SLOVENSKI

SIST EN ISO 7779:2002/oprA2:2006

PREDSTANDARD

junij 2006

Akustika - Merjenje zračnega hrupa informacijske tehnologije in telekomunikacijske opreme - Dopolnilo 2 (ISO 7779:2001/DAM 2:2006)

Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment - Amendment 2 (ISO 7779:2001/DAM 2:2006)

ICS 17.140.20; 35.020

Referenčna številka
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EUROPEAN STANDARD

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English Version

Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment - Amendment 2 (ISO 7779:2001/DAM 2:2006)

Acoustique - Mesurage du bruit aérien émis par les équipements liés aux technologies de l'information et aux télécommunications - Amendement 2 (ISO 7779:2001/DAM 2:2006)

This draft amendment is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 211.

This draft amendment A2, if approved, will modify the European Standard EN ISO 7779:2001. 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 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

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

Ref. No. EN ISO 7779:2001/prA2:2006: E

Foreword

This document (EN ISO 7779:2001/prA2:2006) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 211 "Acoustics", the secretariat of which is held by DS.

This document is currently submitted to the parallel Enquiry.

Endorsement notice

The text of ISO 7779:2001/DAM2:2006 has been approved by CEN as EN ISO 7779:2001/prA2:2006 without any modifications.

DRAFT AMENDMENT ISO 7779:1999/DAmd 2

ISO/TC **43**/SC **1** Secretariat: **DS**

Voting begins on: **2006-03-09** Voting terminates on: **2006-08-09**

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Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment

AMENDMENT 2: Revision of measurement surfaces, procedures for equipment installation/operation and identification of prominent discrete tones

Acoustique — Mesurage du bruit aérien émis par les équipements liés aux technologies de l'information et aux télécommunications

AMENDEMENT 2: Révision des surfaces de mesurage, de l'installation/fonctionnement de l'équipement et de l'identification des composantes tonales émergentes

ICS 17.140.20; 35.020

ISO/CEN PARALLEL ENQUIRY

The CEN Secretary-General has advised the ISO Secretary-General that this ISO/DIS covers a subject of interest to European standardization. **In accordance with the ISO-lead mode of collaboration as defined in the Vienna Agreement, consultation on this ISO/DIS has the same effect for CEN members as would a CEN enquiry on a draft European Standard.** Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Amendment 2 to ISO 7779:1999 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment

AMENDMENT 2: Revision of measurement surfaces, procedures for equipment installation/operation and identification of prominent discrete tones

Page 2: Normative references

Replace ISO 3745:1977 by:

ISO 3745:2003, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms*

Delete the following:

ISO 10302:1996, *Acoustics — Methods for the measurement of airborne noise emitted by small air-moving devices*

Add the following:

ISO 389-7:2005, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions*

IEC 61672-1:2002, *Electroacoustics – Sound level meters – Part 1: Specifications*

ECMA-74:2005, *Measurement of airborne noise emitted by information technology and telecommunications equipment*

Page 7: 5.1.7

Replace the existing 5.1.7 as follows:

5.1.7 Sub-assemblies

A sub-assembly shall be supported $0{,}25\,\text{m} \pm 0{,}03\,\text{m}$ above the reflecting plane by vibration-isolating elements. If a hemispherical measurement surface is used with any radius less than 1 m but at least 0,5 m, the sub-assembly test height shall be reduced to $0{,}125\text{m}^{+0{,}003\text{m}}_{-0{,}005\text{m}}$. The supports shall not interfere with the propagation of airborne sound.

Page 15: 7.6.1

Replace the first paragraph of the existing 7.6.1 and the following NOTES, as follows:

7.6.1 General

Except as specified in Annex B, the requirements of ISO 3744:1994 or ISO 3745:2003 shall be followed as applicable. For information technology and telecommunications equipment, the preferred measurement surfaces are hemispherical and are described in Annex B of ISO 3744:1994. The conditions of Clause 5 above shall however be followed. The number and location of the microphone positions shall be as specified in Annexes B or C of ISO 3744:1994, or in Annexes D, E, F or G of ISO 3745:2003, as applicable, except as specified in Annex B of this International Standard.

NOTE 1 In some cases, for example when small equipment emits relatively low sound power levels, it may be helpful to use a smaller hemispherical surface with a radius of at least 0,5 m. To minimize near field effects, the 0,5 m radius would have a corresponding lower frequency limit of approximately 172 Hz.

NOTE 2 B.2 defines a cylindrical measurement surface as an alternative to the parallelepiped surface in ISO 3744:1994.

Page 29: Annex B

Replace the existing Annex B as follows:

Annex B
(normative)

Measurement surfaces

B.1 Hemispherical surface

Refer to ISO 3744 for the requirements for microphone locations and geometry of the hemispherical measurement surface and microphone array, supplemented by the following recommendations:

a) When using fixed microphone positions, it is recommended that the microphone positions given in ISO 3744 for sources emitting discrete tones be used for all sources. The coordinates for this array are reproduced below in Table B.1.

b) When using the coaxial circular paths arrangement specified in ISO 3744, it is recommended that a minimum of 10 heights be used.

