 Method 1: <i>HML</i> Method .....	40
C.3 Method 2A: <i>HML</i> check method – Measurement check .....	41
C.4 Method 2B: <i>HML</i> check method – Listening method .....	41
<b>Annex D (informative) Calculation method for hearing protectors with audio input</b> .....	<b>43</b>
D.1 General.....	43

<b>D.2</b>	<b>Method</b> .....	<b>43</b>
<b>Annex E</b>	<b>(informative) Improving field performance and special instructions for use</b> .....	<b>45</b>
<b>E.1</b>	<b>Improving field performance</b> .....	<b>45</b>
<b>E.2</b>	<b>Instructions for use</b> .....	<b>46</b>
<b>Annex F</b>	<b>(informative) Further guidance on individual fit testing methods</b> .....	<b>49</b>
<b>F.1</b>	<b>General information</b> .....	<b>49</b>
<b>F.2</b>	<b>Available individual fit testing methods</b> .....	<b>49</b>
<b>Annex G</b>	<b>(informative) Noise types</b> .....	<b>51</b>
<b>Annex H</b>	<b>(informative) Sustainability</b> .....	<b>54</b>
<b>H.1</b>	<b>General</b> .....	<b>54</b>
<b>H.2</b>	<b>Manufacturer evaluation (sourcing)</b> .....	<b>54</b>
<b>H.3</b>	<b>Product attributes (sourcing and safety)</b> .....	<b>55</b>
<b>H.4</b>	<b>Instruction and training (supervision)</b> .....	<b>55</b>
<b>H.5</b>	<b>Cleaning, maintenance and disposal (correct use)</b> .....	<b>56</b>
<b>H.6</b>	<b>Transportation, distribution and storage (safety and sourcing)</b> .....	<b>56</b>
<b>Annex I</b>	<b>(informative) Significant technical changes between this document and the previous edition EN 458:2016</b> .....	<b>57</b>
<b>Bibliography</b>	.....	<b>59</b>

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[oSIST prEN 458:2025](https://standards.iteh.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025)

<https://standards.iteh.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025>

**prEN 458:2024(E)****European foreword**

This document (prEN 458:2024) has been prepared by Technical Committee CEN/TC 159 “Hearing protectors”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 458:2016.

The main changes compared to the previous edition are listed in Annex I.

**iTeh Standards**  
**(<https://standards.itih.ai>)**  
**Document Preview**

[oSIST prEN 458:2025](https://standards.itih.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025)

<https://standards.itih.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025>

## Introduction

This document is intended to guide employers, supervisors and safety advisors. Additionally, this document gives information to all who need to use hearing protectors.

Hearing protectors are intended to protect against the risk of harmful noise and are elevated into the highest risk Category III under the Personal Protective Equipment Regulation (EU) 2016/425, which can cause irreversible health effects or can be potentially life threatening. They are intended to reduce the harmful effects that sound and noise can have on the hearing of an individual worker. Requirements for hearing protection products are given in the EN 352 series.

Guidance is provided on how to best select, use and maintain such devices. Calculation procedures to estimate the residual noise exposure level, when a certain hearing protector is used, are also provided.

National bodies can develop their own local application documents based on this document.

Hearing protectors are generally available in two main forms: earmuffs and earplugs. Both forms are available with additional features and functions. All have their advantages and disadvantages in terms of attenuation, comfort, ease of use, communication facilities and cost.

In hearing conservation programmes noise hazard areas are identified and the personal noise exposure is assessed. Before a suitable hearing protector is considered, priority should be given to reducing noise at source and/or reducing the exposure time.

If the use of a hearing protector is found necessary or advisable, choosing optimum devices is a complex task. The most important aspects for hearing protector performance include sufficient attenuation and usage during the entire exposure period.

It is often desirable to retain the ability to hear speech and warning signals. If the hearing protector is a passive device only, the hearing protector should not provide excessive attenuation (over-protection), which can create a feeling of isolation and difficulties with perception of important sounds. In particular, this needs attention at moderate noise levels.

