

ANSI/ASA S12.11-2003/Part 2

Reaffirmed by ANSI  
on July 15, 2008

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## AMERICAN NATIONAL STANDARD

# **Acoustics – Measurement of noise and vibration of small air-moving devices- Part 2: Structure-borne vibration**

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ANSI/ASA S12.11-2003/Part 2

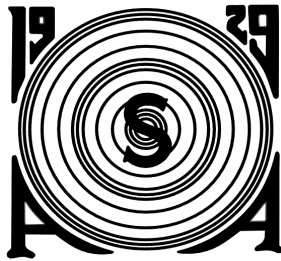
Accredited Standards Committee S12, Noise

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ANSI S12.11-2003/Part 2

AMERICAN NATIONAL STANDARD

# **Acoustics – Measurement of noise and vibration of small air-moving devices – Part 2: Structure- borne vibration**

Secretariat  
**Acoustical Society of America**

Approved August 7, 2003

**American National Standards Institute, Inc.**

## **Abstract**

This Standard contains the recommended methods for testing, determining, and reporting the vibration levels induced by small air moving devices (AMDs) that are found in cooling equipment used for information technology and telecommunications. The use of this Standard is encouraged to promote uniformity in the measurement and reporting of the vibration levels induced by AMDs for use in information technology and telecommunications equipment.

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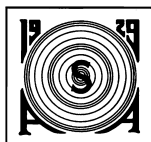
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## Foreword

[This foreword is for information only and is not an integral part of ANSI S12.11/2-2003 American National Standard Acoustics - Measurement of noise and vibration of small air-moving devices – Part 2: Structure-borne vibration,.]

This Standard is the unmodified text of ECMA 275:2002, an international industry standard. The Acoustical Society of America was granted permission to adopt this document as an American National Standard and publish it under the ASA copyright.

Accredited Standards Committee S12, Noise, under whose jurisdiction this Standard was adopted, has the following scope:

*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.*

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

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Working Group S12/WG 3, Measurement of Noise from Information Technology and Telecommunications Equipment, had the following membership:

K.X.C. Man, Chair

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R. Hellweg	C. Saunder	Y. Xu
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Suggestions for improvement of this Standard will be welcomed. They should be made in writing to Accredited Standards Committee S12, Noise, in care of the Standards Secretariat, Acoustical Society of America, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177.

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## Brief History

This Standard contains the recommended methods for testing, determining, and reporting the vibration levels induced by small air moving devices (AMDs) that are found in cooling equipment used for information technology and telecommunications.

The vibration levels are a function of operation speed and pressure loading. Previously, a variety of methods have been used by AMD manufacturers, information technology and telecommunications equipment manufacturers, consultants, and others to satisfy various needs. These diverse practices have, in many cases, made comparison of AMD vibration difficult. The practice recommended in this Standard provides a common basis for such comparisons that is consistent with current measurement standards.

The use of this Standard is encouraged to promote uniformity in the measurement and reporting of the vibration levels induced by AMDs for use in information technology and telecommunications equipment.

The practice specified in this Standard is intended for use by AMD manufacturers, information technology and telecommunications equipment manufacturers, and testing laboratories. Results of measurements conducted in accordance with this practice are expected to be useful for engineering design, performance verification, comparisons among competing AMD designs, and evaluation of vibration isolation devices for small AMDs. This Standard may also be cited in purchase specifications and in contracts between suppliers and users.

The basis for this Standard is from the Institute of Noise Control Engineering Recommended practice 1-96 (see annex D).

The first edition of this Standard was issued in June 1998. This second edition corrects the air flow rate equation, updates the reference for the measurement of the damped plate mobility and clarifies some wording.

**This ECMA Standard, with the permission of ECMA, has been adopted by the American National Standards Institute (ANSI) as ANSI S12.11/2-2003 "Acoustics – Measurement of Noise and Vibration of Small Air-Moving Devices, Part 2 – Structure-Borne Vibration" (08/07/03).**

Adopted as 2<sup>nd</sup> edition of Standard ECMA-275 by the ECMA General Assembly of December 2002.



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This is a preview of "ANSI/ASA S12.11-2003...". [Click here to purchase the full version from the ANSI store.](#)

## 1 Scope

This Standard covers vibration levels from small air moving devices (AMDs) with mounting footprints of less than 0,48 m x 0,90 m for the full size test plenum and less than 0.18 m x 0,3 m for the half size.

It covers all types of AMDs which can be mounted on, and are self-supported at, the discharge or inlet plane of a test plenum box as specified in ISO 10302. Some guidance is given for non-self-supporting AMDs.

## 2 Field of application

The procedures defined in this Standard specify methods for determining the vibration levels that a small AMD would induce in an average structure used in information technology and telecommunications equipment. Although the procedures cited here may be used to acquire data in different frequency bandwidths, standard bandwidths are recommended so that comparisons between data from various tests or laboratories yield comparable results.

The methods specified in this Standard allow the determination of induced vibration levels for the individual AMD that is tested. These data may be used to determine the statistical values of vibration levels for a production series if levels are measured for several units of that series.

## 3 References

### 3.1 International Standards

ISO 266:1997, "*Acoustics – Preferred frequencies for measurements*"

ISO 1683:1983, "*Acoustics – Preferred reference quantities for acoustic levels*"

ISO 5347:1993, "*Methods for the calibration of vibration and shock pick-ups*" Parts 1-19

ISO 5347:1997, "*Methods for the calibration of vibration and shock pick-ups*" Parts 20-22

ISO 5725:1994, "*Precision of Test Methods – Determination of repeatability and reproducibility by Interlaboratory tests*"

ISO 5801:1997 "*Industrial fans – Performance testing using standardized airways*"

ISO 7626:1986, "*Vibration and shock – Experimental determination of mechanical mobility – Part 1: Basic definition and transducers*"

ISO 9611:1996 "*Acoustics: Characterization of sources of structure-borne sound with respect to sound radiation from connected structures – Measurement of velocity at the contact points of machinery when resiliently mounted*"

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

IEC 61260:1995, "*Electroacoustics – Octave-band and fractional-octave-band filters*"

### 3.2 National Standard

ANSI S2.32:1982 (R2001), "*Methods for the experimental determination of mechanical mobility, Part II: Measurements using single-point translational excitation*"

## 4 Definitions

For the purpose of this Standard the following definitions apply.

### 4.1 Air moving device (AMD)

A device for moving air utilizing a rotating impeller driven by an electric, electronic, or mechanical motor. An air moving device has at least one inlet opening and at least one outlet opening. The openings may or may not have elements for connection of ductwork or other parts of the air flow path. An air moving device may have various accessories which may affect performance, vibration and noise emissions; therefore, it is