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"

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"

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 50332-1:2002 sisaldab Euroopa standardi EN 50332-1:2000 ingliskeelset teksti. Käesolev dokument on jõustatud 18.12.2002 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 50332-1:2002 consists of the English text of the European standard EN 50332-1:2000. This document is endorsed on 18.12.2002 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: The object of this standard is to set up a suitable measuring methodology allowing accurate measurement of the maximum sound pressure level produced by consumer's headphones and earphones when associated with portable audio equipment.	**Scope:** The object of this standard is to set up a suitable measuring methodology allowing accurate measurement of the maximum sound pressure level produced by consumer's headphones and earphones when associated with portable audio equipment.

ICS 17.140.50, 33.160.50

Võtmesõnad: acoustoelectric de, electroacoustic equipment, high, instruments, management, measured value, measurement, measurement set-up, measuring frequencies, measuring techniques, performance, portable, sound intensity, sound pressure level, testing, transmission devices

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50332-1

March 2000

ICS 17.140.50; 33.160.50

English version

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"

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 1: Méthode générale pour "un équipement complet"

Elektroakustische Geräte: Kopfhörer und Ohrhörer in Verbindung mit tragbaren Audiogeräten
Verfahren zur Messung des maximalen Schalldruckpegels und Angaben zu Grenzwerten
Teil 1: Allgemeines Verfahren für "Original-Geräte-Sets"

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

Ref. No. EN 50332-1:2000 E

Foreword

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

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50332-1 on 1999-10-01.

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)	2000-10-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2002-10-01

Annexes designated "informative" are given for information only.
In this standard, annex A is informative.

1 Scope

The scope of this standard is to set up a suitable measuring methodology allowing accurate measurement of the maximum sound pressure level produced by consumer's headphones and earphones when associated with portable audio equipment.

NOTE This standard does not apply to acoustically open or acoustically closed headphones associated with mains operated Hi-Fi home equipement nor does it apply to headphones for medical purposes (hard of hearing etc.) or to headphones or similar parts being part of active hearing protection systems. Wireless headphones are neither included, conditions for them may be derived accordingly. Other requirements for safety, e.g. for noise protection in offices and industry are not affected by this standard.

Requested features:

- The method should be reproducible and easily applicable to every type and shape of headphone or earphone available on the market (good mechanical adaptability).
- As safety and health are addressed, the method should faithfully reflect the pressure level effective at the user's earhig (good correlation with subjective tests).
- And finally, it is desirable to establish a global measuring procedure, including each component in the chain:
  Portable set
  + specific test signal
  + associated headphone or earphone.

The standard is split into two parts:

- Part 1 deals with sets provided as a package equipment by the manufacturer. In this case, "Portable audio equipment" means the association of one set (compact cassette player, CD player, FM radio receiver, with its headphone or earphone.
- Part 2 (under consideration at present time) gives guidelines to associate portable audio sets (compact cassette player, CD player, FM radio receiver, ...) with headphones or earphones coming from a different manufacturer.

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 60094-2	Magnetic tape sound recording and reproducing system Part 2: Calibration tapes
EN 60094-7	Magnetic tape sound recording and reproducing system Part 7: Cassette for commercial tape records and domestic use
EN 60268-7	Sound system equipment – Part 7: Headphones and earphones
EN 60315-4	Methods of measurement on radio receivers of various classes of emission Part 4: Receivers for frequency-modulated sound broadcasting emissions
EN 60804	Integrating–averaging sound level meters

IEC 60268-1	Sound system equipment – Part 1: General (IEC 60268-1:1985 + A1:1988 harmonized as HD 483.1 S2:1989)
IEC 60711	Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts (IEC 60711:1981 harmonized as HD 443 S1)
IEC 60959	Provisional head and torso simulator for acoustic measurements on air conduction hearing aids (Technical Report)

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1
equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$)
the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$) defined in EN 60804 as follows:

$$L_{Aeq,T} = 10\lg\left\{\left(\frac{1}{T}\int_{t_1}^{t_2} p_A^2(t)dt\right) \Big/ p_0^2\right\} \quad dBA$$

where:

$L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level re 20 μPa, determined over a time integration interval $T = t_2 - t_1$

$p_A(t)$ is the instantaneous A-weighted sound pressure of the sound signal

p_0 is the reference sound pressure of 20 μPa

3.2
free field frequency response of a Head And Torso Simulator (HATS)
the free field frequency response of a head and torso simulator defined in IEC 60959 as follows:

The difference, as a function of frequency, between the sound pressure level at the ear simulator microphone with the reference point of the manikin at the test point and the sound pressure level at the test point with the manikin absent.

4 Measuring principle

The sound pressure level produced by headphones or earphones can be measured by subjective methods or by objective methods.

The reference method for evaluating the sound pressure level emitted by earphones is a psycho acoustic method known as "equal loudness" (EN 60268-7). It consists in using human test subjects to compare the level of sound emitted by a speaker to that emitted by an earphone.

Nevertheless this subjective method becomes inadequate – and hazardous – when high levels are to be evaluated.

The solution is to use an objective measurement method, giving both a good reproducibility and a good correlation with subjective tests.