



**ASA/ANSI S12.14-1992  
(Formerly ANSI S12.14-1992)  
(ASA 101-1992)**

**Reaffirmed by ANSI June 19, 2020**

**AMERICAN NATIONAL STANDARD**

# **Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors**

**Secretariat:**

**Acoustical Society of America**

**Approved on 12 March 1992:**

**American National Standards Institute, Inc.**

## **Abstract**

This American National Standard describes relatively simple procedures for measuring and reporting certain properties of sounds produced by audible public warning devices. Methods are given for the measurement of the C-weighted sound level and for determining the one-third octave band containing the fundamental frequency of tonal warning sounds produced by audible public warning devices at a distance of 100 ft (30.5 m) from the device and at the mounted height of the device. A method is also given for measuring the maximum level of the sound from a warning sound source at the heads of bystanders on the ground. These methods may be used by manufacturers to specify, in part, the sound produced by their products, by customers to verify compliance with pertinent sound output specifications, and by warning system designers to estimate warning sound coverage.

**ANSI/ASA S12.14-1992**  
**(Formerly ANSI S12.14-1992)**  
**(ASA 101-1992)**

Reaffirmed by ANSI July 29, 1997	Reaffirmed by ANSI July 17, 2002	Reaffirmed by ANSI September 11, 2007	Reaffirmed by ANSI November 30, 2012	Reaffirmed by ANSI June 19, 2020
-------------------------------------	-------------------------------------	--	---	-------------------------------------

---

---

---

## AMERICAN NATIONAL STANDARD

# Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors

---

---

---

ANSI/ASA S12.14-1992  
(Formerly ANSI S12.14-1992)  
(ASA 101-1992)

Accredited Standards Committee S12, Noise

---

Standards Secretariat  
Acoustical Society of America  
35 Pinelawn Road, Suite 114 E  
Melville, NY 11747-3177

The American National Standards Institute, Inc. (ANSI) is the national coordinator of voluntary standards development and the clearinghouse in the U.S.A. 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.



**ANSI/ASA S12.14-1992**  
(Formerly ANSI S12.14-1992)  
(ASA 101-1992)

AMERICAN NATIONAL STANDARD

**Methods for the Field Measurement of the Sound  
Output of Audible Public Warning Devices  
Installed at Fixed Locations Outdoors**

Secretariat  
**Acoustical Society of America**

Approved 12 March 1992  
**American National Standards Institute, Inc.**

**Abstract**

This American National Standard describes relatively simple procedures for measuring and reporting certain properties of sounds produced by audible public warning devices. Methods are given for the measurement of the C-weighted sound level and for determining the one-third octave band containing the fundamental frequency of tonal warning sounds produced by audible public warning devices at a distance of 100 ft (30.5 m) from the device and at the mounted height of the device. A method is also given for measuring the maximum level of the sound from a warning sound source at the heads of bystanders on the ground. These methods may be used by manufacturers to specify, in part, the sound produced by their products, by customers to verify compliance with pertinent sound output specifications, and by warning system designers to estimate warning sound coverage.

## AMERICAN NATIONAL STANDARDS ON ACOUSTICS

The Acoustical Society of America provides the Secretariat for Accredited Standards Committees S1 on Acoustics, S2 on Mechanical Shock and Vibration, 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.

**This standard was approved by the American National Standards Institute as ANSI S12.14-1992 on 12 March 1992.**

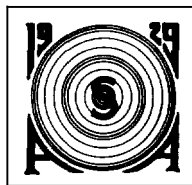
An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest editions.

*Caution Notice:* An American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication.

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.



**Published by the Acoustical Society of America through the American Institute of Physics**

© 1992 by Acoustical Society of America. This standard may not be reproduced in whole or in part in any form for sale, promotion, or any commercial purpose, or any purpose not falling within the fair-use provisions of the Copyright Act of 1976, without prior written permission of the publisher. For permission, address the Standards Secretariat of the Acoustical Society of America.