Hearing protectors are supplied with attenuation data in various formats. The attenuation is expressed in decibels and has been derived from laboratory tests. It is important to note that these data have been achieved under controlled laboratory conditions using trained test subjects. Under real working conditions, the attenuation achieved by the user can be lower than that generated by the laboratory testing.

The performance of hearing protectors is subject to natural variability in the anatomy amongst users. Correct fitting, training, regular inspection and user motivation are important to obtain the desired protection. Due to the natural variability, it is not possible to calculate the exact attenuation that a certain hearing protector will give for an individual. If a more accurate prediction is required, an individual fit test is strongly recommended. At high noise level exposures it is advisable to seek expert advice. In some cases dual protection i.e. the use of an earmuff and an earplug combination, can be required.

For hearing protectors to be effective they should be used at all times when the user is in a potentially hazardous noise environment. When selecting hearing protectors, attention should be given to factors influencing comfort and user preference.

This document also provides advice on how to consider sustainability.

**prEN 458:2024(E)****1 Scope**

This document gives recommendations for the selection, use, care and maintenance of hearing protectors.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 352-6, *Hearing protectors — Safety requirements — Part 6: Earmuffs with safety-related audio input*

EN 352-8, *Hearing protectors — Safety requirements — Part 8: Entertainment audio earmuffs*

EN 352-9, *Hearing protectors — Safety requirements — Part 9: Earplugs with safety-related audio input*

EN 352-10, *Hearing protectors — Safety requirements — Part 10: Entertainment audio earplugs*

**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp/>

— IEC Electropedia: available at <https://www.electropedia.org/>

**3.1 daily noise exposure level**

$L_{EX,8h}$

A-weighted noise exposure level normalized to a nominal 8 h working day according to EN ISO 9612

**3.2 peak sound pressure level**

$L_{p,Cpeak}$

C-weighted instantaneous peak sound pressure level according to EN ISO 9612

**3.3 national regulation level**

$L'_{NR}$

daily noise exposure level ( $L_{EX,8h}$ ) effective to the ear according to national regulations

Note 1 to entry: National laws or regulations determine the levels of exposure at which hearing protectors shall be provided or used.

**3.4 national peak regulation level**

$L'_{NR,peak}$

peak pressure level  $L_{p,Cpeak}$  effective to the ear according to national regulations

Note 1 to entry: National laws or regulations determine the levels of exposure at which hearing protectors shall be provided or used.



**3.5****effective attenuation**

measure of protection afforded by the hearing protector for the user

**3.6****A-weighted sound pressure level**
 $L_{p,A}$ 

sound pressure level with frequency weighting A according to EN 61672-1

**3.7****A-weighted sound pressure level effective to the ear**
 $L'_{p,A}$ 

A-weighted diffuse-field related equivalent sound pressure level under the hearing protector for the external sound pressure level  $L_{p,A}$

**3.8****C-weighted sound pressure level**
 $L_{p,C}$ 

sound pressure level with frequency weighting C according to EN 61672-1

**3.9****A-weighted equivalent sound pressure level effective to the ear**
 $L'_{p,A,eqT}$ 

A-weighted diffuse-field related equivalent sound pressure level under the hearing protector for the external sound pressure level for time period  $T$   $L_{p,A,eqT}$

Note 1 to entry: For simplicity of notation, the subscript  $T$  is omitted throughout the following text.

**3.10****effective daily noise exposure level** [SIST prEN 458:2025](https://standards.iteh.ai/catalog/standards/sist/00235b25-af51-4190-8e8b-d9dc817c9e72/osist-pren-458-2025)
 $L'_{EX,8h}$ 

A-weighted diffuse-field related equivalent sound pressure level under the hearing protector for the external noise exposure level  $L_{EX,8h}$

**3.11****peak sound pressure level effective to the ear**
 $L'_{p,Cpeak}$ 

C-weighted peak sound pressure level under the hearing protector for the external sound pressure level

 $L_{p,Cpeak}$ 
**3.12****flat frequency response**

attenuation which is constant (or nearly constant) over the frequency range between 125 Hz and 8 000 Hz ( $H - L \leq 9$  dB)

Note 1 to entry: See A.1 for explanation of “ $H$ ” and “ $L$ ”.

