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SLOVENSKI STANDARD
SIST EN 352-4:2001/A1:2006

01-januar-2006

Varovala sluha – Varnostne zahteve in preskušanje – 4. del: Naušniki, katerih dušenje je odvisno od nivoja hrupa

Hearing protectors - Safety requirements and testing - Part 4: Level-dependent ear-muffs

Gehörschützer - Sicherheitstechnische Anforderungen und Prüfungen - Teil 4: Pegelabhängige Kapselgehörschützer

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Protecteurs individuels contre le bruit - Exigences de sécurité et essais - Partie 4 : Serre-tete a atténuation dépendante du niveau

Ta slovenski standard je istoveten z: EN 352-4:2001/A1:2005

ICS:

13.340.20   Varovalna oprema za glavo   Head protective equipment

SIST EN 352-4:2001/A1:2006   **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 352-4:2001/A1

October 2005

ICS 13.340.20

English Version

Hearing protectors - Safety requirements and testing - Part 4: Level-dependent ear-muffs

Protecteurs individuels contre le bruit - Exigences de
sécurité et essais - Partie 4 : Serre-tête à atténuation
dépendante du niveau

Gehörschützer - Sicherheitstechnische Anforderungen und
Prüfungen - Teil 4: Pegelabhängige Kapselgehörschützer

This amendment A1 modifies the European Standard EN 352-4:2001; it was approved by CEN on 19 September 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This amendment 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 Central Secretariat has the same status as the official versions.

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

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

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

Ref. No. EN 352-4:2001/A1:2005: E

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Foreword

This European Standard (EN 352-4:2001/A1:2005) has been prepared by Technical Committee CEN/TC 159 "Hearing protectors", the secretariat of which is held by SIS.

This Amendment to the European Standard EN 352-4:2001 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

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

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Page 5, Clause 3. Terms and definitions, subclause 3.1, 3.2 and 3.3

Replace the existing text of 3.1, 3.2 and 3.3 with the following:

3.1
criterion level (H)
A-weighted sound pressure level of the H noise for which the A-weighted equivalent diffuse field related sound pressure level when a level-dependent ear-muff is worn and the sound restoration circuit is operating at maximum volume first exceeds 85 dB(A) (as determined using the calculation procedure described in Annex B)

3.2
criterion level (M)
A-weighted sound pressure level of the M noise for which the A-weighted equivalent diffuse field related sound pressure level when a level-dependent ear-muff is worn and the sound restoration circuit is operating at maximum volume first exceeds 85 dB(A) (as determined using the calculation procedure described in Annex B)

3.3
criterion level (L)
A-weighted sound pressure level of the L noise for which the A-weighted equivalent diffuse field related sound pressure level when a level-dependent ear-muff is worn and the sound restoration circuit is operating at maximum volume first exceeds 85 dB(A) (as determined using the calculation procedure described in Annex B)

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Page 6, subclause 4.3.3

Delete 4.3.3

Page 7, subclause 5.3

Delete 5.3

Page 10, Annex B

Replace the existing text of Annex B with the following text:

Annex B
(informative)

Determination of criterion level for level-dependent ear-muffs

B.1 Introduction

The A-weighted equivalent diffuse field related sound pressure level with the sound transmission systems switched on and operating at full volume is measured for three different external noise spectra in a range of sound level settings.

B.2 Test sounds

As test sounds while determining the A-weighted equivalent diffuse field related sound pressure levels, three different spectra in the frequency range 100 Hz to 20 kHz may be used:

H-orientated noise $(L_C - L_A = -1,2 \text{ dB})$

M-noise $(L_C - L_A = 2 \text{ dB})$

L-orientated noise $(L_C - L_A = 6 \text{ dB})$

NOTE In EN ISO 4869-2, H-noise is defined as having a $(L_C - L_A)$-value of -2 dB and L-noise is defined as having a $(L_C - L_A)$-value of 10 dB. It has been found that the generation of H and L test noises is not straightforward and for the purpose of this annex, alternative noises of slightly different spectral shape are stated. The correct values of A-weighted sound pressure levels for H, M and L spectral noises are then calculated from the data obtained by extrapolation, as described below, and called the CRITERION LEVELS (H, M, L).

B.3 Test method

As an interim test procedure, pending development of a suitable test method by CEN/TC 211, the use of ISO 11904-1 is proposed. A general test procedure following this standard is described in EN 13819-2.