# FOREWORD

[This Foreword is not part of American National Standard Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors, ANSI S12.14-1992 (ASA Catalog No. 101-1992).]

This standard was developed under the American National Standards Institute (ANSI) Accredited Standards Committee Procedures 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 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 for approval, the membership was as follows:

D. L. Johnson, *Chairman*  
L. H. Royster, *Vice-Chairman*  
A. Brenig, *Secretary*

**Acoustical Society of America** ● D. L. Johnson, W. Melnick (*Alt*)  
**Acoustical Systems, Inc.** ● R. Goodwin, R. Seitz (*Alt*)  
**Air-Conditioning and Refrigeration Institute** ● S. Wang, J. Clukey (*Alt*)  
**Aluminum Company of America (ALCOA)** ● S. I. Roth  
**American Academy of Otolaryngology—Head and Neck Surgery, Inc.** ● R. F. Naunton, L. A. Michael (*Alt*)  
**American College of Occupational Medicine** ● P. J. Brownson, J. Sataloff (*Alt*)  
**American Industrial Hygiene Association** ● C. D. Bohl  
**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. Kasten  
**Audio Engineering Society, Inc.** ● M. R. Chial  
**Bruel and Kjaer Instruments, Inc.** ● John R. Bareham, G. C. Michel (*Alt*)  
**Compressed Air and Gas Institute (CAGI)** ● J. H. Addington  
**Computer and Business Equipment Manufacturers Association** ● L. F. Luttrell  
**David Taylor Research Center** ● D. J. Vendittis  
**Edison Electronic Institute** ● J. Fox, M. C. Mingoia (*Alt*)  
**Fastener Industry Noise Control Research Program** ● E. H. Toothman, J. C. McMurray (*Alt*)  
**Federal Aviation Administration** ● R. Tedrick  
**Industrial Safety Equipment Association** ● A. M. Bovi, R. Campbell (*1st Alt*), F. E. Wilcher (*2nd Alt*)  
**Larson-Davis Laboratories** ● L. Davis  
**National Council of Acoustical Consultants** ● J. Erdreich, R. L. Richards (*Alt*)  
**National Electrical Manufacturers Association (NEMA)** ● D. Rawlings  
**National Institute of Standards and Technology** ● D. R. Flynn, D. J. Evans (*Alt*)  
**Power Tool Institute, Inc.** ● R. J. Callahan, D. Keller (*Alt*)  
**Scantek, Inc.** ● R. J. Peppin  
**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 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
K. M. Eldred	W. W. Lang	G. Winzer
R. S. Gales	G. C. Maling, Jr.	G. S. K. Wong
		R. W. Young

Working Group S12/WG29, Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices (Sirens), which assisted Accredited Standards Committee S12, Noise, in the preparation of this Standard, had the following membership:

D. N. Keast, *Chairman*

J. F. Bader	D. J. Evans	E. Stusnick
J. Biersach	D. A. Hale	M. A. Whitcomb
H. V. Byrd, Jr.	V. M. Lee	W. Yarberry

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, 335 East 45th Street, New York, NY 10017-3483. Telephone (212) 661-9404.**

