

Specification for

Electroacoustics — Instruments for the measurement of sound intensity — Measurement with pairs of pressure sensing microphones

The European Standard EN 61043:1994 has the status of a
British Standard

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National foreword

This British Standard has been prepared under the direction of the Electronic Equipment Standards Policy Committee and is the English language version of EN 61043:1994 *Electroacoustics — Instruments for the measurement of sound intensity — Measurement with pairs of pressure sensing microphones*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 1043:1993 published by the International Electrotechnical Commission (IEC).

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Electroacoustics — Instruments for the measurement of sound intensity — Measurement with pairs of pressure sensing microphones

(IEC 1043:1993)

Electroacoustique — Instruments pour la mesure de l'intensité acoustique — Mesure au moyen d'une paire de microphones de pression
(CEI 1043:1993)

Elektroakustik — Geräte für die Messung der Schallintensität — Messungen mit Paaren von Druckmikrofonen
(IEC 1043:1993)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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Foreword

The text of document 29(CO)185, as prepared by IEC Technical Committee 29: Electroacoustics, was submitted to the IEC-CENELEC parallel vote in February 1993.

The reference document was approved by CENELEC as EN 61043 on 8 December 1993.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1994-12-01
- latest date of withdrawal of conflicting national standards (dow) 1994-12-01

For products which have complied with the relevant national standard before 1994-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-12-01.

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

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Introduction

This International Standard specifies the requirements for sound intensity instruments, comprising sound intensity probes and processors, which detect sound intensity by pairs of spatially separated pressure sensing microphones. These instruments, and others employing different detection methods, are still the subject of development.

Sound intensity instruments have two main applications. The first is the investigation of the radiation characteristics of sound sources. The second is the determination of the sound power of sources, especially *in situ*, where sound intensity measurement enables sound power determination to be made under acoustical conditions which render determination by sound pressure measurement impossible.

This International Standard applies to instruments to be used for the determination of sound power in accordance with the requirements of ISO 9614-1 and ensures well-defined performance for instruments used in other applications.

Specifications and tolerances are based on current instrument technology and on typical industrial requirements for dynamic capability index.

Requirements for the verification of performance of probes and processors are written in terms of type tests. A scheme for periodic verification, serving as the basis of the periodic recalibrations required in many countries, is given in Annex A.

Probes and processors are treated separately and together; in the latter case they are called "instruments".

1 Scope

The primary purpose of this Standard is to ensure the accuracy of measurements of sound intensity applied to the determination of sound power in accordance with ISO 9614-1. To meet the requirements of that standard, instruments are required to analyse the sound intensity in one-third octave or octave bands, and optionally to provide A-weighted band levels. They are also required to measure sound pressure level in addition to sound intensity level to facilitate the use of the field indicators described in ISO 9614-1.

This International Standard only applies to instruments which detect sound intensity by pairs of spatially separated pressure sensing microphones.

This International Standard specifies performance requirements for instruments used for the measurement of sound intensity, and their associated calibrators.

The requirements are intended to reduce to a practical minimum any differences in equivalent measurements made using different instruments, including instruments comprising probes and processors from different manufacturers.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard 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.

ISO 9614-1:1993, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points*.

IEC 651:1979, *Sound level meters*.

IEC 942:1988, *Sound calibrators*.

IEC 1260:19XX, *Specification for octave-band and fractional octave-band filters (under consideration)*. (Revision of IEC 225:1966)

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1

sound intensity probe

transducer system from which signals may be processed to obtain the sound intensity component in a specific direction

3.2

p-p probe (also known as a two microphone probe)

probe composed of two pressure sensing microphones spaced apart by a fixed and known distance, in which the sound pressure component is measured by the two microphones and the mean value is considered as the sound pressure existing at the reference point of the probe, while the sound pressure differential is used for the purpose of deriving the sound particle velocity component

NOTE 1 A side-by-side p-p probe has the two microphones arranged as shown in Figure 1.

NOTE 2 A face-to-face p-p probe has the two microphones facing each other and separated by a spacer as shown in Figure 2.