



**SLOVENSKI STANDARD**  
**SIST EN 352-2:2003**

**01-januar-2003**

**BUXca Yý U**  
**SIST EN 352-2:1996**

---

JUfcj UUg`i \ U!`Gd`cýbY`nU Hřj Y`!`&`XY`!` ýYgb]` Yd]

Hearing protectors - General requirements - Part 2: Ear-plugs

Gehörschützer - Allgemeine Anforderungen - Teil 2: Gehörschutzstöpsel

Protecteurs individuels contre le bruit - Exigences générales - Partie 2: Bouchons d'oreille

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**Ta slovenski standard je istoveten z: EN 352-2:2002**

[SIST EN 352-2:2003](#)

[log/star...c7-4db0-abf2-  
f30f6ad8f8b2/sist-en-352-2-2003](#)

---

**ICS:**

13.340.20 Varovalna oprema za glavo Head protective equipment

**SIST EN 352-2:2003**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 352-2:2003](https://standards.iteh.ai/catalog/standards/sist/eafbaae1-f3c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003)

<https://standards.iteh.ai/catalog/standards/sist/eafbaae1-f3c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003>

English version

## Hearing protectors - General requirements - Part 2: Ear-plugs

Protecteurs individuels contre le bruit - Exigences  
générales - Partie 2: Bouchons d'oreillesGehörschützer - Allgemeine Anforderungen - Teil 2:  
Gehörschutzstöpsel

This European Standard was approved by CEN on 18 August 2002.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

(standards.iteh.ai)

[SIST EN 352-2:2003](https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003)

<https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003>

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

## Contents

|  | page      |
|--|-----------|
| Foreword.....  | 3         |
| Introduction .....   | 4         |
| <b>1 Scope .....</b>   | <b>5</b>  |
| <b>2 Normative references.....</b>   | <b>5</b>  |
| <b>3 Terms and definitions .....</b>   | <b>5</b>  |
| <b>4 Requirements.....</b>   | <b>6</b>  |
| 4.1 Sizing and adjustability.....  | 6         |
| 4.2 Materials and construction .....   | 7         |
| 4.3 Performance.....   | 7         |
| <b>5 Marking .....</b>   | <b>8</b>  |
| <b>6 Information supplied by the manufacturer .....</b>  | <b>8</b>  |
| 6.1 General.....   | 8         |
| 6.2 Wearer information.....  | 9         |
| 6.3 Additional information.....  | 10        |
| <b>Annex A (informative) Uncertainty of measurement and interpretation of test results .....</b>   | <b>11</b> |
| <b>Annex ZA (informative) Clauses of this European standard addressing essential requirements or other provisions of EU Directives .....</b> | <b>13</b> |
| <b>Bibliography .....</b>  | <b>14</b> |

[SIST EN 352-2:2003](https://standards.iteh.ai/catalog/standards/sist/cafbaae1-f3c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003)

<https://standards.iteh.ai/catalog/standards/sist/cafbaae1-f3c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003>

## Foreword

This document (EN 352-2:2002) has been prepared by Technical Committee CEN/TC 159, "Hearing protectors", the secretariat of which is held by SIS.

**This European Standard** shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

This document supersedes EN 352-2:1993.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 352-2:2003](https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003)

<https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003>

**EN 352-2:2002 (E)****Introduction**

This standard for "Hearing Protectors - General requirements - Ear-plugs", sets requirements for personal hearing protection devices in relation to Directive 89/686/EEC - Personal Protective Equipment.

The particular requirement in relation to the ability of hearing protectors to reduce noise below daily limit levels is addressed in the standard by requiring the sound attenuation of the hearing protectors, measured in accordance with EN 24869-1, to be not less than a specified minimum. Further, by requiring that the measured sound attenuation be declared, the selection of suitable hearing protectors for individual circumstances may be undertaken according to established practice.

EN 352-1 deals with requirements for ear-muffs, EN 352-2 with ear-plugs, EN 352-3 with ear-muffs attached to industrial safety helmets. EN 13819 deals with testing plans common to all types of hearing protectors covered by this series of prENs, and is in two Parts; Part 1 : Physical test methods, and Part 2 : Acoustic test methods.

