Reaffirmed by ANSI
July 10, 2001

Reaffirmed by ANSI
May 23, 2006

Reaffirmed by ANSI
June 28, 2011

Reaffirmed by ANSI
May 6, 2016

AMERICAN NATIONAL STANDARD

MEASUREMENT OF OCCUPATIONAL NOISE EXPOSURE

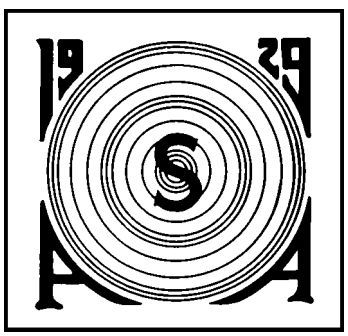
ANSI S12.19-1996

Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
120 Wall Street, 32nd Floor
New York, New York 10005-3993

The American National Standards Institute, Inc. (ANSI) is the national coordinator of voluntary standards development and the clearing house in the U.S. for information on national and international standards.

The Acoustical Society of America (ASA) is an organization of scientists and engineers formed in 1929 to increase and diffuse the knowledge of acoustics and to promote its practical applications.



AMERICAN NATIONAL STANDARD

Measurement of Occupational Noise Exposure

Secretariat

Acoustical Society of America

Approved 29 March 1996

American National Standards Institute, Inc.

ABSTRACT

The standard presents methods that can be used to measure a person's noise exposure received in a work place. The methods have been developed to provide uniform procedures and repeatable results for the measurement of occupational noise exposure.

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, and S12 on Noise. These Committees have wide representation from the technical community (manufacturers, consumers, and general-interest representatives). The Standards are published by the Acoustical Society of America through the American Institute of Physics as American National Standards after approval by their respective Standards Committees and the American National Standards Institute.

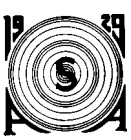
These Standards are developed and published as a public service to provide Standards useful to the public, industry, and consumers, and to Federal, State, and local governments.

Each of the accredited Standards Committees [operating in accordance with procedures approved by American National Standards Institute (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.

The use of an American National Standard is completely voluntary. Their existence does not in any respect preclude anyone, whether he or she has approved the Standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the Standards.

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.



Standards Secretariat
Acoustical Society of America
120 Wall Street, 32nd Floor
New York, New York 10005-3993

Telephone: 1 (212) 248-0373
Telefax: 1 (212) 248-0146

Contents

Foreword

[This Foreword is not part of ANSI S12.19-1996 American National Standard Method for the Measurement of Occupational Noise Exposure.]

This standard was developed using the American National Standards Institute (ANSI) Accredited Standards Committee Procedure under the Secretariat of the Acoustical Society of America.

Accredited Standards Committee S12, Noise, under whose jurisdiction this standard was developed, has the following scope:

> *Standards, specifications, and terminology in the field of acoustic 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 for approval, the membership was as follows:

D. L. Johnson, *Chair*
P. D. Schomer, *Vice Chair*
A. Brenig, *Secretary*

Acoustical Society of America	D. L. Johnson
	W. J. Galloway (*Alt.*)
Acoustical Systems, Inc.	R. Goodwin
	R. Seitz (*Alt.*)
Air-Conditioning and Refrigeration Institute	S. Wang
	G. Acton (*Alt.*)
Aluminum Company of American (ALCOA)	S. I. Roth
American Academy of Otolaryngology-Head and Neck Surgery, Inc.	L. A. Michael
American College of Occupational Medicine	P. J. Brownson
	J. Sataloff (*Alt.*)
American Industrial Hygiene Association	L. H. Royster
	J. F. Meagher (*Alt.*)
American Otological Society	R. F. Naunton
American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)	H. S. Pei
	J. L. Heldenbrand (*Alt.*)
American Speech-Language-Hearing Association	R. F. Burkard
Audio Engineering Society, Inc.	M. R. Chial
Bruel and Kjaer Instruments, Inc.	E. Schonthal
Compressed Air and Gas Institute (CAGI)	J. H. Addington
Computer and Business Equipment Manufacturers Association	R. Lotz
	W. F. Hanrahan (*Alt.*)
Council for Accreditation Occupational Hearing Conservation	W. Monk
	D. Driscoll (*Alt.*)
Industrial Safety Equipment Association	J. Birkner
	W. J. Erny (*Alt.*)
Larson-Davis Laboratories	R. Anderson
	L. Davis (*Alt.*)
National Council of Acoustical Consultants	J. Erdreich
	R. L. Richards (*Alt.*)

