



SLOVENSKI STANDARD

SIST EN 352-5:2003

01-april-2003

Varovala sluha - Varnostne zahteve in preskušanje - 5. del: Naušniki za zmanjšanje delovnega hrupa

Hearing protectors - Safety requirements and testing - Part 5: Active noise reduction ear-muffs

Gehörschützer - Sicherheitstechnische Anforderungen und Prüfungen - Teil 5:
Kapselgehörschützer mit aktiver Geräuschkompensation

Protecteurs individuels contre le bruit - Exigences de sécurité et essais - Partie 5: Serre-tête à atténuation active du bruit

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Ta slovenski standard je istoveten z: EN 352-5:2002

ICS:

13.340.20 Varovalna oprema za glavo Head protective equipment

SIST EN 352-5:2003

en

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EUROPEAN STANDARD

EN 352-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2002

ICS 13.340.20

English version

Hearing protectors - Safety requirements and testing - Part 5: Active noise reduction ear-muffs

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sécurité et essais - Partie 5: Serre-tête à atténuation active
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Geräuschkompensation

This European Standard was approved by CEN on 16 October 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.

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EN 352-5:2002 (E)

Contents

	page
Foreword.....	3
Introduction.....	4
1 Scope.....	4
2 Normative references.....	4
3 Terms and definitions	5
4 Requirements.....	5
5 Testing.....	6
6 Information supplied by the manufacturer	7
7 Marking.....	8
Annex A (informative) Uncertainty of measurement and interpretation of test results.....	9
Annex B (informative) Determination of active attenuation and spread of active attenuation for active noise reduction ear-muffs.....	12
Annex ZA (informative) Clauses of this European standard addressing essential requirements or other provisions of EU Directive	14
Bibliography	15

SIST EN 352-5:2003
<https://standards.iteh.ai/catalog/standards/sist/c9154854-4d91-41f3-bd6e-8459413cc6b9/sist-en-352-5-2003>

Foreword

This document (EN 352-5:2002) 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 June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

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 Directives, see informative Annex ZA, which is an integral part of this standard.

In this standard the annexes A and B are 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.

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EN 352-5:2002 (E)

Introduction

This standard for "Hearing Protectors – Safety requirements and testing – Part 5: Active noise reduction ear-muffs", specifies procedures for the testing of personal hearing protection devices in relation to Directive 89/686/EEC - Personal Protective Equipment.

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 13819-1 and EN 13819-2 deal with testing plans common to all types of hearing protectors covered by this series of ENs.

Additional safety requirements and the associated test procedures for level-dependent ear-muffs are contained in EN 352-4, for ear-muffs with electrical audio input in prEN 352-6 and for level-dependent ear-plugs in prEN 352-7. An associated standard EN 458, covers selection, use, care and maintenance of hearing protection.

The particular requirement for hearing protectors in relation to their ability to reduce noise to below daily limit levels set by Directive 86/188/EEC - "on the protection of workers from the risks related to exposure to noise at work" is addressed in the standard by means of a requirement to report the active component of attenuation provided by the ear-muffs, to complement the passive attenuation data reported within EN 352-1.

An additional acoustic performance test method to that described in EN 24869-1 and applied in EN 352-1, EN 352-2 and EN 352-3 is required for active noise reduction ear-muffs. Until such time as this work is completed the test method described in Annex B of this standard is recommended for active noise reduction ear-muffs in addition to the EN 24869-1 test.

Active noise reduction ear-muffs are designed to provide additional attenuation of external sounds by means of a noise cancellation circuit. This additional attenuation is usually provided at low and mid frequencies. They may be selected for use in low frequency dominated high noise environments.

This part of the standard is a specification intended for type approval purposes, for which four sets of specimen ear-muffs are tested (further samples may be required for testing under EN 352-1, or EN 352-3, as appropriate).

The requirements and tests of the standard are concerned primarily with the active noise reduction performance of the ear-muffs. The standard may be applied to ear-muffs for fitting to industrial safety helmets.

1 Scope

This European Standard is concerned with active noise reduction (ANR) ear-muffs. It specifies additional constructional, design and performance requirements, methods of test, marking requirements and user information relating to the incorporation of the active noise reduction facility.

The requirements of this standard are intended to take account of the ergonomic interaction between the wearer, the device and, where possible, the working environment in which the device is likely to be used (see Annex ZA of this standard 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 352-1:2002, *Hearing protectors - General requirements - Part 1: Ear-muffs*

EN 352-3:2002, *Hearing protectors – General requirements – Part 3: Ear-muffs attached to an industrial safety helmet*

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

3 Terms and definitions

For the purposes of this European Standard the following additional terms and definitions to those of EN 352-1:2002 (or EN 352-3:2002, as appropriate) apply:

3.1

active mode

operation of the ANR ear-muff with the ANR circuit switched on.

