ANSI/ASA S12.61-2020

AMERICAN NATIONAL STANDARD

Declaration and Verification of Noise Emission Values of Machinery, Equipment, and Products

Secretariat:

Acoustical Society of America

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American National Standards Institute, Inc.

Abstract

Information on the acoustical noise emitted by machinery, equipment, and products is needed by consumers, manufacturers, building and land-use planners, governmental authorities, and others concerned about noise in order to make informed purchasing decisions. To meet this need, this Standard gives requirements and guidelines for how to properly and uniformly provide product noise level information to the public. This standard specifies the noise emission values to be declared for a batch of machines, equipment, or products and the requirements for their presentation; the method for determining the mean A-weighted sound power level; the method for optionally determining the total standard deviation; the method for optionally determining the mean A-weighted emission sound pressure level; and the method for verifying the noise emission values that are declared by manufacturers and other product suppliers. This standard is applicable to commercially available products that emit noise, including consumer products and household appliances, information technology products, industrial equipment, outdoor equipment and construction machinery, and other products.

AMERICAN NATIONAL STANDARDS ON ACOUSTICS

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, S3/SC 1 on Animal 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 (ANSI).

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.

Each of the Accredited Standards Committees (operating in accordance with procedures approved by ANSI) is responsible for developing, voting upon, and maintaining or revising its own Standards. The ASA Standards Secretariat administers Committee organization and activity and provides liaison between the Accredited Standards Committees and ANSI. After the Standards have been produced and adopted by the Accredited Standards Committees, and approved as American National Standards by ANSI, the ASA Standards Secretariat arranges for their publication and distribution.

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered and that a concerted effort be made towards their resolution.

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NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this Standard.

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Foreword

[*This Foreword is for information only, and is not a part of the American National ANSI/ASA S12.61-2020 American National Standard Declaration and Verification of Noise Emission Values of Machinery, Equipment and Products. 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 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 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 derived from, and is generally consistent with, ANSI/ASA S12.3-1985 (R2016), *American National Standard Statistical methods for determining and verifying stated noise emission values of machinery and equipment*. This standard represents a simplified and practical version of ANSI/ASA S12.3. The latter is generally equivalent to ISO 7574:1985 *Acoustics–Statistical methods for determining and verifying stated noise emission values of machinery and equipment*, in four Parts. A simplified and practical version of ISO 7574 also exists in ISO 4871-1996 *Acoustics–Declaration and verification of noise emission values of machinery and equipment*, and there are several similarities between the latter and this standard. It should be noted that at the time this Standard was submitted to Accredited Standards Committee S12, Noise for approval, ANSI/ASA S12.3, ISO 7574 (all Parts), and ISO 4871 were very outdated, and it is anticipated that newer versions will be available in the near future and that the four parts of ISO 7574 will be combined into a single part.

This standard includes one Annex. Annex A, “Examples of noise emission declarations,” is informative and is not considered part of this 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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Working Group S12/WG 38, Noise Labelling for Products, which assisted Accredited Standards Committee S12, Noise, in the development of this standard, had the following membership.

Matthew A. Nobile, Chair
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Ben Bard	Carol Drutowski	Richard Peppin
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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; Email: standards@acousticalsociety.org.

Introduction

Information on the acoustical noise emitted by machinery, equipment, and products is needed by consumers, manufacturers, building and land-use planners, governmental authorities, and others concerned about noise in order to make informed purchasing decisions. Such information is useful for comparing the noise emitted by similar products from different manufacturers or suppliers, for assessing stated product noise levels against noise limits or noise specifications, for planning and managing workplaces in terms of employee noise exposure or living spaces and other soundscapes in terms of quality of life, as well as for monitoring noise reduction progress over time. It is anticipated that the availability of product noise emission information will eventually lead to lower-noise products in the marketplace.

In order for noise emission information to be useful and trustworthy to prospective purchasers, uniform methods of product noise measurement and declaration are necessary.

NOTE 1 The term “machinery, equipment, and products” is used as a general term in this standard to denote any commercially available products that emit noise, including consumer products and household appliances, information technology products, industrial equipment, outdoor equipment and construction machinery, and other products.

