

ANSI/ASA S12.10-2010/Part 1
(Revision of ANSI/ASA S12.10-2002/ISO 7779:1999)

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AMERICAN NATIONAL STANDARD

Acoustics – Measurement of Airborne Noise Emitted by Information Technology and Telecommunications Equipment – Part 1: Determination of Sound Power Level and Emission Sound Pressure Level

ANSI/ASA S12.10-2010/Part 1

Accredited Standards Committee S12, Noise

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**Acoustics - Measurement of Airborne
Noise Emitted by Information Technology and
Telecommunications Equipment -
Part 1: Determination of Sound Power Level and
Emission Sound Pressure Level**

Secretariat:

Acoustical Society of America

Approved October 6, 2010 by:

American National Standards Institute, Inc.

Abstract

This Standard specifies methods for the measurement of airborne noise emitted by information technology and telecommunications equipment. Hitherto, a wide variety of methods have been applied by individual manufacturers and users to satisfy particular equipment or application needs. These diverse practices have, in many cases, made comparison of noise emission difficult. This Standard simplifies such comparisons and is the basis for the declaration of the noise emission levels of information technology and telecommunications equipment.

This Standard is technically identical to parts of ECMA-74.

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Foreword

[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.10-2010/Part 1 American National Standard Acoustics – Measurement of airborne noise emitted by information technology and telecommunications equipment - Part 1: Determination of Sound Power Level and Emission Sound Pressure Level.]

This standard comprises a part of a group of definitions, standards, and specifications for use in noise. It was developed and approved by Accredited Standards Committee S12 Noise, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S12 is as follows:

Standards, specifications, and terminology in the field of acoustical noise pertaining to methods of measurement, evaluation, and control, including biological safety, tolerance, and comfort, and physical acoustics as related to environmental and occupational noise.

This standard revises and replaces ANSI/ASA S12.10-2002/ISO 7779:1999. This document adopts, with permission, parts of the 10th Edition of ECMA-74 (2008). ECMA-74 is also the underlying document for ISO 7779 and it is anticipated that the next edition of ISO 7779 will be essentially identical to the 10th Edition of ECMA-74 (2008).

Changes from ANSI/ASA S12.10-2002/ISO 7779:1999 include the following:

Changes were made to the main body of this Standard to be consistent with ECMA-74, which was revised to correspond with upcoming changes in the underlying standards: ANSI/ASA S12.51 / ISO 3741, ANSI/ASA S12.54 / ISO 3744, ANSI/ASA S12.55 / ISO 3745 and ISO 11201.

A revised Annex B includes a provision allowing the use of a 0.5 m radius hemispherical surface for measuring the sound power emitted by small noise sources such as disk drives. Annex B also allows the use of a cylindrical measurement surface and follows wording in ANSI/ASA S12.54 / ISO 3744.

Annex C was modified to reference the latest version of ECMA-74 for details of modes of operation and installation of specific product types, which is contained in Annex C of the 10th Edition of ECMA-74 (2008).

A revised Annex D includes prominence ratio in addition to tone-to-noise ratio, provides improved figures illustrating the tone-to-noise and prominence ratio calculations, and contains new criteria for prominent discrete tones. The new criteria are a result of a 3-year study by ECMA TC26 and ITI TC6. Changes were also made in part to better define the critical band edges, including changing from geometric critical bands to arithmetic critical bands for frequencies below 500 Hz. Also, curves were fitted to the band edges for the lower and upper critical bands when calculating prominence ratio, thus eliminating the need to use iteration for the calculations. Clarifications were added on frequency range of interest and elsewhere. Annex D was also revised to give clearer direction on determining the prominence of tones as well as introducing the concept of threshold of hearing when analyzing very low-noise equipment.

At the time this Standard was submitted to Accredited Standards Committee S12, Noise, for approval, the membership was as follows:

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Working Group S12/WG 3, Measurement of Noise from Information Technology and Telecommunications Equipment, which assisted Accredited Standards Committee S12, Noise, in the development of this standard, had the following membership.