Note 2 to entry: Slope of the linear regression of mean attenuation values from 125 up to 4 000 fulfils the criterion proposed by Liedtke [4] with a value lower than 3.6 dB, or very approximately  $H - L < 9$  dB.

**prEN 458:2024(E)****3.13****fit testing**

<hearing protectors> procedure for checking that a specific hearing protector is suitable for use by a specific individual by assessing the physical fit, seal, sound attenuation or other properties of the hearing protector

[SOURCE: EN 17479:2021, 3.1]

**3.14****personal attenuation rating****PAR**

individual attenuation given as a single value in dB that a user obtains for the fit of the hearing protector that was tested

Note 1 to entry: The PAR can be either the combined left-right (binaural) or separate left-right ear value.

Note 2 to entry: The calculation procedure is not standardized and is specified by the manufacturer for a specific fit testing method.

[SOURCE: EN 17479:2021, 3.4]

**4 Symbols and abbreviations**

For the purposes of this document, the following symbols and abbreviations apply.

$f$	centre frequency of the octave band in Hz
$L_{p,eq}$	equivalent sound pressure level
$L_{p,oct}$	sound pressure level for a single octave band
$L_{p,octveq}$	equivalent sound pressure level for a single octave band
$PNR$	predicted noise level reduction according to EN ISO 4869-2
$APV_f$	assumed protection value $APV_{fB4}$ according to EN ISO 4869-2
$H$	high-frequency attenuation value
$M$	middle-frequency attenuation value
$L$	low-frequency attenuation value
$SNR$	Single Number Rating
rms	root mean square
$L_{EX,8h}$	daily noise exposure level
$L_{p,Cpeak}$	C-weighted peak sound pressure level
$L'_{NR}$	national regulation level
$L'_{NR,peak}$	national peak regulation level
$L_{p,A}$	A-weighted sound pressure level
$L'_{p,A}$	A-weighted sound pressure level effective to the ear
$L_{p,C}$	C-weighted sound pressure level

$L_{p,A,eqT}$	A-weighted equivalent sound pressure level
$L_{p,C,eqT}$	C-weighted equivalent sound pressure level
$L'_{p,A,eqT}$	A-weighted equivalent sound pressure level effective to the ear
NOTE	For simplification of notation, the subscript $T$ is omitted throughout the following text.
$L'_{EX,8h}$	effective daily noise exposure level
$L'_{p,C,peak}$	peak sound pressure level effective to the ear
$L_{C,Fmax}$	maximum value of the sound pressure level with time-weighting F (fast) and frequency weighting C
$L_{A,Fmax}$	maximum value of the sound pressure level with time-weighting F (fast) and frequency weighting A
$A_f$	frequency weighting A in dB for octave band centre frequency $f$
$L_{crit}$	criterion level
$L_{max}$	maximum input signal level to the protector audio input
$V_{crit}$	Criterion voltage
$V_{max}$	maximum rms voltage input to the protector audio input
K	constant for corresponding national regulation level
n	maximum number of hours for use of audio input
PPE	personal protective equipment
ANR	active noise reduction

## 5 Types of hearing protectors

### 5.1 Design forms

#### 5.1.1 Earmuffs

Earmuffs consist of cups which fit over the ears and are sealed to the head with soft cushions, usually filled with foam and/or liquid. The cups are usually lined with sound absorptive material. They are connected by a tensioning band (head band), usually made of metal and/or plastic. When the earmuff is used behind-the-head or under-the-chin and has a mass in excess of 150 g, a flexible head strap is fitted to each cup or to the head band close to the cups to support the earmuff. Some earmuffs have one cup intended only for the left ear and the other only for the right ear. Earmuffs can be available in 'medium size range', 'small size range' and 'large size range' types. 'Medium size range' earmuffs will fit the majority of users. 'Small size range' or 'large size range' earmuffs are designed to fit users for whom 'medium size range' earmuffs are not suitable.

