SLOVENSKI STANDARD
SIST EN 13819-3:2020/oprA1:2022

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Varovala sluha - Preskušanje - 3. del: Dodatne akustične preskusne metode - Dopolnilo A1

Hearing protectors - Testing - Part 3: Supplementary acoustic test methods

Gehörschützer - Prüfung - Teil 3: Zusätzliche akustische Prüfverfahren

Protecteurs individuels contre le bruit - Essais - Partie 3 : Méthodes d'essais acoustiques supplémentaires

Ta slovenski standard je istoveten z: **EN 13819-3:2019/prA1**

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13.340.20 Varovalna oprema za glavo Head protective equipment

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EUROPEAN STANDARD

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Hearing protectors - Testing - Part 3: Supplementary acoustic test methods

Protecteurs individuels contre le bruit - Essais - Partie 3 : Méthodes d'essais acoustiques supplémentaires

Gehörschützer - Prüfung - Teil 3: Zusätzliche akustische Prüfverfahren

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

This draft amendment A1, if approved, will modify the European Standard EN 13819-3:2019. If this draft becomes an amendment, 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.

This draft amendment 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.

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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 (EN 13819-3:2019/prA1:2021) 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.

1 Modification to Clause 2, Normative references

Replace references

"EN 352-2:2002, *Hearing protectors — General requirements — Part 2: Earplugs*

EN 352-8:—[1], *Hearing protectors — Safety requirements — Part 8: Entertainment audio earmuffs*

EN 352-10:—[2], *Hearing protectors — Safety requirements — Part 10: Entertainment audio earplugs*"

with the following:

"EN 352-2:2020, *Hearing protectors — General requirements — Part 2: Earplugs*

EN 352-8:2020, *Hearing protectors — Safety requirements — Part 8: Entertainment audio earmuffs*

EN 352-10:2020, *Hearing protectors — Safety requirements — Part 10: Entertainment audio earplugs*"

2 Modification to Clause 7, Test procedures

Replace in second paragraph of 7.2.3.1

"EN 352-2:2002"

with the following:

"EN 352-2:2020".

Replace

"7.4 Hearing protectors with FM radio receiver"

with the following:

"7.4 Hearing protectors with FM radio receiver or DAB/DAB+ radio receiver"

Replace

"7.4.2 Earmuff with FM radio receiver"

with the following:

"7.4.2 Earmuff with FM radio receiver or DAB/DAB+ radio receiver"

Insert new clause title under clause "7.4.2.1 Test method" before text:

"7.4.2.1.1 Test method for earmuff with FM radio receiver"

Add the following new 7.4.2.1.2 before "7.4.2.2 Calculation procedure":

"7.4.2.1.2 Test method for earmuff with DAB/DAB+ radio receiver

The A-weighted equivalent diffuse-field related SPL is measured using the entertainment audio test signal (6.5), with the entertainment audio system on and operated at maximum settings.

For the generation of the DAB/DAB+ signal an appropriate signal generator shall be used which support the G.703 Ensemble Transport Interface Format (file format: *.eti).

NOTE 1 The *.eti file format is supported by various equipment for audio broadcasting.

An entertainment audio test signal shall be generated in wav-format and with a sufficient duration. To maximize the energy and still have dynamic headroom, the rms value of the signal shall be set to 10 dB less than the rms value of a 250 Hz sinusoidal test signal with full dynamic range (−10 dB FS).

The signal is then encoded to MPEG-1 Audio Layer 2 format for DAB and HE AAC-V2 format for DAB+. The highest possible bitrate shall be used. The resulting two-bit streams are then converted to the Ensemble Transport Interface Format and stored as an *.eti file.

NOTE 2 MPEG and HE AAC-V2 codecs are lossy codecs.

The sound output level of the earmuff shall be measured using the MIRE technique described in 5.4.

Four earmuffs and eight test subjects shall be used. Each of the four earmuff samples shall be tested on two subjects. Measurements shall be taken on both ears. The measured levels shall be corrected for the diffuse-field frequency response of the subject's ear canal to give the A-weighted diffuse-field related SPL produced by the restoration facility."

Replace

"7.4.3 Earplug with FM radio receiver"

with the following:

"7.4.3 Earplug with FM radio receiver or DAB/DAB+ radio receiver"

Insert new clause title under clause "7.4.3.1 Test method" before text:

"7.4.3.1.1 Test method for earplug with FM radio receiver"

Add the following new clause title 7.4.3.1.2 and text before clause "7.4.3.2 Calculation procedure":

"7.4.3.1.2 Test method for earplug with DAB/DAB+ radio receiver

The A-weighted equivalent diffuse-field related SPL is measured using the entertainment audio test signal (6.5), with the entertainment audio system on and operated at maximum settings.

