SLOVENSKI STANDARD
SIST EN 61094-2:2002

01-september-2002

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

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

Meßmikrofone -- Teil 2: Primärverfahren zur Druckkammer-Kalibrierung von Laboratorium-Normalmikrofonen nach der Reziprozitätsmethode

Microphones de mesure -- Partie 2: Méthode primaire pour l'étalonnage en pression des microphones étalons de laboratoire par la méthode de réciprocité

Ta slovenski standard je istoveten z: **EN 61094-2:1993**

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17.140.50	Elektroakustika	Electroacoustics
33.160.50	Pribor	Accessories

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ENGLISH VERSION

Measurement microphones
Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique
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Microphones de mesure
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Teil 2: Primärverfahren zur Druckkammer-Kalibrierung von Laboratorium-Normalmikrofonen nach der Reziprozitätsmethode
(IEC 1094-2:1992)

This European Standard was approved by CENELEC on 1993-09-22. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 1094-2:1992 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 61094-2 on 22 September 1993.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-09-01
- latest date of withdrawal of conflicting national standards	(dow)	1994-09-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given only for information.
In this standard, annexes A, B and ZA are normative and annexes C, D, E and F are informative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 1094-2:1992 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

NOTE : When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
27-2	1972	Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics	HD 245.2 S1*	1983
1094-1	1991	Measurement microphones Part 1: Specifications for laboratory standard microphones (corrigendum February 1993)	-	-

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* HD 245.2 S1 is based on IEC 27-2:1972 + IEC 27-2A:1975 + IEC 27-2B:1980

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Microphones de mesure

Partie 2:
Méthode primaire pour l'étalonnage en pression des microphones étalons de laboratoire par la méthode de réciprocité

Measurement microphones

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

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Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASUREMENT MICROPHONES

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

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This part of International Standard IEC 1094 has been prepared by IEC Technical Committee No. 29: Electroacoustics.

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

DIS	Report on Voting
29(CO)159	29(CO)164

Full information on the voting for the approval of this part can be found in the Voting Report indicated in the above table.

Annexes A and B form an integral part of this standard.

Annexes C, D, E and F are for information only.

MEASUREMENT MICROPHONES

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

1 Scope

This part of IEC 1094

- is applicable to laboratory standard microphones meeting the requirements of IEC 1094-1 and other types of condenser microphones having the same mechanical dimensions;

- specifies a primary method of determining the pressure sensitivity so as to establish a reproducible and accurate basis for the measurement of sound pressure.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 1094. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1094 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 27: 1972, *Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics.*
IEC 1094-1: 1991, *Measurement microphones - Part 1: Specifications for laboratory standard microphones.*

3 Definitions

For the purpose of this part of IEC 1094, the following definitions apply in addition to the definitions given in IEC 1094-1.

3.1 reciprocal microphone: A linear passive microphone for which the open-circuit reverse and forward transfer impedances (see 206 in IEC 27-2) are equal in magnitude.

3.2 phase angle of pressure sensitivity of a microphone: For a given frequency, the phase angle between the open-circuit voltage and the uniform sound pressure acting on the diaphragm.

Unit: degree or radian (° or rad).

3.3 electrical transfer impedance: For a system of two acoustically coupled microphones the quotient of the open-circuit voltage of the microphone used as a receiver by the input current through the electrical terminals of the microphone used as a transmitter.

Unit: ohm (Ω).

NOTE - This impedance is defined for the ground-shield configuration given in 7.2 of IEC 1094-1.

3.4 acoustic transfer impedance: For a system of two acoustically coupled microphones the quotient of the sound pressure acting on the diaphragm of the microphone used as a receiver by the short-circuit volume velocity produced by the microphone used as a transmitter.

Unit: pascal·second per cubic metre (Pa·s/m³).

3.5 coupler: A device which, when fitted with microphones, forms a cavity of predetermined shape and dimensions acting as an acoustic coupling element between the microphones.

4 Reference environmental conditions

The reference environmental conditions are:

Temperature: t_r = 23,0 °C
Static pressure: $p_{s,r}$ = 101,325 kPa
Relative humidity: H_r = 50 %

NOTE - The reference temperature is chosen to be 23,0 °C because practical considerations require that most calibrations be carried out at, or near, this temperature.

5 Principles of pressure calibration by reciprocity

5.1 *General principle*

A reciprocity calibration of microphones may be carried out by means of three microphones, two of which shall be reciprocal, or by means of an auxiliary sound source and two microphones, one of which must be reciprocal.

NOTE - If one of the microphones is not reciprocal it can only be used as a sound receiver.

5.1.1 *General principles using three microphones*

Let two of the microphones be connected acoustically by a coupler. Using one of them as a sound source and the other as a sound receiver, the electrical transfer impedance is measured. When the acoustic transfer impedance of the system is known, the product of the pressure sensitivities of the two coupled microphones can be determined. Using pair-wise combinations of microphones (1), (2) and (3), three such mutually independent products are available, from which an expression for the pressure sensitivity of each of the three microphones can be derived.