ANSI S12.55-2006 /
ISO 3745: 2003

AMERICAN NATIONAL STANDARD

Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms

(A Nationally Adopted International Standard)

NAIS STANDARD
ANSI S12.55-2006 /
ISO 3745:2003

Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
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The Acoustical Society of America (ASA) is an organization of scientists and engineers formed in 1929 to increase and diffuse the knowledge of acoustics and to promote its practical applications.

ANSI S12.55-2006 /
ISO 3745:2003
(Replaces S12.35-1990)

AMERICAN NATIONAL STANDARD

Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms

Secretariat

Acoustical Society of America

Approved 27 April 2006

American National Standards Institute, Inc.

Abstract

This American National Standard specifies a laboratory method for determining the sound power radiated by sources using an anechoic test room or a hemi-anechoic test room having specified acoustical characteristics. The method specified in this American National Standard is only applicable to indoor measurements in specialized test rooms. This American National Standard also specifies a laboratory method for the determination of sound energy levels of sound sources.

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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, 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.

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.

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Foreword

[*This Foreword is for information only, and is not a part of the American National Standard ANSI S12.55 - 200X /ISO 3745:2003 American National Standard Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms*].

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 identical to ISO 3745: 2003, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms*, which was prepared by Technical Committee ISO/TC 43, Acoustics, Subcommittee SC 1, Noise.

In conformance with ANSI and ISO rules, additional editorial modifications were made including: substituting ANSI references for ISO references where the documents referenced are identical, substitution of the words "American National Standard" for "International Standard", and use of American English spelling in place of British English spelling, and substituting decimal points for the commas used in ISO documents.

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

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K.M. Eldred	J. Pope	G.S.K. Wong

Working Group S12/WG 23, Determination of Sound Power, which assisted Accredited Standards Committee S12, Noise, in the development of this standard, had the following membership.

B.M. Brooks and R.J. Peppin Co-Chairs

M.C. Black	K. Cunefare	M.A. Nobile
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Suggestions for improvements of this standard will be welcomed. They should be sent to Accredited Standards Committee S2, Mechanical Vibration and Shock, 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

0.1 This American National Standard is one of the ANSI S12.50/ISO 3740 series, which specifies various methods for determining the sound power levels of machines, equipment and other sub-assemblies. When selecting one of the methods of the ANSI S12.50/ISO 3740 series, it is necessary to select the most appropriate for the conditions and purpose of the test. General guidelines to assist in the selection are provided in ISO 12001 and ISO 3740. The ANSI S12.50/ISO 3740 series gives only general principles regarding the operating and mounting conditions of the source under test. Reference should be made to the noise test code for a specific type of machine or equipment, if available, for specifications on mounting and operating conditions.

0.2 This American National Standard specifies a laboratory method for determining the sound power radiated by sources using an anechoic test room or a hemi-anechoic test room having specified acoustical characteristics. The method specified in this American National Standard is only applicable to indoor measurements in specialized test rooms.

0.3 This American National Standard specifies a laboratory method for the determination of not only sound power levels but also sound energy levels of sound sources. For a single burst of sound energy or transient sound, the sound power level cannot be defined and so it is necessary to adopt the sound energy level in order to specify the emitted sound with such a time history. The application of sound energy levels will be considered in the future revision of other standards of the ANSI S12.50/ISO 3740 series.

0.4 In this American National Standard, the sound power level or sound energy level for reference meteorological conditions is determined. This is required especially for grade 1 measurements.

American National Standard

Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for anechoic and hemi-anechoic rooms

1 Scope

This American National Standard specifies methods for measuring the sound pressure levels on a measurement surface enveloping a noise source in anechoic and hemi-anechoic rooms, in order to determine the sound power level or sound energy level produced by the noise source. It gives requirements for the test environment and instrumentation, as well as techniques for obtaining the surface sound pressure level from which the sound power level or sound energy level is calculated, leading to results which have a grade 1 accuracy.

The methods specified in this American National Standard are suitable for measurements of all types of noise.

The noise source can be a device, machine, component or sub-assembly. The maximum size of the source under test depends on the radius of the hypothetical sphere (or hemisphere) used as the enveloping measurement surface.

2 Normative references

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

ISO 7574-1:1985, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 1: General considerations and definitions*

ISO 7574-4:1985, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 4: Methods for stated values for batches of machines*

ISO 9613-1:1993, *Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere*

IEC 60942:2003, *Electroacoustics — Sound calibrators*

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

IEC 61672-1:2002, *Electroacoustics — Sound level meters — Part 1: Specifications*

GUM:1993[1)], *Guide to the expression of uncertainty in measurement.* BIPM/IEC/IFCC/ISO/IUPAC/IUPAP/OIML (ISBN 92-67-10188-9)

[1)] Corrected and reprinted in 1995.