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Varovala sluha - Splošne zahteve - 2. del: Ušesni čepi

Hearing protectors - General requirements - Part 2: Earplugs

Gehörschützer - Allgemeine Anforderungen - Teil 2: Gehörschutzstöpsel

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

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Hearing protectors - General requirements - Part 2: Earplugs

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

Gehörschützer - Allgemeine Anforderungen - Teil 2:
Gehörschutzstöpsel

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.

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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.

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

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European foreword

This document (prEN 352-2:2018) 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 352-2:2002.

This document has been prepared under a standardization request 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.

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prEN 352-2:2018 (E)**Introduction**

This document sets requirements for personal hearing protection devices in relation to Regulation (EU) 2016/425 on 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 ISO 4869-1, 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 352-2 is part of a family of standards describing product requirements for hearing protectors:

- EN 352-1, *Hearing protectors — General requirements — Part 1: Earmuffs*
- EN 352-2, *Hearing protectors — General requirements — Part 2: Earplugs*
- EN 352-3, *Hearing protectors — General requirements — Part 3: Earmuffs attached to head protection and/or face protection devices*
- EN 352-4, *Hearing protectors — Safety requirements — Part 4: Level-dependent earmuffs*
- EN 352-5, *Hearing protectors — Safety requirements — Part 5: Active noise reduction earmuffs*
- EN 352-6, *Hearing protectors — Safety requirements — Part 6: Earmuffs with safety-related audio input*
- EN 352-7, *Hearing protectors — Safety requirements — Part 7: Level-dependent earplugs*
- 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*

Test methods for these requirements for all types of hearing protectors are described in the following standards:

- EN 13819-1, *Hearing protectors — Testing — Part 1: Physical test methods*
- EN 13819-2, *Hearing protectors — Testing — Part 2: Acoustic test methods*
- EN 13819-3, *Hearing protectors — Testing — Part 3: Supplementary acoustic test methods*

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

The parts of EN 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 EN 352, including parts 1, 2 or 3, as appropriate.

The requirements of this document are concerned primarily with the physical and acoustic performance of the earplugs. It covers disposable, re-usable, custom moulded and headband earplugs

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

In the case of headband earplugs, the standard specifies sizing requirements which enable the majority of the industrial population to be fitted satisfactorily by "medium size range" earplugs. Populations of other sizes may be accommodated by "small size range" or "large size range" earplugs, 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 earplugs (measured in accordance with EN ISO 4869-1) in order to assist purchasers in selecting the most appropriate model of earplugs for their needs. Minimum values of sound attenuation are also specified.

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prEN 352-2:2018 (E)

1 Scope

This document specifies requirements on construction, design, performance, marking and user information for earplugs.

In particular, it specifies the sound attenuation of the earplugs, measured in accordance with EN ISO 4869-1.

Ergonomic aspects are addressed by taking into account, within the requirements, the interaction between the user, 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

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.

<std>EN 13819-1:2002, *Hearing protectors - Testing - Part 1: Physical test methods*</std>

<std>EN 13819-2:2002, *Hearing protectors - Testing - Part 2: Acoustic test methods*</std>

<std>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)*</std>

3 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

earplugs

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

Note 1 to entry: Earplugs may be formable, requiring a degree of manipulation prior to fitting, or pre-formed, which require no manipulation prior to fitting.

Note 2 to entry: Earplugs can sometimes be attached to an interconnecting cord.

3.2

headband

band, usually made of plastics, designed to enable the earplugs to be held within (aural) or against (semi-aural) the entrance to the external earcanals by exerting force against the earplug elements

3.3

disposable earplugs

earplugs intended for one fitting only

3.4

re-usable earplugs

earplugs intended for more than one fitting

3.5**custom moulded earplugs**

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

Note 1 to entry: These are usually of the re-usable type.

3.6**headband earplugs**

ear tips linked by a headband designed to be used in at least one position

Note 1 to entry: Ear tips can be aural or semi-aural; disposable or re-usable.

Note 2 to entry: Headband earplugs belong to the group of re-usable earplugs (see 3.4).

3.6.1**over-the-head headband earplugs**

earplugs designed to be worn with the headband passing over the top of the head

3.6.2**behind-the-head headband earplugs**

earplugs designed to be worn with the headband passing behind the head

3.6.3**under-the-chin headband earplugs**

earplugs designed to be worn with the headband passing under the chin

3.6.4**universal headband earplugs**

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

3.7**sound attenuation**

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

Note 1 to entry: Measured in accordance with EN ISO 4869-1 for a panel of test subjects

[SOURCE: EN ISO 4869-1:1990, 3.8, modified — The words “for a test subject” have been replaced by “, measured in accordance with EN ISO 4869-1 for a panel of test subjects”.]

4 Requirements**4.1 Sizing and adjustability****4.1.1 Aural earplugs**

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

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

4.1.2 Headband earplugs

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

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In the case of earplugs 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 earplugs

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 earplugs to be fitted to the fixture.

b) Behind-the-head and under-the-chin earplugs

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 earplugs to be fitted to the fixture.

4.2 Materials and construction**4.2.1 Materials**

Those materials used in parts of earplugs coming into contact with the user'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 earplugs.
- 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 earplugs that would result in significant alteration to those properties of the earplugs that are required to be assessed when the earplugs are examined for compliance with 4.2 and 4.3.

4.2.2 Construction

4.2.2.1 All parts of earplugs shall be designed and manufactured such that they are not liable to cause physical damage to the user when fitted and used according to the user information [see 6 g)].

4.2.2.2 Any part of the earplugs that is likely to protrude outside the ear canal when fitted in accordance with the user information [see 6 g)] shall be of such a construction that mechanical contact with the earplugs is unlikely to cause any injury to the ear.

4.2.2.3 When inserted in accordance with the user information [see 6 g)], earplugs 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 earplugs are marked re-usable [see 5 e)], re-closable packaging, suitable to ensure hygienic storage between use, shall be supplied with each pair of earplugs.

4.2.2.5 For custom moulded earplugs, impression of the concha and outer ear canal of test subjects shall be created by competent personnel only with a defined protocol.

To adequately assess the protective function of each sample of a custom moulded earplug a fit check shall be performed by the test house according to manufacturer's instructions or by the manufacturer under supervision of the test house. The method has to be specified and agreed between the test house and the manufacturer.

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