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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Acoustics — Measurement of high-frequency noise emitted by computer and business equipment

*Acoustique — Mesurage du bruit à haute fréquence émis par les matériels informatiques et
de bureau*

Reference number
ISO 9295 : 1988 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 9295 was prepared by the European Computer Manufacturers Association (as Standard ECMA-108) and was adopted, under a special "fast-track procedure", by Technical Committee ISO/TC 43, *Acoustics*, in parallel with its approval by the ISO member bodies.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Acoustics — Measurement of high-frequency noise emitted by computer and business equipment

0 Introduction

Some computer and business equipment emits high-frequency noise which may be broad-band noise (e.g. paper noise of high-speed printing) or narrow-band noise and discrete tones (e.g. switching power supplies and video display units). The measured levels are not frequency-weighted. However, when there are significant contributions in the octave bands having centre frequencies between 125 Hz and 8 kHz, and, in addition, there is a contribution in the 16 kHz band which is broad-band in character, the A-weighted sound power level may be calculated with the contribution of the 16 kHz octave band included. The principal objective of this International Standard is to prescribe methods for measuring the levels and frequencies of tones which are contained within the 16 kHz octave band.

1 Scope and field of application

This International Standard specifies four methods for the determination of the sound power levels of high-frequency noise emitted by computer and business equipment in the frequency range covered by the octave band centred at 16 kHz. They are complementary to the methods described in ISO 7779. The first three methods are based on the reverberation room technique described in clause 5 of ISO 7779 : 1988. The fourth method makes use of a free field over a reflecting plane as described in clause 6 of ISO 7779 : 1988.

The test conditions which prescribe the installation and operation of the equipment are those specified in ISO 7779.

While the four methods described in this International Standard are particularly suitable for computer and business equipment, they may also be applied to other types of equipment. This International Standard specifies methods for the determination of sound power levels in the frequency range covered by the octave band centred at 16 kHz which includes frequencies between 11,2 kHz and 22,4 kHz.

NOTE — The sound power level in the 16 kHz octave band determined according to this International Standard typically is subject to a standard deviation of approximately 3 dB.

A method for the measurement of high-frequency noise is in conformance with this International Standard if it satisfies all

the mandatory requirements of one of the four methods described herein and if the information recorded and reported is that specified in clauses 8, 9 and 10, respectively.

2 References

ISO 6926, *Acoustics — Determination of sound power levels of noise sources — Characterization and calibration of reference sound sources*.¹⁾

ISO 7779, *Acoustics — Measurement of airborne noise emitted by computer and business equipment*.

3 Requirements for measurements in a reverberation room

3.1 General

Three methods are described using the reverberation room technique of clause 5 of ISO 7779 : 1988. The first and the second methods are usually called "direct" methods because they use directly measured or calculated reverberation times. The third method is a so-called comparison method. A calibrated reference sound source is used from which the sound power levels of the equipment are determined by comparison.

All three methods require a determination of the average sound pressure level in the reverberant field.

As instrumentation and basic measurement techniques are the same for all three methods, they are summarized in 3.2 to 3.6. Additional requirements specific to each method are given separately. For additional information on instrumentation, refer to ISO 7779.

3.2 Instrumentation

The microphone shall have a flat frequency response for randomly incident sound in the 16 kHz octave band. The tolerances shall be within $\pm 2,0$ dB in the frequency range 11,4 kHz to 22,8 kHz.

NOTE — To meet this requirement, a microphone with a diameter of 13 mm or less is usually required.

1) To be published.