ANSI S1.15-2005/Part 2

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AMERICAN NATIONAL STANDARD

Measurement Microphones – Part 2: Primary Method for Pressure Calibration of Laboratory Standard Microphones by the Reciprocity Technique

ANSI S1.15-2005/Part 2

Accredited Standards Committee S1, Acoustics

Standards Secretariat
Acoustical Society of America
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ANSI S1.15- 2005 /Part 2
(Replaces ANSI S1.10-1966)

AMERICAN NATIONAL STANDARD

Measurement Microphones – Part 2:

Primary Method for Pressure Calibration of Laboratory Standard Microphones by the Reciprocity Technique

Secretariat

Acoustical Society of America

Approved by:

American National Standards Institute, Inc.
9 March 2005

Abstract

This Standard specifies a primary method for the calibration of microphones by the reciprocity technique. The specifications are intended to ensure that primary calibration with the reciprocity technique can attain the highest accuracy. The technical requirements of this American National Standard is identical to International Standard IEC 61094-2: 1992, "Measurement microphones -- Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique". Various improvements have been made to include recent technical information.

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, trade associations, organizations with a general interest, and government representatives). The standards are published by the Acoustical Society of America 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.

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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.

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Foreword

[*This Foreword is for information only, and is not a part of the American National Standard ANSI S1.15 - 200X/Part 2 American National Standard American National Standard Measurement Microphones – Part 2: Primary Method for Pressure Calibration of laboratory Standard Microphones by the Reciprocity Technique*].

This standard comprises a part of a group of definitions, standards, and specifications for use in acoustics. It was developed and approved by Accredited Standards Committee S1 Acoustics, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S1 is as follows:

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

The technical requirements in this American National Standard are identical to the international standard IEC 61094-2 1992-03, *Measurement Microphones – Part 2: Primary Method for Pressure Calibration of Laboratory Standard Microphones by the Reciprocity Technique.* Various improvements have been made to include the latest information on pressure and temperature coefficients for microphone sensitivity correction and physical properties of air.

This standard replaces ANSI S1.10-1966 American National Standard Method for the Calibration of Microphones.

Annexes A and B form an integral part of this standard.

Annexes C, D, E, F, and G are for information only.

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

J.P. Seiler, *Chair*

G.S.K. Wong, *Vice-Chair*
S.B. Blaeser, *Secretary*

Acoustical Society of America ..... G.S.K. Wong
..... J. Seiler (Alt.)

Air-Conditioning and Refrigeration Institute ..... R. Seel

American Industrial Hygiene Association ..... D. Driscoll
..... D. Sandfort (Alt.)

Audio Engineering Society, Inc. ..... M.R. Chial

Brüel & Kjaer Instruments ..... M. Alexander
..... J. Chou (Alt.)

Campanella Associates ..... A.J. Campanella

Information Technology Industry Council ..... R.D. Hellweg
..... J. Thurston (Alt.)

Larson-Davis, Inc. ..... L. Davis
..... K. Cox (Alt.)

National Council of Acoustical Consultants ..... G.E. Winzer
..... N. Stewart (Alt.)

National Institute of Standards & Technology (NIST) ..... V. Nedzelnitsky
..... D. J. Evans (Alt.)

Quest Technologies, Inc. ..... P. Battenberg
..... M. Wurm (Alt.)

Scantek, Inc. ..... R.J. Peppin
..... M. Buzduga (Alt.)

U.S. Air Force (USAF) ..... R. McKinley

U.S. Army Human Research and Engineering Directorate ..... T.R. Letowski
..... A. Scharine (Alt.)

Individual Experts of Accredited Standards Committee S1, Acoustics,

S.L. Ehrlich	W.W. Lang	H.E. von Gierke
K.M. Eldred	A.H. Marsh	G.S.K. Wong
W.J. Galloway	P.D. Schomer	L. Wu

Working Group S1/WG 1 Standard Microphones, which assisted Accredited Standards Committee S1, Acoustics, in the development of this standard, had the following membership.

V. Nedzelnitsky, Chair

J. Arrington	R.P. Wagner
E. Burnett	G.S.K. Wong

Suggestions for improvements of this standard will be welcomed. They should be sent to Accredited Standards Committee S1, Acoustics, in care of the Standards Secretariat of the Acoustical Society of America, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177. Telephone: 631-390-0215; FAX: 631-390-0217; E-mail: asastds@aip.org

American National Standard

Measurement Microphones – Part 2: Primary Method for Pressure Calibration of Laboratory Standard Microphones by the Reciprocity Method

1 Scope

This standard

— is applicable to laboratory standard microphones meeting the requirements of ANSI S1.15-1997/Part 1 (R2001) and other types of condenser microphones having the same mechanical dimensions;

— specifies a primary method of determining the pressure sensitivity to establish a reproducible and accurate basis for the measurement of sound pressure.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI S1.1-1994 (R 1999) *American National Standard Acoustical Terminology*.

ANSI S1.15-1997/Part 1 (R2001), *American National Standard Measurement microphones – Part 1: Specifications for Laboratory Standard Microphones*.

ANSI/IEEE 260.4-1996 (R2002) *American National Standard Letter Symbols and Abbreviations for Quantities Used in Acoustics.*

IEC 60050-801:1994 *International electrotechnical vocabulary – Chapter 801: Acoustics and electroacoustics*.

Guide to the expression of uncertainty in measurement, 1995, BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OILM

3 Definitions

For the purposes of this standard, the terms and definitions given in ANSI S1.1:1994. IEC 60050-810:1994, and ANSI/IEEE 260.45-1996 (R2002), and the following apply

NOTE Boldface symbols represents complex quantities.