



**ASA/ANSI S1.15-2021/Part 2/
IEC 61094-2:2009**
(revision of ANSI/ASA S1.15-2005/Part 2 (R2020))

AMERICAN NATIONAL STANDARD

**Electroacoustics – Measurement microphones – Part
2: Primary method for pressure calibration of
laboratory standard microphones by the reciprocity
technique**
(a nationally adopted international standard)

Secretariat:

Acoustical Society of America

Approved on June 8, 2021:

American National Standards Institute, Inc.

Abstract

This part of International Standard IEC 61094 is applicable to laboratory standard microphones meeting the requirements of IEC 61094 1 and other types of condenser microphone having the same mechanical dimensions; specifies a primary method of determining the complex pressure sensitivity so as to establish a reproducible and accurate basis for the measurement of sound pressure. All quantities are expressed in SI units.

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Accredited Standards Committee S1, Acoustics

Standards Secretariat
Acoustical Society of America
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Foreword

[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S1.15-2021/Part 2/ IEC 61094-2:2009 American National Standard Electroacoustics – Measurement microphones – Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.]

This standard is a nationally adopted international standard (NAIS). 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 IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61094-2 has been prepared by IEC technical committee 29: Electroacoustics.

This second edition cancels and replaces the first edition published in 1992. This second edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- an update of Clause 6 to fulfil the requirements of ISO/IEC Guide 98-3;
- an improvement of the heat conduction theory in Annex A;
- a revision of Annex F: Physical properties of humid air.

The text of this standard is based on the following documents:

FDIS	Report on voting
29/671/FDIS	29/676/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

Note that in this national adoption, the decimal sign is a comma on the line and international English spelling is used throughout.

A list of all parts of the IEC 61094 series, published under the general title *Electroacoustics – Measurement microphones*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

Angelique Scharine, *Chair*
 Richard J. Peppin, *Vice-Chair*
 Nancy Blair-DeLeon, *Secretary*

Acoustical Society of America Richard J. Peppin
 Robert D. Hellweg (Alt.)

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.....	Jason Smoker (Alt.)

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

William D. Gallagher	Richard L. McKinley	Chad M. Walber
Peter Hanes	Karl Peterman	Lixue Wu
Tomasz R. Letowski	Christopher J. Struck	

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

Chad M. Walber, *Chair*
Christopher J. Struck, *Vice-Chair*

David L. Josephson	Randall P. Wagner	Lixue Wu
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Suggestions for improvements to 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, 1305 Walt Whitman Road, Suite 300, Melville, New York 11747. Telephone: + 1 (516) 576-2341; E-mail: standards@acousticalsociety.org.

American National Standard

Measurement Microphones - Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique

(a nationally adopted international standard)

1 Scope

This part of International Standard IEC 61094

- is applicable to laboratory standard microphones meeting the requirements of IEC 61094-1 and other types of condenser microphone having the same mechanical dimensions;
- specifies a primary method of determining the complex pressure sensitivity so as to establish a reproducible and accurate basis for the measurement of sound pressure.

All quantities are expressed in SI units.

2 Normative references

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

IEC 61094-1 *Electroacoustics - Measurement microphones – Part 1: Specifications for laboratory standard microphones*

ISO/IEC Guide 98-3, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*¹

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61094-1 and ISO/IEC Guide 98-3 as well as the following apply.

reciprocal microphone

linear passive microphone for which the open circuit reverse and forward transfer impedances are equal in magnitude

phase angle of pressure sensitivity of a microphone

for a given frequency, the phase angle between the open-circuit voltage and a uniform sound pressure acting on the diaphragm

NOTE Phase angle is expressed in degrees or radians (° or rad).

¹ ISO/IEC Guide 98-3:2008 is published as a reissue of the Guide to the expression of uncertainty in measurement (GUM), 1995.