

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Measurement microphones –  
Part 8: Methods for determining the free-field sensitivity of working standard  
microphones by comparison**

**Microphones de mesure –  
Partie 8: Méthodes pour la détermination de l'efficacité en champ libre par  
comparaison des microphones étalons de travail**



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX

ICS 17.140.50

ISBN 978-2-83220-380-4

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MEASUREMENT MICROPHONES –

**Part 8: Methods for determining the free-field sensitivity  
of working standard microphones by comparison**

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

| CDV        | Report on voting |
|------------|------------------|
| 29/752/CDV | 29/759/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.

A list of all the parts in the IEC 61094 series, published under the general title *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 web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,
- replaced by a revised edition, or
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## MEASUREMENT MICROPHONES –

### Part 8: Methods for determining the free-field sensitivity of working standard microphones by comparison

#### 1 Scope

This part of the IEC 61094 series is applicable to working standard microphones meeting the requirements of IEC 61094-4. It describes methods of determining the free-field sensitivity by comparison with a laboratory standard microphone or working standard microphone (where applicable) that has been calibrated according to either:

- IEC 61094-3,
- IEC 61094-2 or IEC 61094-5, and where factors given in IEC/TS 61094-7 have been applied,
- IEC 61094-6,
- this part of IEC 61094.

Methods performed in an acoustical environment that is a good approximation to an ideal free-field (e.g. a high quality free-field chamber), and methods that use post processing of results to minimise the effect of imperfections in the acoustical environment, to simulate free-field conditions, are both covered by this part of IEC 61094. Comparison methods based on the principles described in IEC 61094-3 are also possible but beyond the scope of this part of IEC 61094.

NOTE 1 This part of IEC 61094 is also applicable to laboratory standard microphones meeting the requirements of IEC 61094-1, noting that these microphones also meet the electroacoustic specifications for working standard microphones.

NOTE 2 This part of IEC 61094 is also applicable to combinations of microphone and preamplifier where the determined sensitivity is referred to the unloaded output voltage of the preamplifier.

NOTE 3 Other devices, for example, sound level meters can be calibrated using the principles of this part of IEC 61094, but are not within the scope of this standard.

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

IEC 61094-4, *Measurement microphones – Part 4: Specifications for working standard microphones*

IEC 61094-5, *Measurement microphones – Part 5: Methods for pressure calibration of working standard microphones by comparison*

IEC 61094-6, *Measurement microphones – Part 6: Electrostatic actuators for determination of frequency response*

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

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

ISO 26101, *Acoustics – Test methods for the qualification of free-field environments*

### 3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 61094-1 and IEC 61094-3, as well as the following apply.

#### 3.1

##### **reference microphone**

laboratory standard microphone or working standard microphone where the free-field sensitivity has been previously determined

#### 3.2

##### **microphone under test device under test**

working standard microphone to be calibrated by comparison with a reference microphone

Note 1 to entry: Other devices, for example, sound level meters, can be calibrated using the principles of this part of IEC 61094, but are not within the scope of this standard.

#### 3.3

##### **monitor microphone**

microphone used to detect changes in sound pressure in the test environment

#### 3.4

##### **microphone reference point**

point specified on the microphone or close to it, to describe the position of the microphone

Note 1 to entry: The microphone reference point may be at the centre of the diaphragm of the microphone.

#### 3.5

##### **reference direction**

inward direction toward the microphone reference point and specified for determining the acoustical response and directional response

Note 1 to entry: The reference direction may be specified with respect to an axis of symmetry.

#### 3.6

##### **angle of incidence**

angle between the reference direction and a line between the acoustic centre of a sound source and the microphone reference point

Note 1 to entry: Angle of incidence is expressed in degrees.