ANSI/ASA S1.15-2021/Part 7/
IEC TS 61094-7:2006

AMERICAN NATIONAL
STANDARD

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

(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 gives a polynomial function derived from a least square fit to data from several laboratories, for the differences between free field and pressure sensitivity levels of laboratory standard microphones as specified in IEC 61094 1; enables determination of the free-field sensitivity level of a laboratory standard microphone for zero-degrees incidence in air by adding values of these differences to the pressure sensitivity level; gives tabulated values for the polynomial function for a range of frequency and temperature; is applicable when a suitable free field calibration is not available.

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, S3/SC 1 on Animal 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 (ANSI).

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 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.

The use of an American National Standard is completely voluntary. Their existence does not in any respect preclude anyone, whether he or she has approved the Standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the Standards.

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.

Acoustical Society of America
Standards Secretariat
1305 Walt Whitman Road, Suite 300
Melville, New York 11747
Telephone: + 1 (516) 576-2341
E-mail: standards@acousticalsociety.org

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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 7/ IEC TS 61094-7:2006 American National Standard Electroacoustics - Measurement microphones - Part 7: Values for the difference between free field and pressure sensitivity levels of laboratory standard microphones. 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.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or

- The subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 61094-7, which is a technical specification, has been prepared by IEC technical committee 29: Electroacoustics.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
29/591/DTS	29/594A/RVC

Full information on the voting for the approval of this technical specification 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.

IEC 61094 consists of the following parts, under the general title *Measurement microphones:*

Part 1: Specifications for laboratory standard microphones

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

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

Part 4: Specifications for working standard microphones

Part 5: Methods for pressure calibration of working standard microphones by comparison

Part 6: Electrostatic actuators for determination of frequency response

Part 7: Values for the difference between free-field and pressure sensitivity levels of laboratory standard microphones

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

- transformed into an International standard,
- 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.)

Air-Conditioning, Heating and Refrigeration Institute ..... Stephen J. Lind

ETS-Lindgren Acoustic Systems ..... Douglas Winker
..... Michael Black (Alt.)

Information Technology Industry Council ..... Willem M. Beltman
..... Stephanie Barrett (Alt.)

Josephson Engineering, Inc. ..... David L. Josephson

National Council of Acoustical Consultants ..... Anthony Nash

National Institute of Standards & Technology (NIST) ..... Randall P. Wagner
..... Richard Allen (Alt.)

OTOjOY ..... Thomas Kaufmann

PCB Group ..... Ken Cox
..... Chad M. Walber (Alt.)

Scantek, Inc. ..... Steve Marshall
..... William Gallagher (Alt.)

TSI, Incorporated ..... Steve Michalski
..... Rich Bechtel (Alt.)

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	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

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

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1 Scope

This part of IEC 61094

– gives a polynomial function derived from a least square fit to data from several laboratories, for the differences between free-field and pressure sensitivity levels of laboratory standard microphones as specified in IEC 61094-1,

– enables determination of the free-field sensitivity level of a laboratory standard microphone for zero-degrees incidence in air by adding values of these differences to the pressure sensitivity level,

– gives tabulated values for the polynomial function for a range of frequency and temperature,

– is applicable when a suitable free-field calibration is not available.

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*

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

IEC 61094-3 *Electroacoustics - Measurement microphones – Part 3: Primary method for free-field calibration of laboratory standard microphones by the reciprocity technique*

3 Terms and definitions

For the purpose of this part of IEC 61094, the following definition applies in addition to the definitions given in IEC 61094-1, IEC 61094-2:1992 and IEC 61094-3:1995.

3.1
zero-degrees incidence
for a frontal incident sound wave, direction perpendicular to the diaphragm of the microphone