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Suggestions for improvements of this standard will be welcomed. They should be sent to Accredited Standards Committee S12, Noise, in care of the Standards Secretariat of the Acoustical Society of America, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177. Telephone: 631-390-0215; FAX: 631-390-0217; E-mail: asastds@aip.org.

Introduction

ANSI/ASA S12.10-2010/Part 1 specifies methods for the measurement of airborne noise emitted by information technology and telecommunications equipment. Hitherto, a wide variety of methods have been applied by individual manufacturers and users to satisfy particular equipment or application needs. These diverse practices have, in many cases, made comparison of noise emission difficult. This Standard simplifies such comparisons and is the basis for declaration of the noise emission level of information technology and telecommunications equipment.

In order to ensure accuracy, validity and acceptability, this Standard is based on the basic Standards for determining the sound power level and for determining the emission sound pressure level at the operator position(s) and bystander position(s). Furthermore, implementation is simplified by conformance with these International Standards.

In many cases free-field conditions over a reflecting plane are realized by hemi-anechoic rooms. These rooms may be particularly useful during product design to locate and to improve individual contributing noise sources. Reverberation test rooms may be more economical for production control and for obtaining sound power levels for noise emission declaration purposes.

The method for measuring the emission sound pressure level at the operator or bystander positions (based on ISO 11201) is specified in a separate clause, as this level is not considered to be primary noise emission declaration information. The measurements can, however, be carried out in conjunction with those for sound power determination in a free field over a reflecting plane.

For comparison of similar equipment it is essential that the installation conditions and mode of operation are the same. In Annex C these parameters are standardized for many categories of equipment by referring to the latest edition of ECMA-74, which is the world-wide test code for the IT industry.

American National Standard

Measurement of Airborne Noise Emitted by Information Technology and Telecommunications Equipment - Part 1: Determination of Sound Power Level and Emission Sound Pressure Level

1 Scope

This American National Standard specifies procedures for measuring and reporting the noise emission of information technology and telecommunications equipment. This Standard is considered part of a noise test code for this type of equipment and is based on basic noise emission standards ANSI/ASA S12.51 / ISO 3741, ANSI/ASA S12.54 / ISO 3744, ANSI/ASA S12.55 / ISO 3745 and ISO 11201. The basic emission quantity is the A-weighted sound power level which may be used for comparing equipment of the same type but from different manufacturers, or for comparing different equipment.

Three basic noise emission standards for determining the sound power levels are specified in this American National Standard in order to avoid undue restriction on existing facilities and experience. The first basic standard (ANSI/ASA S12.51 / ISO 3741) specifies comparison measurements in a reverberation test room; the other two (ANSI/ASA S12.54 / ISO 3744 and ANSI/ASA S12.55 / ISO 3745) specify measurements in an essentially free field over a reflecting plane. Any one of these three basic noise emission standards may be selected and shall then be used exclusively according to this Standard when determining sound power levels of a machine.

The A-weighted sound power level is supplemented by the A-weighted emission sound pressure level determined at the operator position(s) or the bystander positions, based on the basic noise emission standard ISO 11201. This sound pressure level is not a worker's immission rating level, but it may assist in identifying any potential problems that could cause annoyance, activity interference, or hearing damage to operators and bystanders.

Methods for determining whether the noise emission includes prominent discrete tones or is impulsive in character are specified in Annexes D and E, respectively.

This Standard is suitable for type tests and provides methods for manufacturers and testing laboratories to obtain comparable results.

The methods specified in this Standard allow the determination of noise emission levels for a unit tested individually.

The procedures may be applied to equipment which emits broad-band noise, narrow-band noise and noise which contains discrete-frequency components, or impulsive noise.

The sound power and emission sound pressure levels obtained may serve noise emission declaration and comparison purposes (see ECMA-109). They are not to be considered as installation noise immission levels; however, they may be used for installation planning (see ECMA TR/27).

If sound power levels obtained are determined for a number of units of the same production series, they can be used to determine a statistical value for that production series (see ECMA-109).