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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

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- **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.

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SEK Svensk Elstandard

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

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)

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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.

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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 87/720/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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-10-24

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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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**UNDERWATER ACOUSTICS – HYDROPHONES –
CALIBRATION OF HYDROPHONES –****Part 2: Procedures for low frequency pressure calibration**

FOREWORD

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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 **hydrophones** in the frequency range from 0,01 Hz to several kilohertz.

To ensure the correctness of the calibrations, the **hydrophones** to be calibrated are "rigid" **hydrophones** 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 **couplers** 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 **hydrophones** 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*