



AMERICAN NATIONAL STANDARD

# **Acoustics – Test methods for the qualification of free-field environments**

**(a nationally adopted international standard)**

**Secretariat:**

**Acoustical Society of America**

**Approved on August 30, 2021:**

**American National Standards Institute, Inc.**

## **Abstract**

This document describes the divergence loss method of measurement of performance of an environment designed to provide a free sound field or free sound field over a reflecting plane. An acoustical environment is a free sound field if it has bounding surfaces that absorb all sound energies incident upon them. This is normally achieved using specialized test environments, such as anechoic or hemi-anechoic chambers. In practice, these provide a controlled free sound field for acoustical measurements in a confined space within the facility.



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## Foreword

*[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.79-2021/ISO 26101-2021 American National Standard Acoustics – Test methods for the qualification of free-field environments. 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 is a nationally adopted international standard (NAIS). This standard comprises a part of a group of definitions, standards, and specifications for use in acoustics. 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 S1 is as follows:

*Standards, specifications, methods of measurement and test, and terminology in the field of physical acoustics, including architectural acoustics, electroacoustics, sonics and ultrasonics, and underwater sound, but excluding those aspects which pertain to biological safety, tolerances, and comfort.*

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governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 43, *Acoustics*.

This second edition cancels and replaces the first edition (ISO 26101:2012), which has been technically revised. The main changes are as follows:

- the term “acoustic centre” was replaced by “mathematical origin of the traverse” in several places in the document to provide clarification of terminology;
- the minimum traverse path length was reduced from 1/2 wavelength to 1/4 wavelength;
- Figure B.1 has been added.

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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: + 1 (516) 576-2341; E-mail: [standards@acousticalsociety.org](mailto:standards@acousticalsociety.org).

# American National Standard

## Acoustics – Test methods for the qualification of free-field environments

### (a nationally adopted international standard)

#### 1 Scope

This document specifies methodology for qualifying acoustic spaces as anechoic and hemi-anechoic spaces meeting the requirements of a free sound field.

This document specifies discrete-frequency and broad-band test methods for quantifying the performance of anechoic and hemi-anechoic spaces, defines the qualification procedure for an omni-directional sound source suitable for free-field qualification, gives details of how to present the results and describes uncertainties of measurement.

This document has been developed for qualifying anechoic and hemi-anechoic spaces for a variety of acoustical measurement purposes. It is expected that, over time, various standards and test codes will refer to this document in order to qualify an anechoic or hemi-anechoic space for a particular measurement.

In the absence of specific requirements or criteria, Annex A provides qualification criteria and measurement requirements to qualify anechoic and hemi-anechoic spaces for general purpose acoustical measurements.

This document describes the divergence loss method for measuring the free sound field performance of an acoustic environment.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC Guide 98-3, Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)

IEC 61260-1, Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications

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

#### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>