

ANSI/ASA S12.43-1997
(Formerly ANSI S12.43-1997)

Reaffirmed by ANSI
June 19, 2020

Reaffirmed by ANSI
July 17, 2002

Reaffirmed by ANSI
September 11, 2007

Reaffirmed by ANSI
September 5, 2012

Reaffirmed by ANSI
September 29, 2017

AMERICAN NATIONAL STANDARD

Methods for Measurement of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions

ANSI/ASA S12.43-1997
(Formerly ANSI S12.43-1997)

Accredited Standards Committee S12, Noise

Standards Secretariat
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Secretariat
Acoustical Society of America

Approved 27 January 1997
American National Standards Institute, Inc.

Abstract

This Standard provides three methods to measure sound pressure levels from all types of machinery and equipment at workstations and other specified positions. The first method applies to measurements in an essentially free field over a reflecting plane. These sound pressure levels are, in general, equal to or lower than those that would occur when the machine is operated in its normal surroundings as the effects of background noise or reflections from surfaces other than the mounting surface are excluded. The second method applies to measurements in normal operating environments where the effects of background noise and reflections from surfaces surrounding the machine are accounted for in the measurements. The third method is a survey method of measurement for sound sources operating in their normal environments when less-accurate measurements are acceptable.

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Foreword

[This foreword is for information only and is not an integral part of ANSI S12.43-1997 *American National Standard Methods for Measurement of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions.*]

This American National Standard was developed as a national counterpart to four International Standards:

ISO 11200:1995 *Acoustics—Noise Emitted by Machinery and Equipment —Guidelines for the Use of Basic Standards for the Determination of Emission Sound Pressure Levels at a Workstation and at Other Specified Positions.*

ISO 11201:1995 *Acoustics—Noise Emitted by Machinery and Equipment —Measurement of Emission Sound Pressure Levels at a Workstation and at Other Specified Positions—Engineering Method in an Essentially Free Field over a Reflecting Plane.*

ISO 11204:1995 *Acoustics—Noise Emitted by Machinery and Equipment —Measurement of Emission Sound Pressure Levels at a Workstation and at Other Specified Positions—Method Requiring Environmental Corrections.*

ISO 11202:1995 *Acoustics—Noise Emitted by Machinery and Equipment —Measurement of Emission Sound Pressure Levels at a Workstation and at Other Specified Positions—Survey Method in Situ.*

This Standard was developed under the jurisdiction of Accredited Standards Committee S12, Noise, which has the following scope:

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.

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

P. D. Schomer, *Chair*
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This Standard specifies three methods to measure sound pressure levels at workstations and other specified positions. The methods differ from each other in terms of the permissible test environments and expected accuracy of results. One annex provides guidance on the selection of which method is appropriate for a specific situation. Other annexes provide calculation procedures for making corrections to measured sound pressure levels for the presence of background sound levels and the acoustical properties of test environments.

The methods of this Standard are not applicable to machines whose sole purpose is to produce or reproduce sound, such as musical instruments, loudspeakers, or earphones, except where such machines are attached to other machines as annunciators.

This Standard is closely related to Draft ANSI S12.44-1997 *American National Standard Methods for Calculation of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions from Sound Power Level*.

The ad hoc Working Group, which assisted Accredited Standards Committee S12, Noise, in the preparation of this standard, had the following membership:

W. J. Galloway, *Chairman*

B. M. Brooks
A. H. Marsh

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P. D. Schomer

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Suggestions for improvement will be welcomed. They should be made in writing to Accredited Standards Committee S12, Noise, in care of the Standards Secretariat, Acoustical Society of America, 120 Wall Street, 32nd floor, New York, New York, 10005-3993, U.S.A.

Telephone: +1 212 248 0373 FAX: +1 212 248 0146

American National Standard

Methods for Measurement of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions

1 Scope

1.1 General

This Standard specifies three methods for measuring sound pressure levels from machinery and equipment, at a workstation and at other specified positions nearby. The three methods are differentiated primarily by the acoustical environment in which the measurements are made:

Method A: Measurements in an essentially free field over a reflecting plane.

Method B: Measurements in any environment that meets certain qualification requirements specified in this Standard.

Method C: Measurements, in a semi-reverberant field, for which the accuracy implied by the measurements under Methods A or B is not required.

A workstation is occupied by an operator of a machine or equipment. It may be located in an open space in the room where the sound source operates, or in a cab fixed to the source, or in an enclosure remote from the source. One or more specified positions may be in the vicinity of an unattended machine. As some of these positions may be occupied occasionally or regularly, they are sometimes referred to as bystander positions.

Emission sound pressure levels are measured with frequency weighting A and, if required, as C-weighted peak and in frequency bands.

Instructions are given for the installation and operation of the machine under test and for the

choice of microphone positions for the workstation and for other specified positions. The purpose of the measurements is to permit comparison of the performance of different units of a given family of machinery or equipment, under defined environmental conditions and standardized mounting and operating conditions. The data obtained are also used for the declaration and verification of sound pressure levels as specified in noise test codes.

1.1.1 Method A—engineering method

Method A in this Standard prescribes requirements on the test environment and instruments to permit measurements having an engineering grade of accuracy. Corrections are applied for background noise, but not for the acoustical environment.

1.1.2 Method B—method requiring environmental corrections

Method B in this Standard specifies the determination of a local environmental correction (the acceptable maximum value of which is prescribed) to be applied to the measured sound pressure levels to exclude the effects of reflections from reflecting surfaces other than the plane on which the machinery or equipment is placed. The accuracy of the measurements (engineering or survey) depends upon the value of the local environmental factor. The local environmental correction is based on the space average sound pressure level on a specified surface, the sound pressure level measured at a specified position, and either an environmental indicator or the equivalent sound absorption area of the test room.

1.1.3 Method C—survey method *in situ*

Method C of this Standard prescribes requirements on the test environment and instruments for measurements that result in the survey grade of accuracy. A method is given for determining a local environmental correction (subject to a prescribed limiting maximum value) to be applied to the measured sound pressure levels in order to exclude at least part of the effects of reflections from reflecting surfaces other than the plane on which the machinery or equipment is placed.