Earmuffs are available with head bands, neck bands, chin bands and universal bands. Earmuffs with neck bands and chin bands permit the simultaneous using of a safety helmet. Universal bands can be used over-the-head, behind-the-head or under-the-chin.

Requirements for earmuffs are specified in EN 352-1.

**prEN 458:2024(E)****5.1.2 Earmuffs attached to head protection and/or face protection devices**

Earmuffs attached to head protection and/or face protection devices (also called mounted earmuffs) consist of individual cups attached to arms that are mounted to a safety helmet or other equipment serving as carrier for the hearing protector, such as rigid head top of a powered and supplied air respirator system. The arms are adjustable so that the cups can be positioned over the ears.

Requirements for earmuffs attached to head protections and/or face protection devices are specified in EN 352-3.

**5.1.3 Earplugs****5.1.3.1 General**

Earplugs are hearing protectors that are designed to be inserted into the ear canal or to cover the ear canal entrance. They are sometimes provided with an interconnecting cord, rigid band or finger grips. Earplugs can be either disposable (intended for single use) or reusable (intended for repeated use). All types of earplugs except custom moulded earplugs can be available in range of sizes.

Requirements for earplugs are specified in EN 352-2.

**5.1.3.2 Pre-shaped earplugs**

Pre-shaped earplugs can readily be inserted into the ear canal without prior shaping. Pre-shaped earplugs are available in a variety of materials.

**5.1.3.3 User-formable earplugs**

User-formable earplugs are made from compressible materials that the user forms before inserting them into the ear canal. After insertion, these earplugs are designed to expand and form a seal within the ear canal.

**5.1.3.4 Banded earplugs**

These are pre-shaped earplugs attached to a band which presses them into the ear canal or against the entrance of the ear canal. Some are intended to be used in more than one position, e.g. with the band under-the-chin.

**5.1.3.5 Custom moulded earplugs**

Custom moulded earplugs are individually moulded to fit the shape of the user's ear canals typically using an impression or a scan of the individual concha and the outer ear canal of the user. They can be manufactured in a range of materials and with different acoustic filters to offer a range of attenuation.

**5.2 Function mode****5.2.1 Basic function mode**

All hearing protectors have the characteristics of reducing noise by their design and type of material used, to absorb and/or reflect sound. Devices that have only this function are called passive devices. They constitute the basis for all other additional function modes as described in 5.2.2 to 5.2.4.

**5.2.2 Level-dependent hearing protectors****5.2.2.1 General**

Level-dependent hearing protectors are designed to provide different attenuation as the external sound level changes. Their main purpose is to protect against impulsive or intermittent hazardous noise while allowing situational awareness.

### 5.2.2.2 Passive level-dependent hearing protectors

Passive level-dependent hearing protectors use the acoustic properties of carefully designed air ducts to give different protection at different noise levels. These types of hearing protectors are designed to be effective against very high level single-impulse noises, such as firearms, rather than the continuous noise or repetitive impulses found in most industrial situations.

### 5.2.2.3 Sound-restoration level-dependent hearing protectors

Sound-restoration level-dependent hearing protectors incorporate an electronic sound reproduction system. At low sound pressure levels, the sound detected by an external microphone is amplified and relayed to a loudspeaker inside the earmuff or earplug. As the external sound pressure level increases, the electronics reduce the gain and control the level of reproduced sound inside the hearing protector.

Requirements for level-dependent hearing protectors are specified in EN 352-4 (for earmuffs) and EN 352-7 (for earplugs), e.g. minimum criterion levels.

There are two types of sound-restoration level-dependent hearing protectors: products only intended for use in impulsive type noise situations and products for all types of noise environment (continuous, fluctuating and intermittent noise including impulsive noise, see Annex G).

