AMERICAN NATIONAL STANDARD

Acoustics – Measurement of airborne noise emitted and structure-borne vibration induced by small air-moving devices – Part 1: Airborne noise measurement (a nationally adopted international standard)

ANSI/ASA S12.11-2013/Part 1 / ISO 10302-1 :2011

Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
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ANSI/ASA S12.11-2013/Part 1 / ISO 10302-1:2011
(Revision of ANSI/ASA S12.11-2003/Part 1 / ISO 10302:1996 (MOD) (R 2008))

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Secretariat:

Acoustical Society of America

Approved on April 2, 2013 by:

American National Standards Institute, Inc.

Abstract

ANSI/ASA S12.11-2013/Part 1 / ISO 10302-1:2011 specifies methods for measuring the airborne noise emitted by small air-moving devices (AMDs), such as those used for cooling electronic, electrical, and mechanical equipment where the sound power level of the AMD is of interest.

Examples of these AMDs include propeller fans, tube-axial fans, vane-axial fans, centrifugal fans, motorized impellers, and their variations.

This part of this American National Standard describes the test apparatus and methods for determining the airborne noise emitted by small AMDs as a function of the volume flow rate and the fan static pressure developed by the AMD on the test apparatus. It is intended for use by AMD manufacturers, by manufacturers who use AMDs for cooling electronic equipment and similar applications, and by testing laboratories. It provides a method for AMD manufacturers, equipment manufacturers and testing laboratories to obtain comparable results. Results of measurements made in accordance with this part of this American National Standard are expected to be used for engineering information and performance verification, and the methods can be cited in purchase specifications and contracts between buyers and sellers. The ultimate purpose of the measurements is to provide data to assist the designers of electronic, electrical or mechanical equipment which contains one or more AMDs.

Based on experimental data, a method is given for calculating the maximum volume flow rate of the scaled plenum up to which this part of this American National Standard is applicable.

AMERICAN NATIONAL STANDARDS ON ACOUSTICS

The Acoustical Society of America (ASA) provides the Secretariat for Accredited Standards Committees S1 on Acoustics, S2 on Mechanical Vibration and Shock, S3 on Bioacoustics, S3/SC 1 on Animal Bioacoustics, and S12 on Noise. These committees have wide representation from the technical community (manufacturers, consumers, trade associations, organizations with a general interest, and government representatives). The standards are published by the Acoustical Society of America as American National Standards after approval by their respective Standards Committees and the American National Standards Institute (ANSI).

These standards are developed and published as a public service to provide standards useful to the public, industry, and consumers, and to Federal, State, and local governments.

Each of the Accredited Standards Committees (operating in accordance with procedures approved by ANSI) is responsible for developing, voting upon, and maintaining or revising its own Standards. The ASA Standards Secretariat administers Committee organization and activity and provides liaison between the Accredited Standards Committees and ANSI. After the Standards have been produced and adopted by the Accredited Standards Committees, and approved as American National Standards by ANSI, the ASA Standards Secretariat arranges for their publication and distribution.

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered and that a concerted effort be made towards their resolution.

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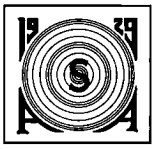
NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this Standard.



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Foreword

[*This Foreword is for information only, and is not a part of the American National Standard* ANSI/ASA S12.11-2013 Part 1/ISO 10302-1:2011 American National Standard Acoustics – Measurement of airborne noise emitted and structure-borne vibration induced by small air-moving devices – Part 1: Airborne noise measurement*. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.*]

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 is an identical national adoption of ISO 10302-1:2011. It revises and replaces ANSI/ASA S12.11-2003/Part 1 / ISO 10302:1996 (MOD) (R 2008) *American National Standard Acoustics – Measurement of noise and vibration of small air-moving devices – Part 1: Airborne noise emission*, which was a Modified Nationally Adopted International Standard. ISO 10302-1:2011 was prepared by Technical Committee ISO/TC 43 Subcommittee SC 1, Noise.

In conformance with ANSI and ISO rules, the words "this part of this American National Standard" replace the words "this part of ISO 10302" where they appear in the ISO document, decimal points were substituted in place of the decimal commas used in ISO documents, and American English spelling is used in place of British English spelling.

The ANSI/ASA equivalents for some of the ISO standards referenced in this standard are given below:

- ANSI/ASA S12.51/ISO 3741 is an identical national adoption of ISO 3741;
- ANSI/ASA S12.54/ISO 3744 is an identical national adoption of ISO 3744; and
- ANSI/ASA S12.55/ISO 3745 is an identical national adoption of ISO 3745.

At time of publication, BSR/ASA S12.11-201x/Part 2 / ISO 10302-2:2011 is expected to be approved as the identical national adoption of ISO 10302-2:2011.

ANSI/ASA S12.10-2010/Part 1 is essentially identical to ISO 7779:2010 as they are both adoptions of 10th Edition of ECMA-74 (2008).

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

W.J. Murphy, *Chair*
S.J. Lind, *Vice-Chair*

S.B. Blaeser, *Secretary*

3M Occupational Health & Environmental Safety Division.....E.H. Berger

Acoustical Society of America.....R.D. Hellweg
.....D. Lubman (Alt.)

Air-Conditioning, Heating and Refrigeration Institute.....S.J. Lind
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Compressed Air and Gas Institute ..... R.C. Johnson
..... D.R. Bookshar (Alt.)

Council for Accreditation in Occupational Hearing Conservation ..... VACANT
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Individual Experts of Accredited Standards Committee S12, Noise, were:

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E.H. Berger	D. Lubman	J. Schmitt
B.M. Brooks	D. Michaud	P.D. Schomer
A.J. Campanella	N.P. Miller	L.C. Sutherland
L.S. Finegold	W.J. Murphy	W.R. Thornton
R.D. Godfrey	M.A. Nobile	L.A. Wilber
R.D. Hellweg		G.E. Winzer

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.

S. Bard, Chair

D. Ali	R.D. Hellweg	C. Saunder
B.A. Bard	K.X.C. Man	J. Schmitt
E. Baugh	A. Nava	R. Underwood
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	D. Quinlan	

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

This part of this American National Standard specifies in detail methods for determining and reporting the airborne noise emissions of small air-moving devices (AMDs) used primarily for cooling electronic equipment, such as that for information technology and telecommunications.

To provide compatibility with measurements of acoustical noise emitted by such equipment, this part of this American National Standard uses the noise emission descriptors and sound power measurement methods of ISO 7779. The descriptor of overall airborne noise emission of the AMD under test is the A-weighted sound power level. The one-third-octave-band sound power level is the detailed descriptor of the noise emission. Octave-band sound power levels may be provided in addition to the one-third-octave-band sound power levels.

American National Standard

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1 Scope

This part of this American National Standard specifies methods for measuring the airborne noise emitted by small air-moving devices (AMDs), such as those used for cooling electronic, electrical, and mechanical equipment where the sound power level of the AMD is of interest.

Examples of these AMDs include propeller fans, tube-axial fans, vane-axial fans, centrifugal fans, motorized impellers, and their variations.

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Based on experimental data, a method is given for calculating the maximum volume flow rate of the scaled plenum up to which this part of this American National Standard is applicable.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3741, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for reverberation test rooms*

ISO 3744, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

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

ISO 5801:2007, *Industrial fans — Performance testing using standardized airways*