



ANSI/ASA S1.15-2021/Part 6/ IEC  
61094-6:2004

AMERICAN NATIONAL STANDARD

**Electroacoustics - Measurement microphones -  
Part 6: Electrostatic actuators for determination  
of frequency response**

**(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 guidelines for the design of actuators for microphones equipped with electrically conductive diaphragms; gives methods for the validation of electrostatic actuators; gives a method for determining the electrostatic actuator response of a microphone.



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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](mailto: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 6/ IEC 61094-6:2004 American National Standard Electroacoustics - Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response. 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.

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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 61094-6 has been prepared by IEC technical committee 29: Electroacoustics.

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

|             |                  |
|-------------|------------------|
| FDIS        | Report on voting |
| 29/562/FDIS | 29/565/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.

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

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:

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

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| 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.

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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](mailto:standards@acousticalsociety.org).

# American National Standard

## Electroacoustics – Measurement microphones – Part 6: Electrostatic actuators for determination of frequency response

(a nationally adopted international standard)

### 1 Scope

This part of IEC 61094

- gives guidelines for the design of actuators for microphones equipped with electrically conductive diaphragms;
- gives methods for the validation of electrostatic actuators;
- gives a method for determining the electrostatic actuator response of a microphone.

The applications of electrostatic actuators are not fully described within this standard but may include

- a technique for detecting changes in the frequency response of a microphone,
- a technique for determining the environmental influence on the response of a microphone,
- a technique for determining the free-field or pressure response of a microphone without specific acoustical test facilities, by the application of predetermined correction values specific to the microphone model and actuator used,
- a technique applicable at high frequencies not typically covered by calibration methods using sound excitation.

### 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*