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AMERICAN NATIONAL STANDARD

SPECIFICATIONS FOR INTEGRATING-AVERAGING SOUND LEVEL METERS

ANSI S1.43-1997

Accredited Standards Committee S1, Acoustics

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

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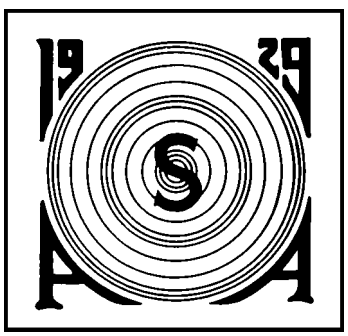

American National Standard

Specifications for Integrating-Averaging Sound Level Meters

Secretariat
Acoustical Society of America

Approved 12 June 1997
American National Standards Institute, Inc.

Abstract

This Standard describes instruments for the measurement of frequency-weighted and time-average sound pressure levels. Optionally, sound exposure levels may be measured. This Standard is consistent with the relevant requirements of ANSI S1.4-1983 (R 1997) *American National Standard Specification for Sound Level Meters,* but specifies additional characteristics that are necessary to measure the time-average sound pressure level of steady, intermittent, fluctuating, and impulsive sounds.

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Foreword

[This Foreword is not an integral part of ANSI S1.43-1997 *American National Standard Specifications for Integrating-Averaging Sound Level Meters.*]

This Standard is intended to be consistent with IEC 804:1985, *Integrating averaging sound level meters*, including Amendment No. 1 and Amendment No. 2. The Standard differs from IEC 804:1985 in the following ways:

a) References to corresponding ANSI Standards are given instead of exclusive references to International Standards;

b) No specifications for Type 3 accuracy class are included, to be consistent with ANSI S1.4-1983 (R 1997) *American National Standard Specification for Sound Level Meters*;

c) Requirements for the response of the instrument to sounds incident from random directions or in a diffuse sound field are consistent with similar requirements in ANSI S1.4-1983 (R 1997);

d) Texts of Amendment No. 1 and Amendment No. 2 to IEC 804:1985 are incorporated into the main text of the Standard rather than as separate amendments;

e) Specifications for time-average AI-weighted sound pressure level are retained for compatibility with IEC 804:1985. It is recommended that time-average AI-weighted sound pressure level not be used in any future standards or regulations.

This Standard was developed under the jurisdiction of Accredited Standards Committee S1, Acoustics, which has the following scope:

> *Standards, specifications, methods of measurement and test, and terminology, in the fields of physical acoustics, including architectural acoustics, electroacoustics, sonics and ultrasonics, and underwater sound, but excluding those aspects which pertain to safety, tolerance, and comfort.*

At the time this Standard was submitted to Accredited Standards Committee S1, Acoustics, for final approval, the membership of the committee was as follows:

G. S. K. Wong, *Chair*
R. W. Krug, *Vice Chair* (*deceased*)
A. Brenig, *Secretary*

Acoustical Society of America	G. S. K. Wong
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U.S. Department of the Air Force	R. L. McKinley

Individual experts of Accredited Standards Committee S1, Acoustics, were:

J. R. Bareham	R. K. Hillquist	L. W. Sepmeyer
S. L. Ehrlich	D. L. Johnson	W. R. Thornton
K. M. Eldred	W. W. Lang	H. E. von Gierke
W. J. Galloway	G. C. Maling, Jr.	G. S. K. Wong
E. E. Gross, Jr.	A. H. Marsh	R. W. Young
R. M. Guernsey		

Working Group S1/WG17, Sound Level Meters, which assisted Accredited Standards Committee S1, Acoustics, in the development of this Standard, had the following membership:

R. W. Krug, *Chair** (*deceased*)
T. J. Kuemmel

J. R. Arrington	A. H. Marsh	J. W. Waite, Jr.
J. J. Earshen	G. C. Michel	A. D. Wallis
T. A. Heline	T. Myles	G. S. K. Wong
D. L. Johnson	J. Pope	R. W. Young
L. Loken	R. J. Peppin	

Suggestions for improvement will be welcomed. Send suggestions for improvement to Accredited Standards Committee S1, Acoustics, in care of the ASA Standards Secretariat, 120 Wall Street, 32nd Floor, New York, New York 10005-3993, USA. E-mail: asastds@aip.org; Telephone: +1 212 248 0373; Fax +1 212 248 0146.

*Mr. Krug died during 1996 whereupon Mr. Kuemmel assumed the position of Chair of the Working Group.

American National Standard

Specifications for Integrating-Averaging Sound Level Meters

1 Scope

1.1 Scope

1.1.1 General

This Standard describes instruments for the measurement of frequency-weighted, time-average sound pressure levels. Optionally, sound exposure levels may be measured. This Standard is consistent with the relevant requirements of ANSI S1.4-1983 (R 1997) *American National Standard Specification for Sound Level Meters*, but specifies additional characteristics that are necessary to measure the time-average sound pressure level of steady, intermittent, fluctuating, and impulsive sounds.

NOTE – Throughout this document, reference to ANSI S1.4-1983 (R 1997) includes the ANSI S1.4A-1985 amendment.

Though a complete integrating-averaging sound level meter is specified, the combination of a conventional sound level meter that satisfies ANSI S1.4-1983 (R 1997) and an accessory or ''plug-in'' that provides the time averaging capability is admissible if the complete system conforms to the specifications of this Standard.

The instrument is called ''integrating-averaging sound level meter,'' but the short form ''integrating sound level meter'' or ''averaging sound level meter'' may also be used. In this Standard, ''integrating sound level meter'' is used.

There are some important differences between the time averaging characteristics of an integrating sound level meter and those of a conventional sound level meter with exponential time weighting. Integrating-averaging sound level meters are inherently different from conventional sound level meters with exponential time weighting. As such, they may produce different results. These differences are discussed in annex A.

1.1.2 Types

This Standard specifies integrating sound level meters of three grades of accuracy, designated Types 0, 1, and 2. For each Type, the specification for directional characteristics and frequency weighting and amplifier characteristics are identical with those of ANSI S1.4-1983 (R 1997). Time averaging and indicator specifications differ from those specified in ANSI S1.4-1983 (R 1997).

1.1.3 Characteristics specified

1.1.3.1 This Standard specifies the following characteristics for integrating sound level meters:

(a) integrating and time averaging;

(b) indicator; and

(c) overload indications.

1.1.3.2 Integrating sound level meters also shall comply with the requirements in ANSI S1.4-1983 (R 1997) as follows:

(a) directional characteristics [from 4.1 and 4.2 of ANSI S1.4-1983 (R 1997)];

(b) frequency weighting characteristics [from 5.1 and 5.2 of ANSI S1.4-1983 (R 1997)];

(c) sensitivity to various environments [from 7 of ANSI S1.4-1983 (R 1997)].

1.1.4 Tolerances

Specifications for Types 0, 1, and 2 integrating sound level meters have the same design goals and differ only in the tolerance limits allowed. Tolerance limits broaden as the Type number increases.

1.1.5 Tests specified

This Standard specifies acoustical and electrical tests to verify conformance to the characteristics specified.

1.2 Purpose

The purpose of this Standard is to ensure specified accuracy and stability of an integrating sound level meter and to reduce to the practical minimum any differences between equivalent measurements