



ASA/ANSI S12.72-2015

Reaffirmed by ANSI June 19, 2020

AMERICAN NATIONAL STANDARD

Procedure for Measuring the Ambient Noise Level in a Room

Secretariat:

Acoustical Society of America

Approved on February 24, 2015:

American National Standards Institute, Inc.

Abstract

This standard specifies requirements and describes procedures for the measurement of ambient noise in a room. The measurements may be made at a specified point in the room, in a defined region of the room, or the measurements may be made to represent the space-average sound pressure level throughout the room. Two methods are offered: a survey method for quick evaluation and an engineering method for a more precise assessment of the ambient noise level. Both fixed and moving measurement microphones are allowed. The scope of this standard includes all types of ambient noise including building utility systems and exterior noise intrusion from street traffic and aircraft. Noise sources excluded from the scope of this standard include noise from building occupants and transient noise sources. The results of the measurements obtained via this standard are intended to be used to compare measured sound pressure levels with acoustic criteria similar to those presented in ANSI/ASA S12.2. It should be noted that by its very nature, ambient noise is not always stationary in time. Consequently, one should not expect to obtain identical results when a procedure specified in this standard is used in the same room at a different time.

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Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
1305 Walt Whitman Road, Suite 300
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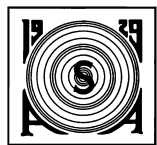
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Foreword

[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.72-2015 American National Standard Procedure for Measuring the Ambient Noise Level in a Room. 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 not comparable to any existing ISO Standard.

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

Introduction

The total ambient sound that exists in a room is usually due to a composite of many different sounds with different strengths and frequency content. The composite sound may be a combination of background noise and sound from a single identifiable source, it may be a combination from several individual sources, and it may include reflections from room surfaces or reflecting objects. This standard is primarily concerned with the measurement of the level of the composite sound at a given point or a region of an enclosed space within a building.

The way in which the sound pressure level varies with time (temporal pattern), how it varies over frequency (frequency content), and how it varies from one physical point to another (spatial distribution) within a room are often important. The desire to quantify these aspects has led, unfortunately, to a preponderance of metrics and descriptors in use today, some quite complicated and some limited to very specific applications. Fortunately, the advent of modern digital instruments of relatively low cost and wide availability, and the efforts by standardization bodies have led to a general consensus on only a small number of descriptors. This standard may be used to measure the time- and space-average sound pressure level in octave and fractional octave bands as well as frequency-weighted full spectrum level descriptors like the A-weighted, C-weighted, and linear (unweighted) sound pressure levels. The choice of frequency weighting will depend upon the specified or desired noise criterion.

There are many reasons for measuring sound pressure levels in rooms. However, most purposes fall into two groups: 1) sound pressure levels measured in order to characterize a source, and 2) sound pressure levels measured in order to characterize an environment. Regardless of the reasons, or whether one is trying to characterize a source or an environment, the process will involve individual measurements of the sound pressure level at one or more specific points in space. This is the focus of this standard. The particular reasons or applications for the measurements are dealt with only superficially.

This standard is intended to be used by practitioners in the field as well as by members of the general public who have little or no special technical training in areas relating to acoustics. One of the goals of publishing this standard is to make the practice of making an accurate sound pressure level measurement more widespread and comfortable.

It is anticipated that standards, test codes, government regulations, purchase specifications, design specifications, or similar documents requiring the measurement of sound pressure levels in rooms will refer to this standard in a form such as "... (at the specified point or points) the (specified type of) sound pressure level shall be measured in accordance with ANSI/ASA S12.72-2015."

American National Standard

Procedure for Measuring the Ambient Noise Level in a Room

1 Scope

This standard specifies requirements and procedures for the measurement of sound pressure levels in building spaces or rooms. These requirements and procedures apply ideally to measurements performed in unoccupied spaces, with normal building services and HVAC equipment operating under relatively steady conditions. This standard, however, does not exclude measurements in occupied rooms. Transient noise sources, which for the purposes of this standard are defined as sounds with a duration of less than 10 seconds, are specifically excluded from this standard. This standard also does not apply to measurements made outdoors.

The requirements in this standard (identified by the use of the word *shall*) are to be understood as conditions on the measurements that must be met in order to state that such measurements have been made in conformance with this American National Standard. The guidelines and recommendations (identified by the use of the word *should*) are to be understood as conditions that will generally improve the accuracy, validity, applicability, documentation, and reporting of the measurement data but that are not mandatory for conformance. The type of sounds considered by this standard may differ widely in spectral characteristics. The sound to be measured may be essentially broadband or may contain discrete tones or narrow bands of noise. The frequency range covered by the requirements of this standard depends on the specific type of sound level meter or instrumentation being used, but, in general, the frequency content of the sound being measured should be contained within the range covered by the octave bands having center frequencies from 16 Hz to 8.0 kHz. The sound pressure levels of sounds whose energy is concentrated outside of this range may not be measured accurately according to the procedures of this standard.

This standard may be used to obtain one-third octave or octave-band sound pressure level spectra or single-number sound descriptors such as the time-average A-weighted overall sound level (also called the equivalent-continuous A-weighted sound pressure level). The standard may also be used to obtain the NC (noise criterion) level, the RC (room criterion) level, or other sound metric applicable to steady-state sounds which can be described by one-third octave bands.

To accommodate a wide range of applications, this standard provides two distinct measurement grades:

1) Survey method

- Provides a quick but only approximate noise evaluation.
- Generally adequate for an initial building commissioning process.

2) Engineering method

- Provides an accurate assessment of the noise level in a room.
- Generally sufficient to establish compliance relative to a noise criterion.

To avoid misinterpretation of noise test results obtained according to this standard, it is essential that the data be clearly marked as to whether they pertain to the survey or the engineering method. This is especially critical when the results are used to establish compliance to building design criteria. If the survey method fails to conclusively determine the compliance of a space with a given criterion, then the engineering method shall be used. Ideally, engineering method tests should be conducted with