



SLOVENSKI STANDARD

SIST EN 61094-5:2016

01-november-2016

Nadomešča:

SIST EN 61094-5:2007

Merilni mikrofoni - 5. del: Metode za primerjalno kalibriranje tlaka delujočega standardnega mikrofona (IEC 61094-5:2016)

Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison (IEC 61094-5:2016)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Microphones de mesure - Partie 5: Méthodes pour l'étalonnage en pression par comparaison des microphones étalons de travail (IEC 61094-5:2016)

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>

Ta slovenski standard je istoveten z: EN 61094-5:2016

ICS:

17.140.50	Elektroakustika	Electroacoustics
33.160.50	Pribor	Accessories

SIST EN 61094-5:2016

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61094-5:2016

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>

EUROPEAN STANDARD

EN 61094-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2016

ICS 17.140.50

Supersedes EN 61094-5:2001

English Version

**Electroacoustics - Measurement microphones - Part 5: Methods
for pressure calibration of working standard microphones by
comparison
(IEC 61094-5:2016)**

Électroacoustique - Microphones de mesure - Partie 5:
Méthodes pour l'étalonnage en pression par comparaison
des microphones étalons de travail
(IEC 61094-5:2016)

Messmikrofone - Teil 5: Verfahren zur Druckkammer-
Kalibrierung von Gebrauchs-Normalmikrofonen nach der
Vergleichsmethode
(IEC 61094-5:2016)

This European Standard was approved by CENELEC on 2016-07-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf1209b6e8c/sist-en-61094-5-2016>

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 61094-5:2016**European foreword**

The text of document 29/870/CDV, future edition 2 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 61094-5:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-04-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-07-04

This document supersedes EN 61095-5:2001.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61094-5:2016 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61094-2:2009

NOTE Harmonized as EN 61094-2:2009.

[SIST EN 61094-5:2016](https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016)

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>

Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here:

www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61094-1	-	Measurement microphones -- Part 1: Specifications for laboratory standard microphones	EN 61094-1	-
IEC 61094-4	-	Measurement microphones -- Part 4: Specifications for working standard microphones	EN 61094-4	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61094-5:2016](https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1c4209b6e8c/sist-en-61094-5-2016)

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1c4209b6e8c/sist-en-61094-5-2016>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61094-5:2016

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>



IEC 61094-5

Edition 2.0 2016-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electroacoustics – Measurement microphones –
Part 5: Methods for pressure calibration of working standard microphones
by comparison**

**Électroacoustique – Microphones de mesure –
Partie 5: Méthodes pour l'étalonnage en pression par comparaison des
microphones étalons de travail**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.140.50

ISBN 978-2-8322-3434-1

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Reference environmental conditions.....	7
5 Principles of pressure calibration by comparison	7
5.1 Principles.....	7
5.1.1 General principle.....	7
5.1.2 General principles using simultaneous excitation	7
5.1.3 General principles using sequential excitation.....	8
5.2 Measuring the output voltages of the microphones.....	8
6 Factors influencing the pressure sensitivity	8
6.1 General.....	8
6.2 Microphone pressure equalization mechanism	8
6.3 Polarising voltage.....	9
6.4 Reference shield configuration	9
6.5 Pressure distribution over the diaphragms	9
6.6 Dependence on environmental conditions.....	10
6.7 Validation.....	10
7 Calibration uncertainty components.....	10
7.1 General.....	10
7.2 Sensitivity of the reference microphone.....	10
7.3 Measurements of microphone output.....	11
7.4 Differences between the sound pressure at the test microphone and that at the reference microphone.....	11
7.5 Acoustic impedances of the microphones.....	11
7.6 Microphone separation distance	11
7.7 Microphone capacitance.....	11
7.8 Microphone configuration during calibration	11
7.9 Uncertainty on pressure sensitivity level	12
Annex A (informative) Examples of couplers and jigs for simultaneous excitation	13
A.1 A coupler for use with WS2 microphones at frequencies up to 10 kHz	13
A.2 A jig for use with WS2 or WS3 microphones at frequencies up to 20 kHz.....	14
Annex B (informative) Examples of couplers for sequential excitation.....	16
B.1 A coupler for use with LS1 microphones at frequencies up to 8 kHz	16
B.2 A coupler for use with WS2 microphones at frequencies up to 16 kHz	16
Annex C (informative) Determining the open-circuit sensitivity of a measurement microphone without using the insert-voltage method.....	18
Annex D (informative) Typical uncertainty analysis	19
D.1 Introduction.....	19
D.2 Analysis.....	19
D.3 Combined and expanded uncertainties	21
Bibliography	22
Figure A.1 – A coupler for use with WS2 microphones	13

Figure A.2 – A jig fitted with an LS2 and WS2 microphone	14
Figure A.3 – Example arrangement of LS2 and WS2 microphones in a jig	14
Figure A.4 – Example arrangement of LS2 and WS3 microphones in a jig	14
Figure B.1 – A coupler for use with LS1 microphones	16
Figure B.2 – A coupler for use with WS2 microphones	17
Table A.1 – Calculated corrections to be added to the sensitivity level of the WS3 microphone when using the arrangement in Figure A.4	15
Table D.1 – Example uncertainty budget	20

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61094-5:2016

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – MEASUREMENT MICROPHONES –**Part 5: Methods for pressure calibration of working standard microphones by comparison**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61094-5 has been prepared by IEC technical committee 29: Electroacoustics.

This edition cancels and replaces the first edition published in 2001. This edition constitutes a technical revision.

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

- a) details of additional components of uncertainty;
- b) revised corrections for type WS3 microphones;
- c) 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
29/870/CDV	29/887A/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 parts in the IEC 61904 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 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61094-5:2016

<https://standards.iteh.ai/catalog/standards/sist/0cd9387d-22d6-46ae-a86b-1cf4209b6e8c/sist-en-61094-5-2016>