

ANSI S1.43-1997

AMERICAN NATIONAL STANDARD
**SPECIFICATIONS FOR INTEGRATING-
AVERAGING SOUND LEVEL METERS**

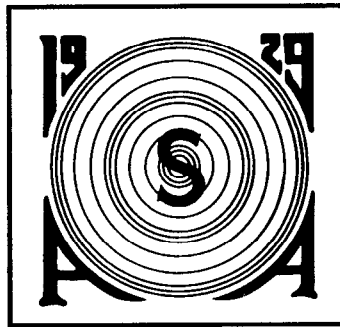
ANSI S1.43-1997

Accredited Standards Committee S1, Acoustics

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ANSI S1.43-1997

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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Contents

	Page
Foreword	ii
1 Scope	1
2 Normative references	2
3 Definitions	2
4 General characteristics	4
5 Frequency weighting and amplifier characteristics	6
6 Time averaging and indicator characteristics	7
7 Overload indication	9
8 Sensitivity to various environments	9
9 Calibration and verification of the basic characteristics	10
10 Provision for use with auxiliary equipment	13
11 Rating information and Instruction Manual	13

Annexes

A Difference between time averaging capability of integrating and conventional sound level meters	14
B Use of free-field and random-incidence responses	15
C Time-average AI-weighted sound pressure level	15
D Approximation of the random-incidence relative response level	16
E Relative response levels of frequency weighting characteristic	17

Tables

1 Maximum allowable deviation of free-field relative response level with respect to the random-incidence relative response level when the angle of incidence is varied ± 22.5 deg from the free-field calibration angle of incidence	5
2 Maximum allowable deviation of free-field relative frequency response level for sounds arriving at any angle of incidence with respect to the random-incidence relative response level	5
3 Maximum change of reading, in decibels, during 1 h of operation	6
4 Random-incidence relative response level as a function of frequency for various frequency weightings	6
5 Tolerance limits, in decibels, on design-goal frequency weightings for sound at random incidence measured on an instrument's reference level range	7
6 Tolerance limits on level range control accuracy in two frequency ranges, in decibels	7
7 Tolerance limits for time averaging	8
8 Minimum values for linear operating range and pulse range with tolerance limits, in decibels	8
9 Examples of theoretical time-average levels, in decibels, of toneburst test signals relative to level of the time-average continuous low level signal alone	12
C.1 Response to a continuous sequence of tonebursts of repetition frequency 0.2 Hz with tolerance limits	15

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 A1-weighted sound pressure level are retained for compatibility with IEC 804:1985. It is recommended that time-average A1-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:

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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