NOTE 2 The terms "declare," "state," "label," and "publish" may generally be used interchangeably to indicate the manner in which product noise levels are communicated to the public. In this Standard, the term "declare" is preferred and will be used primarily. Note also that the term "label" does not necessarily imply a physical label; i.e., a product noise level may be "labelled" electronically.

a) Measurement of noise emission

The ANSI S12.50 series specifies methods for determining the sound power levels of noise sources from sound pressure level measurements; ANSI S12.12 specifies methods for determining the sound power levels from sound intensity level measurements; ANSI/ASA S12.43 and ANSI/ASA S12.44 describe methods for determining emission sound pressure levels at specified positions in the vicinity of machinery and equipment. Other standards in the form of *test codes* give procedures for the measurement of the noise emissions of particular types of machinery, equipment, and products which are based on these methods. The installations conditions and operating modes of the equipment under test invariably affect the measured noise emission levels and therefore are usually specified in the underlying test code.

b) Determination of the noise emission values to be declared

ANSI S12.3 gives general methods for determining the noise emission values to declare (to “state,” “label,” or otherwise “publish”), with the primary noise emission quantity being the A-weighted sound power level. The specific methods in this Standard rely on the underlying statistical concepts in ANSI S12.3 but are based on declaring and verifying the mean value instead of a statistical upper limit. This Standard also includes the A-weighted emission sound pressure level as an optional quantity to declare, which is not included in ANSI S12.3.

NOTE 3 It is recommended that the total standard deviation also be determined and declared along with the A-weighted sound power level (see 5.3 and 5.4).

NOTE 4 The term “emission sound pressure level” is not to be confused with the basic term “sound pressure level” that is used to describe noise *immission* in a room or space (i.e., the sound *received* by a person or sensed by a microphone). The former is a measure of the noise *emission* from a source and is determined in a controlled measurement environment according to prescribed procedures.

c) Presentation of noise emission values

This standard describes the methods for the presentation of the noise emission information; that is, how to declare the noise emission values. The primary quantity to declare is the A-weighted sound power level,

preferably supplemented with the total standard deviation. Optionally, the A-weighted emission sound pressure level may also be declared, if applicable.

d) Verification of declared noise emission values

ANSI S12.3 gives general procedures for the verification of declared noise emission values. The specific verification procedures of this standard are consistent with ANSI S12.3 in that they employ the same principles and assumptions therein and adopt the recommended probability of acceptance (95%). However, the equations in this Standard are different because the verification procedures are applied to the mean and not to a statistical upper limit.

Note that “acceptance” in the context of this Standard is not a judgement of product quality; it is merely a conclusion that the declared value is “reasonable” for the batch being declared. A noisy product (high noise emission value) is just as likely to be “accepted” as a quiet product (low noise emission value).

Conformance requirements for this Standard are given in Clause 4, and requirements for the determination and presentation of the noise emission values to declare are given in Clauses 5 and 6. Requirements on the verification of declared noise emission values are given in Clause 8.

American National Standard

1 Scope

This Standard specifies:

- the noise emission values to be declared and the requirements for their presentation,
- product information that should accompany the declared noise emission values,
- the method for determining the mean A-weighted sound power level, $L_{WA,m}$, for a batch of machines, equipment, or products,
- the method for optionally determining the mean A-weighted emission sound pressure level, $L_{pA,m}$, for a batch of machines, equipment, or products
- the method for optionally determining the total standard deviation, σ_t, for the batch if this quantity is to be declared (e.g., if required by a regulation, standard, or test code citing this Standard).
- the method for verifying the noise emission values that are declared by manufacturers and other product suppliers.

This Standard is applicable to commercially available products that emit noise, including consumer products and household appliances, information technology products, industrial equipment, outdoor equipment and construction machinery, and other products. The term “machinery, equipment, and products” is used in this Standard to include all such products. In general, and at the time of its initial publication, this Standard does not apply to transportation vehicles (cars, motorcycles, trucks, trains, planes) or other moving equipment, but its Scope and requirements may be extended to such products if relevant test codes are developed and published that apply the methods of noise emission declaration and verification herein to such equipment and products. The uniform declaration methods in this Standard use, when required and unless otherwise specified in relevant test codes, noise emission data obtained in accordance with standards in the ANSI S12.5x series or ANSI S12.12 for determining the sound power levels of noise sources, and optionally ANSI/ASA S12.43 and ANSI/ASA S12.44 for determining emission sound pressure levels at specified positions.

The basic noise emission value to be declared is the mean A-weighted sound power level, $L_{WA,m}$. This may optionally be supplemented by the mean A-weighted emission sound pressure level at the operator or bystander positions, $L_{pA,m}$. These declared values are arithmetic mean values based upon measurements on a random sample of units taken from a production batch or lot of the machinery, equipment, or products being declared.

In addition to these noise emission quantities, the standard deviation of the noise emission values for the batch being declared is often needed (see Note 1 in Clause 5.4 for discussion.) It is therefore recommended, but left optional, that the total standard deviation (see 3.16) also be declared.

The mean A-weighted sound power level for the batch of machines permits comparison of the noise emission levels between similar products and permits predictions of installation or work-place noise immission levels in spaces where such products are to be located.