For the purposes of this standard, the effective attenuation of the ear-muff, comprising the passive attenuation and the sound output of the level-dependent circuit should be measured using the microphone in the real ear technique (MIRE) described in ISO 11904-1. The measured sound levels shall be corrected for the diffuse-field frequency response of the subject's ear canal to give the equivalent diffuse-field sound pressure level produced by the level-dependent earmuff as a function of the external sound level. For reliability and repeatability of measurement, the open ear canal procedure of ISO 11904-1 shall be used. Test subject noise exposure shall be monitored. A measurement time sufficient to control measurement uncertainty to below 0,2 dB shall be used. If a volume control is fitted, it shall be set to maximum audio output.

For each type of external noise spectrum, determine, as a function of external noise level, the A-weighted equivalent diffuse field sound pressure level for each sample earmuff, ensuring that data points corresponding to lower and higher than 85 dB(A) are encompassed. Use linear interpolation between adjacent test values of the external noise spectrum on either side of the "85 dB(A)" criterion, for each sample earmuff, if necessary. Determine, for each sample earmuff, the external noise level for which the A-weighted equivalent diffuse field sound pressure level equals 85 dB(A).

Calculate the mean value, for the eight earmuffs tested, of the external noise level for which the A-weighted equivalent diffuse field sound pressure level equals 85 dB(A). Calculate the standard deviation of external noise level for the eight earmuffs tested.

Subtract one standard deviation from the mean value of external noise level thus obtained to obtain the criterion level for the eight earmuffs tested for each type of external noise spectrum.

Obtain by extrapolation, assuming a linear relationship for the change in external sound pressure level with $(L_C - L_A)$-value on either side of the M-value of 2 dB, the "criterion levels" for H-noise at –2 dB and L-noise at 10 dB.

B.4 Report

Report the criterion levels for the H-, M- and L-noises for use in Clause 6.

B.5 An example calculation

This example contains data for 16 ears as defined in EN 13819-2.

For each cup, each external noise spectrum, obtain data such as these:

External L-orientated noise level dB(A)	Corrected "level effective to the ear" dB(A)
90	82
95	84
100	86

Therefore, by linear interpolation, the "criterion" external noise level at which the "level effective to the ear" is 85 dB(A) for this sample is 97,5 dB(A), halfway between the 95 dB and 100 dB "at the external level" data points.

Say, for the four samples of earmuff, 8 cups, and 16 measurement values, "criterion" external levels of L-orientated noise

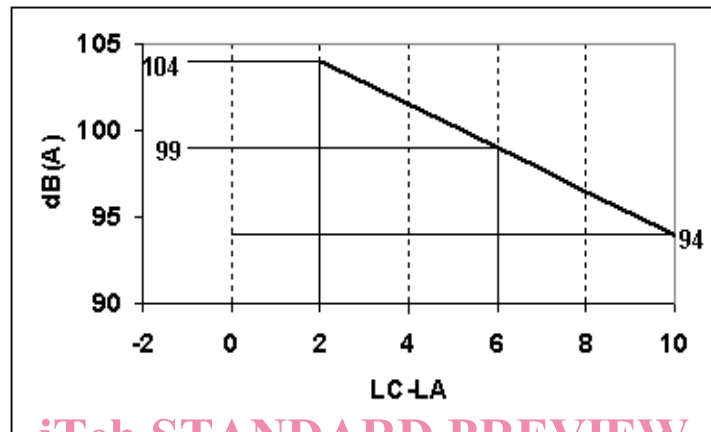|	
Cup A, measurement i	101,6
Cup A, measurement ii	101,0
Cup B, measurement i	98,5
Cup B, measurement ii	100,7
Cup C, measurement i	100,0
Cup C, measurement ii	102,0
Cup D, measurement i	100,1
Cup D, measurement ii	99,3
Cup E, measurement i	98,0
Cup E, measurement ii	102,0
Cup F, measurement i	101,8
Cup F, measurement ii	99,6
Cup G, measurement i	98,0
Cup G, measurement ii	102,0
Cup H, measurement i	101,7
Cup H, measurement ii	102,3

Mean value = 100,5 dB(A)

Standard Deviation = 1,5 dB(A)

Therefore "criterion level" (at mean minus one standard deviation across samples) for L-orientated noise = 99 dB(A)

Say, from similar measurements, criterion level for M-noise = 104 dB(A)

By linear extrapolation between M-noise ($L_C - L_A$ = 2 dB) and L- orientated noise ($L_C - L_A$ = 6 dB) we obtain for, Criterion Level at L-noise (L_C-L_A = 10 dB):

Figure B.1 — Linear extrapolation