Additional safety requirements and the associated test procedures for level-dependent ear-muffs are contained in EN 352-4, for ear-muffs with active noise reduction in prEN 352-5, for ear-muffs with audio communications in prEN 352-6 and for level-dependent ear-plugs in prEN 352-7.

The Parts of prEN 352, other than Parts 1, 2 and 3, cover the performance of functions additional to passive hearing protection. Hearing protectors which incorporate one or more of these functions are subject to the requirements and tests of each of the relevant Parts of prEN 352, including Parts 1, 2 or 3, as appropriate.

An associated standard EN 458 covers selection, use, care and maintenance of hearing protectors.

The requirements of EN 352-2 are concerned primarily with the physical and acoustic performance of the ear-plugs. It covers disposable, re-usable, custom moulded and headband ear-plugs

In order to assist users to select the correct size(s) ear-plug, a nominal diameter, or range of diameters, of the ear-plugs is required to be declared (except for custom moulded ear-plugs).

In the case of headband ear-plugs, the standard specifies sizing requirements which enable the great majority of the industrial population to be fitted satisfactorily by "medium size range" ear-plugs. Populations of other sizes may be accommodated by "small size range" or "large size range" ear-plugs, which are required to be accompanied by information regarding the range of sizes which they are designed to fit.

The standard also calls for the values of sound attenuation afforded by the ear-plugs (measured in accordance with EN 24869-1) in order to assist purchasers in selecting the most appropriate model of ear-plugs for their needs. Minimum values of sound attenuation are also specified.

## 1 Scope

This part of the standard specifies constructional, design and performance requirements, marking requirements and user information for ear-plugs.

In particular, it specifies the sound attenuation of the ear-plugs, measured in accordance with EN 24869-1.

Ergonomic aspects are addressed by taking into account, within the requirements, the interaction between the wearer, the device and where possible the working environment in which the device is likely to be used (see Annex ZA and EN 458).

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13819-1:2002, *Hearing protectors - Testing - Part 1: Physical test methods*

EN 13819-2:2002, *Hearing protectors - Testing - Part 2 : Acoustic test methods*

EN ISO 4869-2, *Acoustics - Hearing protectors - Part 2: Estimation of effective A-weighted sound pressure levels when hearing protectors are worn (ISO 4869-2:1994)*

THIS STANDARD PREVIEW  
(standards.iteh.ai)

## 3 Terms and definitions

SIST EN 352-2:2003

For the purposes of this European Standard, the following terms and definitions apply:

standards.iteh.ai  
30f6ad8f8b2/sist-en-352-2-2003

### 3.1

#### ear-plugs

hearing protector worn within each of the external ear canals (aural) or in the concha, against the entrance to each of the external ear canals (semi-aural)

#### 3.1.1

##### disposable ear-plugs

ear-plugs intended for one fitting only

#### 3.1.2

##### re-usable ear-plugs

ear-plugs intended for more than one fitting

#### 3.1.3

##### formable ear-plugs

ear-plugs which require some degree of manipulation before fitting

#### 3.1.4

##### pre-formed ear-plugs

ear-plugs which require no manipulation before fitting

#### 3.1.5

##### custom moulded ear-plugs

ear-plugs made using an impression of the individual concha and the external ear canal of the user

NOTE These are usually of the re-usable type.

**EN 352-2:2002 (E)****3.1.6****headband ear-plugs**

ear-plugs linked by a headband (may be aural or semi-aural; disposable or re-usable)

**3.1.6.1****over-the-head headband ear-plugs**

ear-plugs designed to be worn with the headband passing over the top of the head

**3.1.6.2****behind-the-head headband ear-plugs**

ear-plugs designed to be worn with the headband passing behind the head

**3.1.6.3****under-the-chin headband ear-plugs**

ear-plugs designed to be worn with the headband passing under the chin

**3.1.6.4****universal headband earplugs**

ear-plugs designed to be worn as an over-the-head, a behind-the-head and an under-the-chin ear-plug

**3.2****headband**

band, usually of metal or plastics, designed to enable the ear-plugs to be held within (aural) or against (semi-aural) the entrance to the external ear canals by exerting force against the ear-plug elements

**3.3****sound attenuation**

for a given test signal, the mean difference in decibels between the threshold of hearing with and without the hearing protector in place, for a panel of test subjects

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN 352-2:2003](https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003)

**4 Requirements**

<https://standards.iteh.ai/catalog/standards/sist/cafbaae1-13c7-4db0-abf2-f30f6ad8f8b2/sist-en-352-2-2003>

**4.1 Sizing and adjustability****4.1.1 Aural ear-plugs**

The nominal diameter or, if appropriate, the range of nominal diameters of the ear-plugs, shall be tested in accordance with EN 13819-1:2002, 5.2 and reported.

