



ASA/ANSI S1.15-2021/Part 3/
IEC 61094-3:2016

AMERICAN NATIONAL STANDARD

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

Secretariat:

Acoustical Society of America

Approved on July 12, 2021:

American National Standards Institute, Inc.

Abstract

This part of IEC 61094 specifies a primary method of determining the complex free-field sensitivity of laboratory standard microphones so as to establish a reproducible and accurate basis for the measurement of sound pressure under free-field conditions; is applicable to laboratory standard microphones meeting the requirements of IEC 61094-1; is intended for use by laboratories with highly experienced staff and specialized equipment.

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ANSI/ASA S1.4-2014/Part 2 /Amd.1-2019/
IEC 61672-2:2013/Amd.1-2017

Accredited Standards Committee S1, Acoustics

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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 3/IEC 61094-3:2016 American National Standard Electroacoustics – Measurement microphones – Part 3: Primary method for free-field 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 61094-3 has been prepared by IEC technical committee 29: Electroacoustics.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

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

- a) a new informative annex describing the use of time-selective techniques to minimize the influence of acoustic reflections from the measurement setup;
- b) provision for the calibration of microphones in driven shield configuration.

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

CDV	Report on voting
29/873/CDV	29/892A/RVC

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 in 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 stability date indicated on the IEC website 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.

The contents of the Corrigendum 1 of December 2016 have been included in this copy. 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.)
Air-Conditioning, Heating and Refrigeration Institute	Stephen J. Lind
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U.S. Air Force (USAF)	Richard L. McKinley Frank Mobley (Alt.)
U.S. Army Construction Engineering Research Laboratory	Michelle Swearingen Michael J. White (Alt.)
U.S. Naval Surface Warfare Center - Carderock	Kuangcheng Wu Jason Smoker (Alt.)

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

William D. Gallagher
Peter Hanes
Tomasz R. Letowski

Richard L. McKinley
Karl Peterman
Christopher J. Struck

Chad M. Walber
Lixue Wu

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

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

Electroacoustics – Measurement microphones – Part 3: Primary method for free-field calibration of laboratory standard microphones by the reciprocity technique

(a nationally adopted international standard)

1 Scope

This part of IEC 61094

- specifies a primary method of determining the complex free-field sensitivity of laboratory standard microphones so as to establish a reproducible and accurate basis for the measurement of sound pressure under free-field conditions,
- is applicable to laboratory standard microphones meeting the requirements of IEC 61094-1,
- is intended for use by laboratories with highly experienced staff and specialized equipment.

NOTE The calibration principle described in this part of IEC 61094 is also applicable to working standard microphones, preferably used without their protection grid.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

IEC 61094-2 *Electroacoustics – Measurement microphones – Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique*

IEC TS 61094-7 *Electroacoustics – Measurement microphones – Part 7: Values for the difference between free-field and pressure sensitivity levels of laboratory standard microphones*

ISO 9613-1 *Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere*

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