

<b>STN</b>	<b>Piezoelektrické snímače</b> <b>Časť 2: Chemické a biochemické senzory</b>	<b>STN</b> <b>EN IEC 63041-2</b>  35 8400
------------	---	--

Piezoelectric sensors - Part 2: chemical and biochemical Sensors

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. 01/19

Obsahuje: EN IEC 63041-2:2018, IEC 63041-2:2017

**127830**

EUROPEAN STANDARD

**EN IEC 63041-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2018

ICS 31.140

English Version

**Piezoelectric sensors - Part 2: chemical and biochemical  
sensors  
(IEC 63041-2:2017)**

Capteurs piézoélectriques - Partie 2: Capteurs chimiques et  
biochimiques  
(IEC 63041-2:2017)

Piezoelektrische Sensoren - Teil 2: Chemische und  
biochemische Sensoren  
(IEC 63041-2:2017)

This European Standard was approved by CENELEC on 2018-01-17. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, 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**

**EN IEC 63041-2:2018 (E)****European foreword**

The text of document 49/1221/CDV, future edition 1 of IEC 63041-2, prepared by IEC/TC 49 "Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63041-2:2018.

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) 2018-10-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-01-17

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 63041-2:2017 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 60068 (series)	NOTE	Harmonized as EN 60068 (series).
IEC 60122-1	NOTE	Harmonized as EN 60122-1.
IEC 60444-1	NOTE	Harmonized as EN 60444-1.
IEC 60444-5	NOTE	Harmonized as EN 60444-5.
IEC 60444-9	NOTE	Harmonized as EN 60444-9.
IEC 60679 (series)	NOTE	Harmonized as EN 60679 (series).
IEC 60758:2008	NOTE	Harmonized as EN 60758:2009 (not modified).
IEC 60862-1	NOTE	Harmonized as EN 60862-1.
IEC 61019-1:2004	NOTE	Harmonized as EN 61019-1:2005 (not modified).
IEC 61240:2016	NOTE	Harmonized as EN 61240:2016 (not modified).
IEC 61760 (series)	NOTE	Harmonized as EN 61760 (series).
IEC 61837 (series)	NOTE	Harmonized as EN 61837 (series).
IEC 62276:2016	NOTE	Harmonized as EN 62276:2016 (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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60027	series	Letter symbols to be used in electrical technology - Part 1: General	EN 60027	series
IEC 60050-561	2014	International electrotechnical vocabulary - Part 561: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection	-	-
IEC 60617	-	Standard data element types with associated classification scheme for electric components - Part 4: IEC reference collection fo standard data element types and component classes	-	-
IEC 63041-1	-	Piezoelectric sensors - Part 1: Generic specifications	EN IEC 63041-1	-
ISO 80000-1	2009	Quantities and units - Part 1: General	EN ISO 80000-1	2013



IEC 63041-2

Edition 1.0 2017-12

# INTERNATIONAL STANDARD



---

## Piezoelectric sensors – Part 2: Chemical and biochemical sensors





**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2017 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

#### **About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

#### **About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### **IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### **IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### **IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### **Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### **IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### **IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).



IEC 63041-2

Edition 1.0 2017-12

# INTERNATIONAL STANDARD



---

## Piezoelectric sensors – Part 2: Chemical and biochemical sensors

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 31.140

ISBN 978-2-8322-5144-7

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references .....	5
3 Terms and definitions .....	5
3.1 General.....	5
3.2 Types of chemical and biochemical sensors.....	6
4 Specifications .....	6
4.1 General.....	6
4.2 Conceptual diagram of BAW sensor elements and cells .....	6
4.3 Conceptual diagram of SAW sensor elements and cells .....	6
4.4 Key points of specifications.....	7
4.4.1 General .....	7
4.4.2 Interface layer .....	7
4.4.3 Sensitive or receptive layer (target recognition material).....	7
4.4.4 Nonspecific and unselective reactions .....	8
4.5 Improved sensor performance.....	8
4.6 Technical documents .....	8
5 Delivery conditions .....	8
6 Quality and reliability .....	8
7 Test and measurement procedures.....	8
Annex A (informative) Chemical reaction in sensor cells .....	9
A.1 Reference values before and after reaction.....	9
A.2 Typical formulae .....	10
A.2.1 General .....	10
A.2.2 BAW (AT-cut QCM) .....	10
A.2.3 SAW .....	11
A.3 Calibration .....	14
Bibliography.....	15
Figure 1 – Conceptual diagram for chemical and biochemical sensor elements and cells of BAW resonator type (side view) .....	6
Figure 2 – Conceptual diagram for chemical and biochemical sensor elements and cells of SAW resonator type (side view) .....	7
Figure 3 – Conceptual diagram for chemical and biochemical sensor elements and cells of SAW delay-line type (top view) .....	7
Figure 4 – Conceptual diagram for SAW chemical and biochemical sensor elements and cells with three-layer reaction region on a propagation surface (side view).....	8
Figure A.1 – Frequency-time characteristics .....	9
Figure A.2 – Conceptual resonance response of an SAW sensor cell.....	10

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## PIEZOELECTRIC SENSORS –

## Part 2: Chemical and biochemical sensors

## 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 63041-2 has been prepared by IEC technical committee TC 49: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection.

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

CDV	Report on voting
49/1221/CDV	49/1250/RVC

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.

A list of all parts in the IEC 63041 series, published under the general title *Piezoelectric sensors*, can be found on the IEC website.

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

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

A bilingual version of this publication may be issued at a later date.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## PIEZOELECTRIC SENSORS –

### Part 2: Chemical and biochemical sensors

#### 1 Scope

This part of IEC 63041 is applicable to piezoelectric chemical sensors mainly used in the field of biological, medical, gas and environmental sciences. It provides users with technical guidelines on biochemical sensors as well as basic knowledge of common chemical sensors.

#### 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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050-561:-2014, *International Electrotechnical Vocabulary – Part 561: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection*

IEC 60617, *Graphical symbols for diagrams*, available at <http://std.iec.ch/iec60617>

IEC 63041-1, *Piezoelectric sensors – Part 1: Generic specifications*

ISO 80000-1:2009, *Quantities and units – Part 1: General*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**