### 5.2.3 Active noise reduction (ANR) protectors

These are hearing protectors which incorporate an electronic sound cancelling system to achieve additional noise attenuation where passive hearing protectors can be less effective. ANR is particularly effective at low frequencies (50 Hz to 500 Hz).

Requirements for active noise reduction earmuffs are specified in EN 352-5.

### 5.2.4 Hearing protectors with external audio input

#### 5.2.4.1 General

These devices use a wired or wireless system through which communication signals, alarms, messages or audio entertainment can be relayed. Some products incorporate a system to limit the sound pressure level.

#### 5.2.4.2 Hearing protector with entertainment audio input

These devices can incorporate a radio receiver set or music player for entertainment or allow audio input from external devices. Such devices incorporate functions for limiting sound exposure.

Requirements for entertainment audio hearing protectors are specified in EN 352-8 (for earmuffs) and EN 352-10 (for earplugs).

#### 5.2.4.3 Hearing protector with safety-related audio input

These devices include wired or wireless input and/or built-in two-way radio and can be used for work-related or safety-related communication. As the information to be received might be crucial for safety, the product standards impose no limitation on the reproduced sound pressure level at the ear.

Requirements for hearing protectors with electrical audio input (for work or safety-related communication) are specified in EN 352-6 (for earmuffs) and EN 352-9 (for earplugs).

## 6 Selection

### 6.1 Principles

Personal hearing protection should be selected so that, when used correctly and for the entire duration of exposure, it will eliminate or minimize the risk to hearing.

**prEN 458:2024(E)**

As there are many different hearing protectors intended for use in a wide range of noise environments it is important to choose a suitable type. The product shall be checked for regulatory conformance. Consideration should be given to the factors listed in a) to h). The list is neither exclusive nor exhaustive:

- a) sound attenuation, see 6.2;
- b) work environment, see 6.3;
- c) essential work or safety-related communication, especially speech intelligibility, see 6.4;
- d) compatibility with other personal protective equipment (PPE), such as helmets, spectacles, etc., see 6.5;
- e) the interaction between the user and the situation of use, see 6.6;
- f) medical factors, see 6.7;
- g) user comfort and ergonomic requirements, see 6.8;
- h) sustainability aspects of the products, see Clause 9.

The selection procedure should be reviewed at regular intervals to ensure that an effective attenuation is maintained. When considering all factors in the selection process the most important outcome is that the hearing protector will be used during the whole time of noise exposure.

**6.2 Selection according to sound attenuation****6.2.1 Guide to protection rating**

Hearing protectors should be chosen according to the sound attenuation they will provide. Methods to predict the sound attenuation of hearing protectors are given in 6.2.3.

NOTE 1 It is generally accepted that the risk of hearing damage associated with occupational noise exposure is low where the daily noise exposure level ( $L_{EX,8h}$ ) is below 80 dB, and insignificant where  $L_{EX,8h}$  is below 75 dB.

NOTE 2 National regulations or other guidelines can stipulate selection criteria for personal hearing protection and place limits on sound exposure. Such relevant criteria and limits are often taken into account in deciding what level of sound attenuation is required.

In general, a hearing protector which provides an effective sound level at the ear ( $L'_{p,A,eq}$ ) of between 70 dB and 80 dB is considered suitable. If the chosen hearing protector provides excessive attenuation, users are at risk of failing to recognize warning signals and understand essential communications. Users can also feel isolated from their working environment. The perception of isolation increases as the sound level effective to the ear decreases.

Workers can be exposed to different noise environments during the working day. It can be possible to select a single hearing protector which is adequate for all situations likely to be encountered, or in some situations, to select more than one type of hearing protector.

EXAMPLE 1 A worker's only significant noise exposure is to an  $L_{p,A,eq}$  of 98 dB, for a total of 30 min per day. His  $L_{EX,8h}$  is 86 dB. His employer wishes to minimize the risk to the worker's hearing, and so aims to provide a hearing protector that provides an effective sound pressure level at the ear of below 80 dB, ideally between 75 dB and 70 dB during the noise exposure. The employer selects a protector that provides a sound attenuation of  $M = 26$  dB.