3.2

passive mode

operation of the ANR ear-muff with the ANR circuit switched off.

4 Requirements

4.1 General

Active noise reduction ear-muffs shall meet the requirements of EN 352-1 (or EN 352-3, as appropriate). Additional requirements are listed below.

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4.2 Materials and construction

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The electronic circuit of the ANR ear-muff shall meet the electrical safety and EMC requirements appropriate to this class of equipment.

4.3 Performance

4.3.1 General

Active noise reduction ear-muffs shall meet all the performance requirements of EN 352-1(or EN 352-3, as appropriate), including the minimum attenuation requirement in their passive mode. Additionally, the requirements specified in 4.3.2, 4.3.3 and 4.3.4 shall be satisfied.

Specimens of ear-muffs shall be conditioned and tested as specified in 5.1.1 and 5.1.2. The scheme of testing shall be as specified in 5.1.3.

4.3.2 Active attenuation

The sound output levels of the four test samples shall be measured in accordance with 5.2 and reported in wearer information (6.1).

EN 352-5:2002 (E)

4.3.3 Maximum Sound pressure Level for linear operation

The highest level of the external test noise for which the sound pressure level at the subject's ear remains linearly related to the external sound pressure level, for all subjects and samples tested, shall be determined and reported in wearer information (6.1).

4.3.4 Oscillation and acoustic malfunction

When tested in accordance with 4.3.2, none of the subjects shall have perceived sustained oscillation or acoustic malfunction (whistling or instability) when the ear-muff has been fitted in accordance with the manufacturers instructions.

5 Testing

5.1 Specimens, conditioning and scheme of testing

This scheme of testing is additional to that described in EN 13819-1. It shall be carried out on additional samples. Estimates of uncertainty shall be presented with results, according to Annex A.

5.1.1 Specimens

Four pairs of ear-muffs shall be submitted for testing. The individual ear-muff cups shall be numbered 1 to 8. Fresh batteries, if any are installed in the ear-muffs, shall be fitted for the tests.

5.1.2 Conditioning and testing atmosphere

All specimens shall be conditioned and tested in an atmosphere having a temperature of $22\text{ °C} \pm 5\text{ °C}$ and a relative humidity of not more than 85 %, as required in EN 13819-1.

5.1.3 Scheme of testing

The eight ear-muff cups shall be tested for active attenuation as described in 5.2 and for linearity as described in 5.3

5.2 Active attenuation

The acoustic measurements for active noise reduction ear-muffs are under consideration. For the time being and because of the urgent need, such measurements may be carried out in accordance with test procedures described in Annex B.

5.3 Maximum Sound Pressure Level for linear operation

The acoustic measurements for active noise reduction ear-muffs are under consideration. For the time being and because of the urgent need, such measurements may be carried out in accordance with test procedures described in Annex B.

6 Information supplied by the manufacturer

6.1 Wearer information

The following information for the wearer (in addition to that required by EN 352-1) shall be supplied with the ear-muffs:

- a) the number of this standard, EN 352-5;
- b) an indication as to whether the hearing protector provides an active noise reduction facility;
- c) the values of the active attenuation as determined by the procedures described in the Annex B;
- d) recommended storage conditions before and after use;
- e) maintaining of batteries;
- f) for ear-muffs with an active noise reduction facility, the statements:
 - 1) "This ear-muff is provided with active noise reduction. The wearer should check correct operation before use. If distortion or failure is detected, the wearer should refer to the manufacturers advice for maintenance and replacement of the battery."
 - 2) "Warning: performance may deteriorate with battery usage. The typical period of continuous use that can be expected from the ear-muff battery is hours" (to be inserted by the manufacturer).
 - 3) "Warning: the performance of the active noise reduction may be adversely affected when sustained oscillation (whistling or instability) is perceived. If refitting the ear-muff or replacement of the batteries, if fitted, does not overcome this malfunction, the wearer should contact the supplier or manufacturer."
- g) the address from which additional information can be obtained.

Information according with 6.1 shall be provided at least in the official language(s) of the European state of destination.

6.2 Additional information

The following information shall be available from the manufacturer on request:

- a) results of tests performed in accordance with this European Standard;
- b) the name and country of the test laboratory which performed the tests specified and the date of the tests.

Information according with 6.2 shall be provided at least in the official language(s) of the European state of destination.