National Electrical Manufacturers Association (NEMA)	D. Rawlings
National Hearing Conservation Association	J. Franks
	E. H. Berger (*Alt.*)
Naval Surface Warfare Center	D. J. Vendittis
Power Tool Institute, Inc.	R. J. Callahan
	D. Kellar (*Alt.*)
U. S. Army Aeromedical Research Laboratory	B. Mozo
	J. H. Patterson (*Alt.*)
U. S. Army Construction Engineering Laboratory (USA-CERL)	P. D. Schomer
	M. White (*Alt.*)
U. S. Army Human Engineering Laboratory	G. R. Price
	J. Kalb (*Alt.*)
U. S. Department of the Air Force	R. L. McKinley
U. S. Department of the Army, Walter Reed Army Medical Center	R. M. Atack
U. S. Department of the Navy, Bureau of Medicine and Surgery	J. Page
	L. Marshall (*Alt.*)

Individual experts of Accredited Standards Committee S12, Noise, were:

P. K. Baade	W. J. Galloway	A. H. Marsh
R. G. Bartheld	R. Guernsey	L. H. Royster
R. W. Benson	R. K. Hillquist	H. E. von Gierke
L. Beranek	D. L. Johnson	L. Wilber
E. H. Berger	W. W. Lang	G Winzer
K. M. Eldred	L. Luttrell	G. S. K. Wong
R. S. Gales	G. C. Maling, Jr.	R. W. Young

Working Group S12/WG19, Measurement of Occupational Noise Exposure, which assisted Accredited Standards Committee S12, Noise, in the development of this standard, had the following membership:

John Barry, Chairman
Richard Goodwin, Co-chairman

John Earshen	Michael Valoski	Thomas Miller
Stephen Roth	Edwin Toothman	William R. Thornton
Carl Bohl	Terrence Dear	

Suggestions for improvement of this standard will be welcomed. They should be sent to Accredited Standards Committee S12, Noise, in care of the ASA Standards Secretariat, Acoustical Society of America, 120 Wall Street, 32nd Floor, New York, NY 10005-3993, USA. Telephone: 1 (212) 248-0373; FAX: 1 (212) 248-0146.

American National Standard

Measurement of Occupational Noise Exposure

1 Scope

1.1

This Standard provides procedures for the measurement of occupational noise exposure. The user of this Standard should be proficient, or under the direction of one who is proficient in noise measurement.

1.2

This Standard provides procedures for measuring the occupational noise exposure from all types of noise, e.g., continuous, fluctuating, intermittent and/or impulse/impact. Measurements may be reported as sound level with corresponding duration, time-weighted average sound level and/or noise dose.

1.3

This Standard provides for the measurement of the noise exposure of individuals and can be extended to representative groups performing similar activities. It can also be used to measure the noise exposure from a given job or activity.

1.4

This Standard does not provide procedures for the measurement of occupational noise exposure attributable to the use of earphones or telephone receivers.

2 Definitions and symbols

Some definitions and symbols contained in this document are unique to this Standard. Standard acoustical terminology defined in ANSI S1.1-1994 and other applicable Standards are not redefined in this document.

Action level. A specified value, which when a measured sound level or exposure equals or exceeds that value, certain actions are required.

Activity. Unique elements of an employee's workshift that represent different noise exposure conditions during the work shift. All activities are comprised of one or more work tasks and/or events that can be definitely recognized and have specific beginning and ending points.

Activity duration. The activity duration is the duration of an activity duty cycle multiplied by the number of times the activity occurs per workday.

Activity duty cycle. The length of time required for all of the tasks comprising an activity to occur at least once and in proportion to their occurrence relative to other tasks associated with the activity.

Allowed Exposure Time (T_i). Based on a specified criterion sound level (LC), criterion duration (TC) and exchange rate (Q), this is the allowed time of exposure at a given constant A-weighted sound level (L_i). The relation is:

$$T_i = \frac{\mathrm{TC}}{2^{[L_i - \mathrm{LC}]/\mathrm{Q}}}$$

Average daily work shift. If an employee works longer than a ''normal'' work shift, and the longer work shift is not a regularly scheduled occurrence, the average hours worked per day, based on a week, month, etc. time period (holidays and vacation excluded), may be used to determine the average daily work shift.

Average sound level (L_{avg}). The logarithmic average sound level, using applicable exchange rate, during a measurement duration. Exposure to such an average level for the measurement duration would produce the same dose as the measured dose.

Criterion duration (TC). The duration in hours used as a basis for determination of noise exposure. Most common criterion duration is 8-hours.

Criterion sound level (LC). That constant sound level in decibels (dB), which, if it continues for the criterion duration, would provide 100% of an employee's allowable noise exposure.

Exchange rate (Q). The change in sound level corresponding to a doubling or halving of the duration of sound level that is considered to result in an equivalent amount of noise exposure.

Eight-hour time-weighted average sound level ($L_{TWA(8)}$). The A-weighted constant sound level that would, in eight hours, expose a person to the same noise dose as did the actual time-varying sound