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AMERICAN NATIONAL STANDARD
**MEASUREMENT MICROPHONES —
PART 1: SPECIFICATIONS FOR
LABORATORY STANDARD
MICROPHONES**

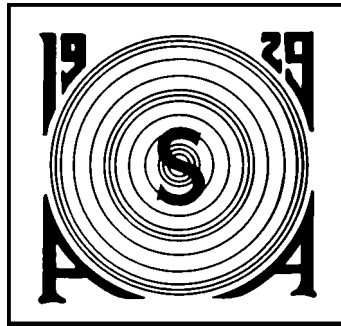
ANSI S1.15-1997/Part 1

Accredited Standards Committee S1, Acoustics

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ANSI S1.15-1997/Part 1

American National Standard

**Measurement Microphones —
Part 1: Specifications for Laboratory
Standard Microphones**

Secretariat
Acoustical Society of America

Approved 6 June 1997
American National Standards Institute, Inc.

Abstract

This Standard specifies mechanical dimensions and certain electroacoustical characteristics for capacitor (condenser) microphones used as laboratory standards for sound pressure measurements of the highest attainable accuracy. The specifications are intended to ensure that primary calibration by the reciprocity method can be readily carried out. This Standard establishes a system to classify laboratory standard microphones into a number of types according to their dimensions and properties. This American National Standard is comparable to International Standard IEC 61094-1:1992, "Measurement microphones — Part 1: Specifications for laboratory standard microphones."

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Foreword

[This Foreword is for information only and is not an integral part of American National Standard Measurement Microphones — *Part 1: Specifications for Laboratory Standard Microphones*, ANSI S1.15-1997/Part 1.]

This American National Standard is comparable to International Standard IEC 61094-1:1992, "Measurement microphones — *Part 1: Specifications for laboratory standard microphones.*"

This Standard is *Part 1* of a series of standards related to measurement microphones.

Part 2 of this series covers the primary method for pressure calibration of laboratory standard microphones by the reciprocity technique. *Part 3* covers the primary method for free-field calibration of laboratory standard microphones by the reciprocity technique. *Part 4* provides specifications for working standard microphones.

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 was as follows:

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

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Working Group S1/WG1, Standard Microphones and their Calibration, of Accredited Standards Committee S1 provided comments and recommendations during the development of the IEC 61094 series of International Standards for measurement microphones. The composition of S1/WG1 was:

V. Nedzelnitsky, Chair

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| J. R. Arrington | D. J. Evans | E. E. Gross |
| E. D. Burnett | E. Frederiksen | G. S. K. Wong |

The *ad hoc* Working Group, that assisted Accredited Standards Committee S1, Acoustics, in the preparation of this Standard, had the following membership:

| | | | |
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| A. H. Marsh | V. Nedzelnitsky | P. D. Schomer | G. S. K. Wong |
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Suggestions for improvement of this Standard will be welcomed. They should be made in writing 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. Telephone +1 212 248 0373; FAX: +1 212 248 0146, E-mail asastds@aip.org.

American National Standard

Measurement Microphones—Part 1: Specifications for Laboratory Standard Microphones

1 Scope

This Part 1:

— specifies mechanical dimensions and certain electroacoustic characteristics for condenser microphones used as laboratory standards for sound pressure measurements of the highest attainable accuracy. The specifications are intended to ensure that primary calibration by the reciprocity method can be readily carried out for the purpose of traceability to national standards.

— establishes a system for classifying laboratory standard condenser microphones into a number of types according to their dimensions and properties in order to facilitate the specification of calibration methods, the conduct of inter-laboratory comparisons involving the calibration of the same microphones in different laboratories, and the interchangeability of microphones in a given calibration system.

2 Normative references

The following Standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of approval by the American National Standards Institute, Inc. (ANSI), the editions indicated were valid. All standards are subject to revision. Parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the Standards listed below. Information on the most recent editions is available from the ASA Standards Secretariat.

[1] ANSI S1.1-1994, *American National Standard Acoustical Terminology*.

[2] IEC 50(801): 1994, *International Electrotechnical Vocabulary—Chapter 801: Acoustics and electroacoustics*. First edition.

[3] ASME B1.1:1989, *Unified inch screw threads (UN and UNR thread form)*.

3 Definitions

For the purposes of this Part 1, the following definitions apply. Definitions for related quantities are given in ANSI S1.1 and in IEC 50(801). Boldface symbols represent complex quantities.

3.1 capacitor (condenser) microphone. Microphone that consists of a capacitor and whose operation depends upon interaction between its electric field and the change of its electrostatic capacitance when exposed to the pressure of a sound wave [8.25 of ANSI S1.1-1994 and IEC 801-06-13].

NOTE – This Standard only considers capacitor (condenser) microphones operating by a virtually constant charge obtained from an external polarizing voltage applied from a source of suitably high internal resistance.

3.2 laboratory standard microphone. Capacitor microphone capable of being calibrated to a very high accuracy by a primary method such as the closed coupler reciprocity method, and meeting certain severe requirements on mechanical dimensions and electroacoustical characteristics, especially with respect to stability in time and dependence on environmental conditions.

3.3 open-circuit voltage. Alternating voltage appearing at the electrical output terminals of a microphone as measured by the insert voltage technique when the microphone is attached to the ground-shield configuration specified in 7.2, but is otherwise unloaded. Unit, volt (V).

NOTE – Owing to the capacitive nature of the microphone, the voltage at the electrical terminals depends on the electrical load presented by the mechanical and electrical attachment of the microphone to a preamplifier. For this reason, preamplifiers used for measuring the open-circuit voltage of a microphone should fulfill the requirements of 7.2.

3.4 pressure sensitivity of a microphone. For a sinusoidal signal of given frequency and for given environmental conditions, quotient of the root-mean-square, open-circuit voltage of the microphone by the root-mean-square sound pressure acting over the exposed surface of the diaphragm (i.e., at the acoustical terminals of the