



ASA/ANSI S12.9-2013/Part 3

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AMERICAN NATIONAL STANDARD

**Quantities and Procedures for Description and  
Measurement of Environmental Sound –  
Part 3: Short-term Measurements with an  
Observer Present**

**Secretariat:**

**Acoustical Society of America**

**Approved on January 13, 2015:**

**American National Standards Institute, Inc.**

**Abstract**

This standard is the third in a series of parts concerning description and measurement of outdoor environmental sound. The standard describes recommended procedures for measurement of short-term, time-average environmental sound outdoors at one or more locations in a community for environmental assessment or planning for compatible land uses and for other purposes such as demonstrating compliance with a regulation. These measurements are distinguished by the requirement to have an observer present. Sound may be produced by one or more separate, distributed sources of sound such as a highway, factory, or airport. Methods are given to correct the measured levels for the influence of background sound.

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ANSI/ASA S12.9-2013/Part 3

Accredited Standards Committee S12, Noise

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**Quantities and Procedures for Description and  
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Short-term Measurements with an Observer Present**

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This standard is the third in a series of parts concerning description and measurement of outdoor environmental sound. The standard describes recommended procedures for measurement of short-term, time-average environmental sound outdoors at one or more locations in a community for environmental assessment or planning for compatible land uses and for other purposes such as demonstrating compliance with a regulation. These measurements are distinguished by the requirement to have an observer present. Sound may be produced by one or more separate, distributed sources of sound such as a highway, factory, or airport. Methods are given to correct the measured levels for the influence of background sound.

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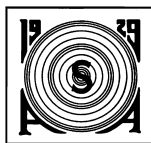
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## FOREWORD

*[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.9-2013/Part 3 American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present. 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 technical revision of ANSI/ASA S12.9-1993/Part 3. The applications of this Standard have been clarified, the microphone position and correction for nearby reflecting surfaces has been expanded, and the equation for day-night sound level as a function of population density in the United States has been corrected. The prediction in the previous edition was 3 dB too high, and all associated tables have been adjusted down by 3 dB.

This standard is the third in a series of six parts concerning description and measurement of outdoor environmental sound. This Part describes recommended procedures for measurement of short-term, average environmental sound pressure levels outdoors in a community with an observer present. Part 1 deals largely with definitions for standard quantities. Part 2 addresses measurement of long-term, wide-area sound. Part 4 deals with noise assessment and noise assessment metrics. Part 5 deals with noise-zone compatible land use planning. Part 6 deals with the probability of awakening by a set of discrete noise events; typically, the set encompasses the whole nights (e.g., all the nighttime operations at a busy commercial airport).

The subject matter in ANSI/ASA S12.9-2013/Part 3 is not considered in corresponding ISO documents.

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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, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177. Telephone: 631-390-0215; FAX: 631-390-0217; E-mail: [asastds@aip.org](mailto:asastds@aip.org).

## INTRODUCTION

This standard is the third part of a series related to quantities and procedures for description and measurement of environmental sound. Part 1 lists definitions for basic quantities that can be used separately or in combination to describe community sound and basic procedures for measurement of these quantities. Part 2 provides procedures for measurement of long-term, wide-area time-average descriptors such as day-night sound exposure and yearly day-night average sound level; Part 2 also establishes spatial and temporal sampling requirements so as to measure these time-average sound levels with a specified degree of precision and confidence. Long-term wide-area measurements take days or weeks or months to accomplish with the desired degree of accuracy and confidence. Normally, long-term sound level measurements are not made by an operator at a measurement site; they are measured by unattended instruments.

This standard, Part 3, deals with basic measurements of sound with an observer present. Typically, the duration of these measurements ranges from several minutes to several hours. The purpose of this part is to provide the method(s) to measure the sound of a specific source at a specified location, such as the noise from a specific power plant in some specified person's backyard. The method is to measure the total sound and then to subtract the background, which is all sound at the location in question except for the sound from the specific source in question.

**NOTE** As an example, one hour (1 h) is used as the basic measurement duration in Part 3. One hour is not a measurement duration required by this standard; it is only an example of a basic measurement duration, though a common one.



## American National Standard

# Quantities and Procedures for Description and Measurement of Environmental Sound — Part 3: Short-term Measurements with an Observer Present

## 1 Scope

The scope of this standard includes the measurement, with an observer present, of quantities such as equivalent-continuous sound pressure level or sound exposure from a specific source or sources at a specified location. These measurements require several minutes to several hours to perform; they take less than one day to perform. Measurements may be obtained with a standard frequency weighting, may be frequency filtered in a defined manner, or may be frequency filtered by octave band or fractional octave band filters. This standard specifies procedures to effectively eliminate, to the extent possible, the contributions of extraneous background sound from the source-specific measurements. Measurement procedures in this standard require the presence of an instrument operator and are not applicable to measurements by unattended instruments. This standard does not define specific measures or limits for environmental sounds or recommend measurement locations or durations.

The purposes of this standard are to (a) specify procedures for measurement of environmental sound from a specific source or sources at a specified location, and (b) to specify procedures to effectively eliminate the contributions of extraneous background sounds from the source-specific measurements. Sound pressure levels are measured with an observer present to record the data described in this part.

This standard is applicable to the measurement of quantities such as equivalent-continuous sound pressure level or sound exposure level from a specific source or sources with an observer present. Major applications of this Standard include:

1. Assessment of environmental sound
2. Measurement of source emissions as equivalent-continuous sound pressure level (LEQ), or as sound exposure level (SEL)
3. Measurement of received sound as LEQ
4. Correction of LEQ measurements for the background sound

**NOTE** Source emissions typically are measured only when the direct measurement of the received sound is not practical or when the source is not yet in operation. In either case, the received sound must be predicted using the measured source emissions. Annex A contains an informative discussion regarding source emissions and received sound, and clause 7.4 discusses, in general terms, moving closer to the source when the source cannot be turned off, and, as a result of not being able to be turned off, correction for the background is problematic.

## 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.

ANSI S1.4-1983 (R 2006) *American National Standard Specification for Sound Level Meters*; and Amendment No. 1 in ANSI S1.4A-1985