

Measurement microphones —

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

The European Standard EN 61094-5:2001 has the status of a
British Standard

ICS 17.140.50

National foreword

This British Standard is the official English language version of EN 61094-5:2001. It is identical with IEC 61094-1:2001.

The UK participation in its preparation was entrusted to Technical Committee EPL/29, Electroacoustics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Part 5: Methods for pressure calibration of
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Microphones de mesure
Partie 5: Méthodes pour l'étalonnage
en pression par comparaison des
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(CEI 61094-5:2001)

Messmikrofone
Teil 5: Verfahren zur Druckkammer-
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(IEC 61094-5:2001)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 29/495/FDIS, future edition 1 of IEC 61094-5, prepared by IEC TC 29, Electroacoustics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61094-5 on 2001-12-04.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B, C and D are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61094-5:2001 was approved by CENELEC as a European Standard without any modification.

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MEASUREMENT MICROPHONES –

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

1 Scope

This part of IEC 61094 is applicable to working standard microphones with removable protection grids meeting the requirements of IEC 61094-4 and to laboratory standard microphones meeting the requirements of IEC 61094-1.

This part of IEC 61094 also describes methods of determining the pressure sensitivity by comparison with either a laboratory standard microphone that has been calibrated according to IEC 61094-2, or another working standard microphone that has been calibrated according to this part of IEC 61094.

Alternative comparison methods based on the principles described in IEC 61094-2 are possible but beyond the scope of this part of IEC 61094.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61094. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61094 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

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

IEC 61094-2:1992, *Measurement microphones – Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique*

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

ISO/IEC GUIDE EXPRES:1995, *Guide to the expression of uncertainty in measurement (GUM)*

3 Terms and definitions

For the purpose of this part of IEC 61094, the following definitions apply in addition to the definitions given in IEC 61094-1.

3.1

reference microphone

laboratory standard microphone or working standard microphone of previously determined pressure sensitivity

3.2

test microphone

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

3.3

monitor microphone

microphone used to measure changes in sound pressure in a coupler

3.4

coupler

device which, when fitted with microphones, forms a gas-filled cavity of predetermined shape and dimensions and provides an acoustic coupling element between the microphones and between the microphones and the sound source

3.5

jig

a device which, when fitted with microphones, holds them with their diaphragms face to face separated by a small distance but does not enclose the space between them

4 Reference environmental conditions

The reference environmental conditions are:

- temperature 23,0 °C
- static pressure 101,325 kPa
- relative humidity 50 %

5 Principles of pressure calibration by comparison

5.1 Principles

5.1.1 General principle

The pressure sensitivity of a measurement microphone is defined in terms of a sound pressure applied uniformly over the diaphragm. Consequently, the pressure sensitivity can only be realised in principle for microphones from which the protection grid can be removed and the diaphragm be exposed to the sound waves.

The principle of these comparison methods is that when the reference microphone and the test microphone are exposed to the same sound pressure either simultaneously or sequentially, the ratio of their pressure sensitivities is given by the ratio of their open-circuit output voltages. The sensitivity (both modulus and phase) of the test microphone can then be calculated from the sensitivity of the reference microphone.

The principle of the method allows the test microphone to be attached to a particular preamplifier and the sensitivity may be referred to the output of that preamplifier.

Multi-frequency measurements can be performed particularly rapidly if a wideband sound source is used and the output voltages of the microphones are analysed in narrow bands.