Custom moulded and semi-aural ear-plugs shall not be subjected to this test.

**4.1.2 Headband ear-plugs**

Adjustability shall be tested in accordance with EN 13819-1:2002, 5.3 and the following requirements satisfied, as appropriate.

In the case of ear-plugs incorporating a means to adjust the headband force, these requirements shall be satisfied at both the maximum and the minimum force setting.

**a) Over-the-head ear-plugs**

For each of the combinations of test dimensions shown in EN 13819-1:2002, Table 6, the range of fitting of the headband shall enable the ear-plugs to be fitted to the fixture.

**b) Behind-the-head and under-the-chin ear-plugs**

For each of the combinations of test dimensions shown in EN 13819-1:2002, Table 7, the range of fitting of the headband shall enable the ear-plugs to be fitted to the fixture.



## 4.2 Materials and construction

### 4.2.1 Materials

Those materials used in parts of ear-plugs coming into contact with the wearer's skin shall comply with the following requirements:

- a) The materials shall not be known to be likely to cause skin irritation, skin disorders, allergic reactions nor any other adverse effects to health within the lifetime of the use of the ear-plugs.
- b) When subject to contact with sweat, ear wax or with other materials likely to be found in the ear canal, the materials shall not be known to undergo changes within the lifetime of the use of the ear-plugs that would result in significant alteration to those properties of the ear-plugs that are required to be assessed when the ear-plugs are examined for compliance with 4.2 and 4.3.

### 4.2.2 Construction

**4.2.2.1** All parts of ear-plugs shall be designed and manufactured such that they are not liable to cause physical damage to the wearer when fitted and used according to the manufacturer's instructions (see 5 e) and 6.2 f)).

**4.2.2.2** Any part of the ear-plugs that is likely to protrude outside the ear canal when fitted in accordance with the manufacturer's instructions (see 5 e) and 6.2 f)) shall be of such a construction that mechanical contact with the ear-plugs is unlikely to cause any injury to the ear.

**4.2.2.3** When inserted in accordance with the manufacturer's instructions (see 5 e) and 6.2 f)), ear-plugs shall be capable of being readily and completely removed from the ear canal by the user, without the use of tools or instruments, when tested using a test panel of 16 subjects.

**4.2.2.4** When ear-plugs are marked re-usable (see 5 d)), re-closable packaging, suitable to ensure hygienic storage between use, shall be supplied with each pair of ear-plugs.

NOTE Information concerning compliance with this clause, 4.2.2, may be derived from observations arising during the course of, or following, tests performed in order to determine compliance with 4.3.6.

## 4.3 Performance

### 4.3.1 General

The requirements specified in 4.3.2 to 4.3.6 shall be satisfied.

Ear-plugs shall be conditioned and tested in accordance with EN 13819-1:2002, 5.1.1, 5.1.2 and 5.1.3.

### 4.3.2 Resistance to damage when dropped

The ear-plugs shall not crack when tested in accordance with EN 13819-1:2002, 5.4. Neither shall any part of the ear-plugs become detached, such that correct re-assembly requires the use of either a tool or a replacement part.

### 4.3.3 Resistance to damage when dropped at low temperature (optional)

The ear-plugs shall not crack when tested in accordance with EN 13819-1:2002, 5.5. Neither shall any part of the ear-plugs become detached, such that correct re-assembly requires the use of either a tool or a replacement part.

### 4.3.4 Cleaning and disinfection

If ear plugs are marked re-usable, after the ear-plugs have been cleaned and disinfected once, in accordance with the manufacturer's instructions, there shall be:

- a) no significant alteration to those initial properties of the ear-plugs that are required to be assessed when the ear-plugs are examined for compliance with clauses 4.1 and 4.2, and