

ANSI/ASA S12.5-2016 / ISO 6926:2016
(a revision of ANSI/ASA S12.5-2006 / ISO 6926:1999)

AMERICAN NATIONAL STANDARD

Acoustics – Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels

(a nationally adopted international standard)

ANSI/ASA S12.5-2016 / ISO 6926:2016

Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
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Secretariat:

Acoustical Society of America

Approved on April 11, 2016, by:

American National Standards Institute, Inc.

Abstract

This Standard specifies the acoustical performance requirements and the important physical and performance characteristics of reference sound sources and specifies procedures for their calibration. Reference sound sources are used extensively in “comparison methods” for determining the noise emissions of physically stationary sound sources. A reference sound source of known sound power output is used to establish the numerical relationship between the sound power level of a source, in a given location, in a given acoustic environment and the space- and time-averaged sound pressure level at a set of microphone positions. Once that relationship is established, it is straightforward to measure the average sound pressure level produced by an “unknown source” and to determine the sound power level produced by that source.

This is an identical national adoption of ISO 6926:2016.

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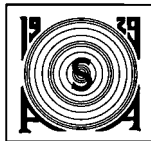
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Foreword

[This Foreword is for information only and is not a part of ANSI/ASA S12.5-2016/ISO 6926:2016 American National Standard Acoustics — Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels. 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 a revision of ANSI/ASA S12.5-2006/ISO 6926:1999, which has been technically revised.

This Standard is identical to International Standard ISO 6926:2016, which was prepared by Technical Committee ISO/TC 43 Subcommittee SC 1, Noise. However, in conformance with ANSI and ISO rules, the words “American National Standard” replace the words “International Standard” 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 the ISO and IEC standards referenced herein are given below:

- ANSI/ASA S1.4/Part 1/IEC 61672-1 is an identical national adoption of IEC 61672-1;
- ANSI/ASA S1.4/Part 2/IEC 61672-2 is an identical national adoption of IEC 61672-2;
- ANSI/ASA S1.4/Part 3/IEC 61672-3 is an identical national adoption of IEC 61672-3;
- ANSI/ASA S1.11/Part 1/IEC 61260-1 is an identical national adoption of IEC 61260-1;
- ANSI/ASA S12.50/ISO 3740 is an identical national adoption of ISO 3740;
- ANSI/ASA S12.51/ISO 3741 is an identical national adoption of ISO 3741;
- ANSI/ASA S12.53/Part 1/ISO 3743-1 is an identical national adoption of ISO 3743-1;
- ANSI/ASA S12.53/Part 2/ISO 3743-2 is an identical national adoption of ISO 3743-2;
- ANSI/ASA S12.54/ISO 3744 is an identical national adoption of ISO 3744;
- ANSI/ASA S12.55/ISO 3745 is an identical national adoption of ISO 3745;
- ANSI/ASA S12.56/ISO 3746 is an identical national adoption of ISO 3746; and
- ANSI/ASA S12.57/ISO 3747 is an identical national adoption of ISO 3747.

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

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Suggestions for improvements to 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, 1305 Walt Whitman Road, Suite 300, Melville, New York 11747. Telephone: 631-390-0215; Fax: (631) 923-2875; E-mail: asastds@acousticalsociety.org.

Introduction

Reference sound sources are used extensively in “comparison methods” for determining the noise emissions of physically stationary sound sources. A reference sound source, of known sound power output, is used to establish the numerical relationship between the sound power level of a source, in a given location in a given acoustic environment and the space- and time-averaged sound pressure level at a set of microphone positions. Once that relationship is established, it is straightforward to measure the average sound pressure level produced by an “unknown source” and to determine the sound power level produced by that source.

This American National Standard defines the important physical and performance characteristics of reference sound sources and specifies procedures for their calibration, primarily to determine the sound power level of other sound sources.

This American National Standard supplements a group or family of Nationally Adopted International Standards, the ANSI/ASA S12.50/ISO 3740 group, which describes various methods for determining the sound power levels of machines and equipment. This group of American National Standards specifies the acoustical requirements for measurements that are appropriate for different test environments.

Five American National Standards in the ANSI/ASA S12.50/ISO 3740 group include procedures in which a reference sound source is used: ANSI/ASA S12.51/ISO 3741, ANSI/ASA S12.53/Part 1/ISO 3743-1, ANSI/ASA S12.54/ISO 3744, ANSI/ASA S12.56/ISO 3746 and ANSI/ASA S12.57/ISO 3747. ANSI/ASA S12.50/ISO 3740 gives guidelines for the use of all the American National Standards in the group.

Note that the sound power output of reference sound sources will vary, in particular at low frequencies, with the distance from the source to nearby reflecting planes. Sound power data of reference sound sources are thus valid only for the position used during the calibration.

In addition to being useful for determining sound power levels by the comparison method, reference sound sources can be used for qualification tests on an acoustic environment and to estimate the influence of an acoustic environment on the sound pressure levels produced by one or more sound sources located in that environment. Examples of International Standards referring to reference sound sources with these applications are ISO/TR 11690-3 and ISO 14257. Requirements other than those of this American National Standard can be applicable in these cases.

This is a preview of "ANSI/ASA S12.5-2016/...". [Click here to purchase the full version from the ANSI store.](#)

American National Standard

Acoustics — Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels (a nationally adopted international standard)

1 Scope

This American National Standard specifies the acoustical performance requirements for reference sound sources:

- temporal steadiness (stability) of the sound power output;
- spectral characteristics;
- directivity.

Temporal steadiness is defined in terms of the standard deviation of repeatability (see 5.2). The spectral characteristics can be verified in either a hemi-anechoic room or a reverberation test room from measurements of the frequency band sound power levels in accordance with this American National Standard (see 5.4). The performance requirements on directivity index can only be verified in a hemi-anechoic room (see 5.5).

This American National Standard also specifies procedures for providing level calibration data and uncertainty on a sound source intended for use as a reference sound source in terms of its sound power level under reference meteorological conditions as defined in Clause 4 in octave and in one-third-octave bands, and with frequency weighting A.

This American National Standard is titled as a calibration standard even though the method is conducted in a testing laboratory and the level calibration results are not directly traceable to national standards of measure in a strict metrological sense. Testing laboratories performing this method are not expected to meet all requirements normally associated with a calibration laboratory.

NOTE ISO/IEC 17025^[15] specifies different requirements for the competence of testing laboratories and calibration laboratories respectively. Laboratories testing reference sound sources in accordance with this American National Standard would typically comply with the requirements for testing laboratories but not necessarily with those for calibration laboratories.

This American National Standard specifies methods to calibrate reference sound sources not only in a free field over a reflecting plane but also in reverberation test rooms at different distances from the boundary surfaces. For the position of the reference sound source on one reflecting plane, the two different test environments mentioned above are considered equivalent for frequency bands above or equal to 200 Hz. At 160 Hz and below, some systematic differences can occur (see 11.2). For frequencies below 100 Hz, an alternative calibration method using sound intensity is given.

The sound source can either be placed directly on the floor or mounted on a stand to be used at a certain elevation above the floor. According to this American National Standard, stand-mounted sources are calibrated in reverberation test rooms. Floor-mounted sources are either calibrated in hemi-anechoic or in reverberation test rooms. For floor-mounted sources in hemi-anechoic rooms, this American National