

DRAFT AMENDMENT

ISO 389-7:2005/DAM 1

ISO/TC 43

Secretariat: DIN

Voting begins on:
2015-05-14

Voting terminates on:
2015-08-14

Acoustics — Reference zero for the calibration of audiometric equipment —

Part 7:

Reference threshold of hearing under free-field and diffuse-field listening conditions

AMENDMENT 1: Reference threshold of hearing at 20 Hz and 18 000 Hz under free-field listening conditions and a 20 Hz under

Acoustique — Zéro de référence pour l'étalonnage d'équipements audiométriques —

Partie 7: Niveau liminaire de référence dans des conditions d'écoute en champ libre et en champ diffus

AMENDEMENT 1

ICS: 13.140

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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.



Reference number
ISO 389-7:2005/DAM 1:2015(E)

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Published in Switzerland

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 1 to ISO 389-7:2005 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

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Acoustics — Reference zero for the calibration of audiometric equipment — Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions - **AMENDMENT 1: Reference threshold of hearing at 20 Hz and 18 000 Hz under free-field listening conditions and at 20 Hz under diffuse-field listening conditions**

Page 3, Table 1

In the column "Reference threshold of hearing under the condition of free-field listening (frontal incidence)" and "Reference threshold of hearing under the condition of diffuse-field listening", replace the value "78,5" for "20 Hz" with the value "78,1" and remove the superscript "a".

In the column "Reference threshold of hearing under the condition of free-field listening (frontal incidence)", replace the value "73,2" for "18 000 Hz" with the value "70,4" and remove the superscript "a".

Replace the note to the Table with the following:

- ^a At 16 000 Hz experimental data for ΔL was reported from one laboratory only.

Page 6, Clause A.1

Add the following paragraph and NOTE after the last paragraph before Table A.1:

The values at 20 Hz and 18 000 Hz were replaced with the average of the median threshold values of two studies (References [25] and [26]) and those of three studies (References [27] to [29]), respectively, to increase the number of subjects involved and, thereby, improve the reliability of the threshold values. Weighting on the basis of the number of subjects was not carried out in the averaging.

NOTE As a result of this amendment, the reference thresholds at 20 Hz given in this International Standard differ from those given in ISO 226:2003.

Page 6, Clause A.1

Add the following Table A.2 after Table A.1:

Table A.2 — Investigations of threshold of hearing used for determining the thresholds at 20 Hz and 18 000 Hz

Investigation	Reference [25]	Reference [26]	Reference [27]	Reference [28]	Reference [29]
Year	1997	2008	2001	2003	2005
Country	Denmark	Japan	Japan	Japan	Japan
Sound field	Pressure field ^a	Pressure field ^a	Free field	Free field	Free field
Measurement frequency adopted for the threshold determination, Hz	20	20	18 000	18 000	18 000
Number of subjects (age)	23 (19 to 25)	51 (19 to 25)	32 (18 to 25)	51 (19 to 24)	38 (18 to 24)

^a It is empirically known that, at low frequencies, the threshold measurement in a pressure field yields the same value as that in a free field.

Page 9, Bibliography

Replace Reference [6] by the following:

- [6] ISO 389-5, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 5: Reference equivalent threshold sound pressure levels for pure tones in the frequency range 8 kHz to 16 kHz*

Delete the reference to Footnote 1) and the footnote "To be published". Renumber the reference to Footnote 2) and the footnote itself to Footnote 1).

Add the following references:

- [25] LYDOLF, M. and MØLLER, H. New measurements of the threshold of hearing and equal-loudness contours at low frequencies. *Proceedings of the 8th International Meeting on Low Frequency Noise and Vibration*, Gothenburg, Sweden, 1997, pp. 76-84
- [26] KURAKATA K., MIZUNAMI T., SATO H., and INUKAI Y. Effect of ageing on hearing thresholds in the low frequency region. *J. Low Freq. Noise Vibr. Act. Cont.*, **27**, 2008, pp. 175-184
- [27] TAKESHIMA, H., SUZUKI, Y., FUJII, H., KUMAGAI, M., ASHIHARA, K., FUJIMORI, T. and SONE, T. Equal-loudness contours measured by the randomized maximum likelihood sequential procedure. *Acustica — acta acustica*, **87**, 2001, pp. 389-399
- [28] KURAKATA K., ASHIHARA K., MATSUSHITA K., TAMAI H., and IHARA Y. Threshold of hearing in free field for high-frequency tones from 1 to 20 kHz. *Acoust. Sci. Tech.*, **24**, 2003, pp. 398-399
- [29] KURAKATA, K., MIZUNAMI, T., MATSUSHITA, K. and ASHIHARA, K. Statistical distribution of normal hearing thresholds under free-field listening conditions. *Acoust. Sci. Tech.*, **26**, 2005, pp. 440-446

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