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STN	**Ultrazvuk Hydrofóny Časť 1: Meranie a charakterizácia zdravotníckych ultrazvukových polí**	**STN EN IEC 62127-1 34 0883**

Ultrasonics - Hydrophones - Part 1: Measurement and characterization of medical ultrasonic fields

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/22

Obsahuje: EN IEC 62127-1:2022, IEC 62127-1:2022

Oznámením tejto normy sa od 29.04.2025 ruší
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EN IEC 62127-1

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Supersedes EN 62127-1:2007 + A1:2013

English Version

Ultrasonics - Hydrophones - Part 1: Measurement and characterization of medical ultrasonic fields (IEC 62127-1:2022)

Ultrasons - Hydrophones - Partie 1: Mesurage et caractérisation des champs ultrasoniques médicaux (IEC 62127-1:2022)

Ultraschall - Hydrophone - Teil 1: Messung und Charakterisierung von medizinischen Ultraschallfeldern bis zu 40 MHz (IEC 62127-1:2022)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 87/783/FDIS, future edition 2 of IEC 62127-1, prepared by IEC/TC 87 "Ultrasonics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62127-1:2022.

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) 2023-01-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-04-29

This document supersedes EN 62127-1:2007 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62127-1:2022 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60500	NOTE Harmonized as EN 60500
IEC 60601-2-5	NOTE Harmonized as EN 60601-2-5
IEC 60601-2-37	NOTE Harmonized as EN 60601-2-37
IEC 60601-2-62	NOTE Harmonized as EN 60601-2-62
IEC 61157	NOTE Harmonized as EN 61157
IEC 61161	NOTE Harmonized as EN 61161
IEC 61828	NOTE Harmonized as EN IEC 61828
IEC 61846	NOTE Harmonized as EN 61846
IEC 61847	NOTE Harmonized as EN 61847
IEC/TS 61949	NOTE Harmonized as CLC/TS 61949
IEC 62359	NOTE Harmonized as EN 62359
IEC 63045	NOTE Harmonized as EN IEC 63045

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where 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.

Publication	Year	Title	EN/HD	Year
IEC 60565-1	-	Underwater acoustics - Hydrophones - Calibration of hydrophones - Part 1: Procedures for free-field calibration of hydrophones	EN IEC 60565-1	-
IEC 61689	-	Ultrasonics - Physiotherapy systems - Field specifications and methods of measurement in the frequency range 0,5 MHz to 5 MHz	EN IEC 61689	-
IEC 62127-2	-	Ultrasonics - Hydrophones - Part 2: Calibration for ultrasonic fields up to 40 MHz	EN 62127-2	-
IEC 62127-3	-	Ultrasonics - Hydrophones - Part 3: Properties of hydrophones for ultrasonic fields up to 40 MHz	EN 62127-3	-
IEC 63009	-	Ultrasonics - Physiotherapy systems - Field specifications and methods of measurement in the frequency range 20 kHz to 500 kHz	EN IEC 63009	-
ISO 16269-6	-	Statistical interpretation of data – Part 6: Determination of statistical tolerance intervals	-	-
ISO/IEC Guide 98-3	2008	Uncertainty of measurement - Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)	-	-

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Edition 2.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Ultrasonics – Hydrophones – Part 1: Measurement and characterization of medical ultrasonic fields

Ultrasons – Hydrophones – Partie 1: Mesurage et caractérisation des champs ultrasoniques médicaux

IEC 62127-1:2022-03(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ULTRASONICS – HYDROPHONES –

Part 1: Measurement and characterization of medical ultrasonic fields

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.
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IEC 62127-1 has been prepared by IEC technical committee 87: Ultrasonics. It is an International Standard.

This second edition cancels and replaces the first edition published in 2007 and Amendment 1:2013. This edition constitutes a technical revision.

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

a) The upper frequency limit of 40 MHz has been removed.
b) Hydrophone sensitivity definitions have been changed to recognize sensitivities as complex-valued quantities.
c) Procedures and requirements for narrow-band approximation and broadband measurements have been modified; details on waveform deconvolution have been added.
d) Procedures for spatial averaging correction have been amended.
e) Annex D, Annex E and bibliography have been updated to support the changes of the normative parts.

The text of this International Standard is based on the following documents:

Draft	Report on voting
87/783/FDIS	87/788/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts of IEC 62127 series, published under the general title *Ultrasonics – Hydrophones*, can be found on the IEC website.

NOTE Words in **bold** in the text are terms defined in Clause 3.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The main purpose of this document is to define various acoustic parameters that can be used to specify and characterize ultrasonic fields propagating in liquids, and, in particular, water, using hydrophones. Measurement procedures are outlined that may be used to determine these parameters. Specific device related measurement standards, for example IEC 61689, IEC 61157, IEC 61847 or IEC 62359, can refer to this document for appropriate acoustic parameters. In IEC 62359, some additional measurement methods for attenuated parameters and indices are described addressing the specific needs of acoustic output characterization of ultrasonic diagnostic equipment in accordance with IEC 60601-2-37.

The philosophy behind this document is the specification of the acoustic field in terms of acoustic pressure parameters, acoustic pressure being the primary measurement quantity when hydrophones are used to characterize the field.

Intensity parameters are specified in this document, but these are regarded as derived quantities that are meaningful only under certain assumptions related to the ultrasonic field being measured.

ULTRASONICS – HYDROPHONES –

Part 1: Measurement and characterization of medical ultrasonic fields

1 Scope

This part of IEC 62127 specifies methods of use of calibrated **hydrophones** for the measurement in liquids of acoustic fields generated by ultrasonic medical equipment including **bandwidth** criteria and calibration frequency range requirements in dependence on the spectral content of the fields to be characterized.

This document:

– defines a group of acoustic parameters that can be measured on a physically sound basis;
– defines a second group of parameters that can be derived under certain assumptions from these measurements, and called derived intensity parameters;
– defines a measurement procedure that can be used for the determination of acoustic pressure parameters;
– defines the conditions under which the measurements of acoustic parameters can be made using calibrated **hydrophones**;
– defines procedures for correcting for limitations caused by the use of **hydrophones** with finite **bandwidth** and finite active element size, and for estimating the corresponding **uncertainties**.

NOTE 1 Throughout this document, SI units are used. In the specification of certain parameters, such as **beam areas** and intensities, it can be convenient to use decimal multiples or submultiples. For example, **beam area** is likely to be specified in cm^2 and intensities in W/cm^2 or mW/cm^2.

NOTE 2 The **hydrophone** as defined can be of a piezoelectric or an optic type.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60565-1, *Underwater acoustics – Hydrophones – Calibration of hydrophones – Part 1: Procedures for free-field calibration of hydrophones*

IEC 61689, *Ultrasonics – Physiotherapy systems – Field specifications and methods of measurement in the frequency range 0,5 MHz to 5 MHz*

IEC 62127-2, *Ultrasonics – Hydrophones – Part 2: Calibration for ultrasonic fields up to 40 MHz*

IEC 62127-3, *Ultrasonics – Hydrophones – Part 3: Properties of hydrophones for ultrasonic fields up to 40 MHz*

IEC 63009, *Ultrasonics – Physiotherapy systems – Field specifications and methods of measurement in the frequency range 20 kHz to 500 kHz*

ISO 16269-6, *Statistical interpretation of data – Part 6: Determination of statistical tolerance intervals*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*