For the generation of the DAB/DAB+ signal an appropriate signal generator shall be used which support the G.703 Ensemble Transport Interface Format (file format: *.eti).

NOTE 1 The *.eti file format is supported by various equipment for audio broadcasting.

An entertainment audio test signal shall be generated in wav-format and with a sufficient duration. To maximize the energy and still have dynamic headroom, the rms value of the signal shall be set to 10 dB less than the rms value of a 250 Hz sinusoidal test signal with full dynamic range (−10 dB FS).

The signal is then encoded to MPEG-1 Audio Layer 2 format for DAB and HE AAC-V2 format for DAB+. The highest possible bitrate shall be used. The resulting two-bit streams are then converted to the Ensemble Transport Interface Format and stored as an *.eti file.

NOTE 2 MPEG and HE AAC-V2 codecs are lossy codecs.

An occluded-ear simulator described in 5.2 or a head simulator described in 5.3 shall be used.

All values shall be diffuse-field corrected. The diffuse-field frequency response in EN ISO 11904-2:2004, Table 1 shall be used as diffuse-field related transfer function.

Eight earplugs shall be tested with related electronic units. That corresponds to eight or four products, depending if made for one or two-ear use. In case where the manufacturer designed left and right earplug in a different way (especially in terms of SPL effective to the ear), sixteen earplugs shall be measured (eight right and eight left)."

Replace in first paragraph of 7.6.1.2.3

"EN 352-8:—[1]"

with the following:

"EN 352-8:2020"

Replace in first paragraph of 7.6.2.2.2

"EN 352-10:—[2]"

with the following:

"EN 352-10:2020"

Add the following new clauses and text after clause "7.6.2.4.2 Maximum SPL for entertainment audio earplug" before Annex A:

"7.7 Hearing protectors with built-in two-way radio

7.7.1 Earmuff with built-in analogue frequency modulated two-way radio

7.7.1.1 General

This test method determines the A-weighted equivalent diffuse-field related SPL generated by earmuffs for safety-related communication.

7.7.1.2 Test method

7.7.1.2.1 Measurement of the criterion level

The A-weighted diffuse-field related SPL is measured for an artificial speech signal (6.4) with the DUT operated at maximum settings.

Four earmuffs and eight test subjects shall be used. Each of the four earmuff samples shall be worn by two subjects. Measurements shall be taken on both ears according to MIRE technique described in 5.4.

A radio communication signal generator shall be used without pre-emphasis. The input voltage rms level of the signal shall result in the maximum permissible frequency modulation. For 25 kHz channel spacing modulation is set to 5 kHz and for 12,5 kHz channel spacing the modulation is set to 2,5 kHz. The manufacturer shall state which of the channel spacing is used.

NOTE 1 There are no differences between PMR and LPD regarding the analogue FM modulation (12,5kHz channel). The main differences are the transmitted power and the frequency band. LPD: frequency band 433/434 MHz and power 10 mW; PMR: frequency band 446 MHz and power 500 mW. Additional information on PMR and LPD for two-way radio can be found in EN 303 405 V1.1.1 (2017-05) and EN 300 296 V2.1.1 (2016-03).

A speech signal shall be generated according to 6.4. To maximize the energy and still have dynamic headroom, the rms value of the signal shall be set to 14 dB less than the rms value of a 1 000 Hz sinusoidal test signal with full dynamic range (−14 dB FS).

NOTE 2 FS equals maximum frequency modulation.

The signal shall also be made available at lower levels in 5 dB steps at least down to −35 dB FS.

A receiving device for two-way radio signals (radio communication test instrument) shall be used to verify that the signal is correctly transmitted. The user information of the radio communication test instrument shall be consulted to setup the receiver correctly.

Start with an input signal level approximately equivalent to an A-weighted diffuse-field related SPL of 70 dB(A). Increase the input signal level in steps of 5 dB. Measure the A-weighted diffuse-field related SPL for each input signal level, up to the level for which the A-weighted diffuse-field related SPL first exceeds 85 dB(A). Follow this procedure for each subject, using the same input signal levels.

7.7.1.2.2 Measurement of the performance for high input levels

In order to assess the performance of the products for higher input levels, measurements shall be performed on an ATF or on a suitably mounted occluded ear-simulator resulting in A-weighted equivalent diffuse-field related SPL.

All samples shall be measured starting with the input signal that resulted in an A-weighted equivalent diffuse-field related SPL of 70 dB(A) with the test subjects. The level shall be increased in 5 dB steps up to an A-weighted diffuse-field related SPL of 120 dB(A), saturation of the signal or up to the maximum input level.

