
Elektroakustične naprave: Naglavne in ušesne slušalke skupaj s prenosno avdio opremo – Metodologija merjenja največjega nivoja zvočnega tlaka in upoštevanje mejnih vrednosti – 2. del: Prilagajanje naprav z naglavnimi slušalkami, če se ena od njiju ali pa obe ponujata ločeno

Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Matching of sets with headphones if either or both are offered separately

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**Sound system equipment:
Headphones and earphones associated with portable audio equipment –
Maximum sound pressure level measurement methodology
and limit considerations
Part 2: Matching of sets with headphones
if either or both are offered separately**

Equipement de systèmes acoustiques:
Casques et écouteurs associés
avec un baladeur –
Méthode de mesure de niveau maximal
de pression acoustique et
prise en compte d'une limite
Partie 2: Adaptation des équipements
avec des écouteurs provenant
de différents fabricants

Elektroakustische Geräte:
Kopfhörer und Ohrhörer in Verbindung
mit tragbaren Audiogeräten –
Verfahren zur Messung des maximalen
Schalldruckpegels und Angaben
zu Grenzwerten
Teil 2: Anpassung von Geräten und
Kopfhörern, wenn eine der beiden
oder beide Komponenten getrennt
angeboten werden

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 206, Consumer equipment for entertainment and information and related sub-systems.

The Part 1 of this standard describes conditions and procedures for combination of player units and headphones sold as “one-package sets”. The sound pressure limitation (SPL) of these sets is lost when players or headphones with standardised sockets and plugs are arbitrarily combined.

This Part 2 provides matching values which guarantee the SPL limit also for the aforementioned condition.

This text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50332-2 on 2003-07-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2004-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2006-07-01

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1 Scope

This Part 2 of EN 50332 specifies matching values for the use of battery-operated audio equipment and headphones/earphones defined for the use with those and with standardised connectors allowing to combine components of different manufacturers or different design sold separately in order to avoid possible hearing impairment by excessive sound pressure resulting from them.

Compared with "one-package sets" the sound pressure level at the ear cannot be fixed by only one condition but needs at least two characteristics, one each for player and the headphones/earphones, defined by the matching values for their connection.

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 revision 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 or the publication referred to applies.

EN 50332-1:2000	Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for "one package equipment"
EN 60268-3:2000	Sound system equipment - Part 3: Amplifiers (IEC 60268-3:2000)
EN 60268-7:1996	Sound system equipment - Part 7: Headphones and earphones (IEC 60268-7:1996)
EN 60804	Integrating-averaging sound level meters (IEC 60804)
EN 61938:1997	Audio, video and audiovisual systems - Interconnections and matching values - Preferred matching values of analogue signals (IEC 61938:1996)
IEC 60268-1	Sound system equipment - Part 1: General (IEC 60268-1:1985 + A1:1988 harmonized as HD 483.1 S2:1989)

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1

portable audio equipment

battery operated binaural small audio equipment used with earphone, which is intended to be mainly used for listening to the music outdoors. D.C. operated players with separate a.c. adapter are included

NOTE Players with loudspeakers and equipment with one-ear earphone are excluded; however this does not mean that only the devices covered by this standard may cause hearing impairment. Only the big difference in daily use decreases the risk caused by home equipment even at higher listening level.

3.2

portable audio headphones and earphones

headphones and earphones, which are intended to be used with battery operated audio equipment and to be mainly used for binaural (mostly stereo) listening to the music outdoors. The actual design is mostly of supra aural or intra concha type, however also other solutions are in use. The main feature of all these headphones is their small size

3.3

wide band characteristic voltage (WBCV)

similar to EN 60268-7, subclause 3.3.3 but using wide band signal (see EN 50332-1:2000, Clause 5) instead of 500 Hz sinusoidal input to characterise the necessary input level for an output sound pressure level of the headphone of 94 dB (re 20 μ Pa)

NOTE For more definitions, see Part 1 of this standard, EN 60268-7 and the basic standards for electroacoustics.

4 Basic conditions for specifications and measurements

For basic conditions on measurements of the maximum sound pressure level, reference is made to EN 50332-1.

5 Player characteristics and methods of measurement

5.1 Maximum output voltage V_m

The maximum output voltage of the player is a wide band value measured at the headphone output under the conditions given in 5.2.

5.2 Method of measurement and conditions

5.2.1 Input signal

The player input signal shall be as specified in Part 1, Clause 5 recorded on the relevant medium with the specified level.

5.2.2 Operating conditions

Devices under test shall be powered by a stabilised power supply, at their nominal supply voltage with a tolerance of $\pm 3\%$.

When testing, all controls shall be adjusted to the maximum sound pressure level. For example:

- noise reduction system : OFF;
- volume control : maximum;
- tone control : adjusted in order to maximise the sound pressure level.

Player output shall be loaded with a resistive load of 32 Ω .

NOTE The load of 32 Ω takes into account the fact that some devices derive the headphone output from a higher voltage over an internal resistor of e.g. 50 Ω . These devices would result in too high output voltage at no load measurement condition.

5.2.3 Method of measurement

The measuring instruments shall conform to EN 60804, class 1.

The maximum output voltage V_m shall be defined as unweighted true r.m.s. voltage at the load, using an averaging time of 30 s or more.

6 Headphone/Earphone characteristics and methods of measurement

6.1 Wide band characteristic voltage (WBCV)

This characteristic is defined in 3.3.

NOTE The limit value of WBCV corresponds with the SPL limit L_{Aeqmax} and the maximum output voltage V_{max} by the equation

$$V_{WBCV} = V_{max} / [10 \exp ((L_{Aeqmax} - 94)/20)].$$

6.2 Method of measurement arrangement and conditions

6.2.1 Input signal

The test signals shall be program simulation noise as defined in IEC 60268-1. Further details are given in EN 50332-1:2000, subclause 5.1.

6.2.2 Source impedance

The output impedance of the test signal source shall be $\leq 2 \Omega$.

6.2.3 Head and Torso Simulator (HATS)

The acoustical measurements are preferably done by using a suitable HATS (see also EN 50332-1:2000, subclause 6.1). For reasons to change to other devices see Clause 4.

6.2.4 Headphones/earphones fit

Headphones/earphones shall be positioned on the HATS correctly, so that the measured sound pressure level is maximised. The manufacturer's instructions for correct use have to be taken into account.

6.2.5 Measurement and evaluation

See EN 50332-1:2000, subclause 6.4.

The characteristic voltage WBCV is the input signal voltage when sound pressure level reaches 94 dB SPL. Within guaranteed linear operation of the headphone the value can be calculated from results with other SPL output.

7 Limits

The values given in Table 1 are as well given for defined operation of headphones at battery operated sources as for a limitation of the maximum sound pressure level at the ear.

Table 1 – Limits

Player		Headphone	
Maximum output voltage	$\leq 150 \text{ mV}$	Wide band characteristic voltage	$\geq 75 \text{ mV}$

8 Classification of the characteristics to be specified

Data which shall be labelled on the product or in the accompanying manual are given in Table 2.

Table 2 – Classification of the characteristics to be specified

Subclause	Characteristics	Products
5.1	Maximum output voltage	Players
6.1	Wide band characteristic voltage	Headphones

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