SVENSK STANDARD SS-EN IEC 60565-2

Fastställd	Utgåva	Sida	Ansvarig kommitté
2020-09-23	1	1 (1+55)	SEK TK 62

Undervattenakustik – Hydrofoner – Kalibrering – Del 2: Tryckkalibrering vid låga frekvenser

Underwater acoustics – Hydrophones – Calibration of hydrophones – Part 2: Procedures for low frequency pressure calibration

Som svensk standard gäller europastandarden EN IEC 60565-2:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60565-2:2019.

Nationellt förord

Europastandarden EN IEC 60565-2:2019

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60565-2, First edition, 2019 - Underwater acoustics - Hydrophones - Calibration of hydrophones - Part 2: Procedures for low frequency pressure calibration**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60565, utgåva 1, 2007, gäller ej fr o m 2022-10-24.

ICS 17.140.50

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SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60565-2

November 2019

ICS 17.140.50

English Version

Underwater acoustics - Hydrophones - Calibration of hydrophones - Part 2: Procedures for low frequency pressure calibration (IEC 60565-2:2019)

Acoustique sous-marine - Hydrophones - Étalonnage des hydrophones - Partie 2: Procédures pour l'étalonnage à basse pression de fréquence (IEC 60565-2:2019)

Wasserschall - Hydrophone - Kalibrierung von Hydrophonen - Teil 2: Verfahren für niederfrequente Druckkalibrierung (IEC 60565-2:2019)

This European Standard was approved by CENELEC on 2019-10-24. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 60565-2:2019 E

European foreword

The text of document 87/720/FDIS, future edition 1 of IEC 60565-2, prepared by IEC/TC 87 "Ultrasonics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60565-2:2019.

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) 2020-07-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-10-24

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.

Endorsement notice

The text of the International Standard IEC 60565-2:2019 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 60565:2006 NOTE Harmonized as EN 60565:2007 (not modified)

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 60050-801	-	International Electrotechnical Vocabulary - Chapter 801: Acoustics and electroacoustics	-	-
IEC 60500	2017	Underwater acoustics - Hydrophones - Properties of hydrophones in the frequency range 1 Hz to 500 kHz	EN 60500	2017

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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UNDERWATER ACOUSTICS – HYDROPHONES – CALIBRATION OF HYDROPHONES –

Part 2: Procedures for low frequency pressure calibration

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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International Standard IEC 60565-2 has been prepared by IEC technical committee 87: Ultrasonics.

This first edition of IEC 60565-2, together with IEC 60565-1, replaces the second edition of IEC 60565 published in 2006. This edition constitutes a technical revision.

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

1) IEC 60565 has been divided into two parts:
   - Part 1: Procedures for free-field calibration;
   - Part 2: Procedures for low frequency pressure calibration (this document).
2) A relative calibration method has been added to Clause 8: Calibration by piezoelectric compensation.

3) A relative calibration method has been added to Clause 11: Calibration by **vibrating column**.
4) Clause 12: Calibration by static pressure transducer, has been added.
5) Annex A: Equivalent circuit of the excitation system for calibration with a **vibrating column**, has been deleted.
6) Subclauses 9.6, 9.7 and 9.8 have been moved to form a new Annex A: Advanced acoustic coupler calibration methods.

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

FDIS	Report on voting
87/720/FDIS	87/723/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

A list of all parts in the IEC 60565 series, published under the general title *Underwater acoustics – Hydrophones – Calibration of hydrophones*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://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 purpose of this document is to establish the procedures for low frequency pressure calibrations of **hydrophone**s in the frequency range from 0,01 Hz to several kilohertz.

To ensure the correctness of the calibrations, the **hydrophone**s to be calibrated are "rigid" **hydrophone**s with small size compared to the acoustic wavelength, and are not sensitive to vibration when calibrated.

Principles, procedures, and **uncertainties** of physical calibrations such as hydrostatic excitation, piezoelectric compensation, **pistonphone**, **vibrating column**, static pressure transducer, etc., and reciprocity calibrations in acoustic **coupler**s are given in this document. Calibrations are carried out using one of these methods, depending on the different principles to be used, and its limitations to the sound field and the frequency range.

UNDERWATER ACOUSTICS – HYDROPHONES – CALIBRATION OF HYDROPHONES –

Part 2: Procedures for low frequency pressure calibration

1 Scope

This part of IEC 60565 specifies the methods for low frequency pressure calibration of **hydrophone**s at frequencies from 0,01 Hz to several kilohertz depending on calibration method.

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 60050-801, *International Electrotechnical Vocabulary – Chapter 801: Acoustics and electroacoustics* (available at http://www.electropedia.org/)

IEC 60500:2017, *Underwater acoustics – Hydrophones – Properties of the hydrophone in the frequency range 1 Hz to 500 kHz*