7.7.1.3 Calculation procedure

7.7.1.3.1 Criterion level

The input signal level (X_i dB FS) for which the A-weighted equivalent diffuse-field related SPL is equal to 82 dB(A) shall be determined for all cups and subjects, by interpolation where necessary, and then the mean input signal level ($X_1 + X_2 + ... + X_{16}$)/16 and the standard deviation shall be calculated.

The criterion level is the mean input signal level in dB FS minus one standard deviation (L_{82}).

7.7.1.3.2 High input level

Since the sound levels measured on the ATF or on a suitably mounted occluded-ear simulator will typically not be identical to the MIRE results the curve shall be shifted to match the MIRE results for the range where both curves overlap using the following procedure:

Calculate the mean over the results of the eight cups for each input level.

The mean curve of the values measured on the ATF or on a suitably mounted occluded-ear simulator will probably not contain a data point with the level value of L_{82}, therefore determine this point by interpolation.

Determine the difference in SPL between MIRE and ATF or a suitably mounted occluded-ear simulator values at L_{82}.

Shift the whole ATF or suitably mounted occluded-ear simulator mean curve by this offset and combine the two curves.

Determine from the combined mean SPL data the input levels that result in an SPL of 70 dB(A) up to the maximum SPL measured in steps of 5 dB [70 dB(A), 75 dB(A), ...].

7.7.1.4 Report — Criterion level and high input level

a) Report the A-weighted equivalent diffuse-field related SPL for each cup and subject as a function of input signal level. Report the mean and standard deviation of these data as a function of input signal level. In case where the manufacturer designed left and right cup in a different way (especially in terms of SPL effective to the ear), the mean and standard deviation of left and right cups shall be reported separately.

b) Report the criterion level in dB FS. In case where the manufacturer designed left and right cup in a different way the criterion level should be the lower value between left and right.

c) Report the data from the ATF or suitably mounted occluded-ear simulator for all cups.

d) Report the combined data from MIRE and ATF or suitably mounted occluded-ear simulator.

e) Report the dependence between A-weighted equivalent diffuse-field related SPL and input level between 70 dB(A) and the maximum SPL in 5 dB steps (dB SPL vs. level in dB FS).

f) Report the A-weighted equivalent diffuse-field related SPL for the maximum input level.

g) Report the usage time for the maximum input signal that corresponds to an A-weighted equivalent diffuse-field related SPL of 82 dB(A) over 8 h.

h) Report the maximum frequency modulation set on the transmitting device during the test.

7.7.2 Earplug with built-in analogue frequency modulated two-way radio

7.7.2.1 General

This test method determines the A-weighted equivalent diffuse-field related SPL generated by earplugs for safety-related communication.

7.7.2.2 Test method — Measurement of the criterion level and performance for high input levels

The A-weighted diffuse-field related SPL is measured for an artificial speech signal (6.4) with the DUT operated at maximum settings.

An occluded-ear simulator described in 5.2 or a head simulator described in 5.3 shall be used. The diffuse-field frequency response in EN ISO 11904-2:2004, Table 1 shall be used as diffuse-field related transfer function.

Eight earplugs shall be tested. That corresponds to eight or four products, depending if made for one or two-ear use.

A Radio Communication signal generator shall be used without pre-emphasis. The input voltage rms level of the signal shall result in the maximum permissible frequency modulation. For 25 kHz channel spacing modulation is set to 5 kHz and for 12,5 kHz channel spacing the modulation is set to 2,5 kHz. The manufacturer shall state which of the channel spacing is used.

NOTE 1 There are no differences between PMR and LPD regarding the analogue FM modulation (12,5kHz channel). The main differences are the transmit power and the frequency band. LPD: frequency band 433/434 MHz and power 10 mW; PMR: frequency band 446 MHz and power 500 mW. Additional information on PMR and LPD for two-way radio can be found in EN 303 405 V1.1.1 (2017-05) and EN 300 296 V2.1.1 (2016-03).

A speech signal shall be generated according to 6.4. To maximize the energy and still have dynamic headroom, the rms value of the signal shall be set to 14 dB less than the rms value of a 1 000 Hz sinusoidal test signal with full dynamic range (−14 dB FS).

NOTE 2 FS equals maximum frequency modulation.

The signal shall also be made available at lower levels in 5 dB steps at least down to −35 dB FS.

A receiving device for two-way radio signals (radio communication test instrument) shall be used to verify that the signal is correctly transmitted. The user information of the radio communication test instrument shall be consulted to setup the receiver correctly.

Start with an input signal level approximately equivalent to an A-weighted diffuse-field related SPL of 70 dB(A). Increase the input signal level in steps of 5 dB. Measure the A-weighted equivalent diffuse-field related SPL for each input signal level, up to an A-weighted equivalent diffuse-field related SPL of 120 dB(A), saturation of the signal or to the maximum input signal level.