Other acceptable alternatives are described in Annexes D, E, F, and G of ISO 3745:2003.

Table B.1 — Co-ordinates of microphone positions for equipment emitting discrete tones

Position	x/r	y/r	z/r
1	0,16	- 0,96	0,22
2	0,78	- 0,60	0,20
3	0,78	0,55	0,31
4	0,16	0,90	0,41
5	- 0,83	0,32	0,45
6	- 0,83	- 0,40	0,38
7	- 0,26	- 0,65	0,71
8	0,74	- 0,07	0,67
9	- 0,26	0,50	0,83
10	0,10	- 0,10	0,99

For small equipment, a hemispherical surface with a radius of at least 0,5 m may be used. To minimize the near field effects, the 0,5 m radius would have a corresponding lower frequency limit of approximately 172 Hz (based on a requirement of one quarter of the wavelength of sound at the lowest frequency of interest). Additional information is given in references [12], [13] and [14].

B.2 Cylindrical surface

B.2.1 General

Figure B.1 illustrates the cylindrical measurement surface, having microphones located along the side and top of the cylinder. The cylinder shall be centred around the reference box with the centre of the cylinder's base corresponding to the centre of the reference box base. The dimensions of the reference box, l_1, l_2, and l_3, and the reference distances to the cylinder, d_1, d_2, and d_3 are as shown. For the purposes of this annex, the dimensional labels shall be assigned so that $l_1 \geq l_2$. All dimensions are in metres.

NOTE The cylindrical measurement surface stated here or similar one will also be a part of forthcoming version of ISO 3744.

B.2.2 Selection of size of cylindrical surface

The microphone positions lie on the measurement surface, a hypothetical cylindrical surface enveloping the source and having a total area S equal to the sum of the area of the top circular surface, Stop, and the area of the side vertical surface, S_{side}. The radius of the cylinder is $R = l_1/2 + d_1 = l_2/2 + d_2$ and the height of the cylinder is $H = l_3 + d_3$. The area of the top surface of the cylinder is $S_{top} = \pi R^2$ and the area of the vertical side surface is $S_{side} = 2\pi RH$. Due to the fact that the microphones are associated with unequal sub-areas, both d_3 and d1 may be selected arbitrarily based on the size of the machine under test or other considerations. It is recommended that both of these be set to the same value, preferably 1 m, but neither shall be less than 0,5 m. Furthermore, none of the distances d_1, d_2, or d_3 shall be greater than 1,5 times either of the others (e.g., this condition will be met for d_1 and d_2 provided $d_1 \geq l_1 - l_2$). With d_3 and d_1 selected, H and R are defined and d_2 defaults to $d_2 = R - l_2/2$.

B.2.3 Selection of microphone positions on the cylindrical surface

The microphones on the cylindrical measurement surface are associated with unequal sub-areas, as described below. It is strongly recommended that continuous paths (circular traverses) be used for the microphones. However, if fixed microphone positions are used to sample over the circular traverses, at least 12 equally-spaced angular positions (i.e. at 30-degree spacing or less) shall be used. The traverses may be implemented by either rotating the microphones keeping the source stationary, or rotating the source keeping the microphones stationary.

The following requirements govern the number of side microphones, N_{side}, and the number of top microphones, N_{top}, and the associated sub-areas: (1) $N_{side} \geq H/0{,}5$ (to achieve adequate vertical sampling by limiting spacing to ½-metre or less); (2) as a minimum, $N_{side} \geq 4$ (for relatively short sources); and (3) $N_{top} \geq N_{side}/2$.

The vertical side microphones are associated with equal sub-areas and positioned such that the i-th microphone is $h_i = (I - 1/2)H/N_{side}$ from the floor. The sound pressure level averaged over the side surface is:

$$\overline{L_{p,\text{side}}} = 10\lg\left[\frac{1}{N_{\text{side}}}\sum_{i=1}^{N_{\text{side}}} 10^{0{,}1L_{pi}}\right] \text{ dB} \qquad \text{(B.1)}$$

The top microphones are associated with unequal sub-areas, S_j, and are spaced equally along the radius of the top surface. The radius of the j-th sub-area is $R_j = jR/N_{top}$, and the position of each top microphone is $r_j = R_{j-1} + (R_j - R_{j-1})/2$ for $j > 1$, and $r_1 = R_1/2$. The sound pressure level averaged over the top surface is:

$$\overline{L_{p,\text{top}}} = 10\lg\left[\frac{1}{S_{\text{top}}}\sum_{j=1}^{N_{\text{top}}} S_j 10^{0{,}1L_{p,j}}\right] \text{ dB} \qquad \text{(B.2)}$$