# CONTENTS

<b>0</b>	<b>INTRODUCTION</b> .....	1
<b>1</b>	<b>SCOPE</b> .....	1
<b>2</b>	<b>PURPOSE AND APPLICABILITY</b> .....	1
<b>3</b>	<b>REFERENCES TO OTHER STANDARDS</b> .....	2
<b>4</b>	<b>DEFINITIONS</b> .....	2
<b>5</b>	<b>MEASUREMENT CONDITIONS</b> .....	2
	5.1 Measurement Site.....	2
	5.2 Measurement Positions.....	2
	5.3 Weather Conditions.....	3
	5.4 Measuring Instruments.....	3
<b>6</b>	<b>MEASUREMENT OPERATIONS</b> .....	4
	6.1 Orientation of Warning Sound Source.....	4
	6.2 Sound Level Measurement.....	4
	6.3 Determination of the One-Third Octave Band Containing the Fundamental Frequency.....	5
	6.4 Measurement of Maximum Sound Level for Bystanders.....	5
<b>7</b>	<b>TEST REPORT</b> .....	5
	7.1 General Information.....	5
	7.2 Sound Source.....	5
	7.3 Measurement Site.....	5
	7.4 Instrumentation.....	5
	7.5 Acoustical Data.....	6
	<b>APPENDIX: SAMPLE DATA SHEET</b> .....	6
	<b>FIGURES</b>	
	<b>FIG. 1</b> Measurement site requirements and location of base line measurement position.....	3
	<b>FIG. A1</b> Sample data sheet.....	7

# American National Standard Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors

## 0 INTRODUCTION

This American National Standard describes relatively simple procedures for measuring and reporting certain properties of the sound produced by audible public warning devices. The Standard describes the instrumentation, measurement procedures, measurement positions, and measurement environment necessary to obtain reasonably repeatable field data for a variety of installed configurations.

The methods are not intended to provide a complete description of the sound field produced by audible public warning devices. However, they may be used by manufacturers to specify, in part, the sound produced by their products; and by customers to verify compliance with pertinent sound output specifications. The only previous United States standards on this subject have been the Standard Item Specifications of the Federal Civil Defense Administration (a predecessor of the Federal Emergency Management Agency) dating from 1957 through 1960. These earlier specifications have fallen into disuse. This American National Standard codifies current practice in the industry.

This Standard is intended to be applicable to large audible public warning devices that are normally installed at fixed locations outdoors. It is not intended to be applicable to smaller devices that are normally installed on vehicles or inside buildings.

The methods described in this American National Standard are specifically restricted to the measurement of warning sounds close to the source—close enough that propagation effects are minimized but not so close that near-field effects are encountered. The objective is to determine selected sound source characteristics approximately independent of the operating environment (except for the ground surface) so that these characteristics can be used to estimate sound coverage at remote locations in any operating environment.

At distances remote from a sound source, such as at ten source heights or more from the source over open, level ground, the sound observed from the source will be strongly dependent upon atmospheric conditions and upon the nature of the intervening terrain. As a result, measurements of warning sounds at locations

remote from the source cannot provide a definitive description of the sound source characteristics. Similarly, warning sounds observed within structures (buildings, vehicles) will be influenced by the acoustic properties of those structures as well as by the sound output of the source, and hence cannot provide a definitive measure of the sound output of the source.

This American National Standard may be used to make measurements of the sound output of “mechanical,” “electronic,” and “mechanical/electronic” sirens. (See Definitions, Sec. 4.) However, the results obtained by applying the methods prescribed in this standard are only applicable to estimating the levels of tonal sounds from sirens at locations remote from the source; and not to estimating the intelligibility of voice messages at locations remote from electronic sirens.

## 1 SCOPE

This standard specifies methods for measuring and reporting the sound produced by sound-making devices installed at fixed locations outdoors for the purpose of warning people of emergencies. The sound-making devices to which this standard is applicable include mechanical, electronic, and mechanical/electronic sirens that produces steady, tonal sounds with a nominal fundamental frequency in the range from 300 to 1000 Hz; when installed at a fixed location outdoors in accordance with the manufacturer’s recommendations.

## 2 PURPOSE AND APPLICABILITY

The purpose of this standard is to provide methods for measuring and reporting certain properties of tonal sounds produced by audible public warning devices when such devices are installed at fixed locations outdoors. Methods are given for the measurement of the C-weighted sound level produced by the device, and for the determination of the one-third octave band containing the fundamental frequency of the warning sound, at a distance of 100 ft (30.5 m) from the device and at the mounted height of the device. A method is