

STN	Kryštály lítium-tantalátu a lítium-niobátu na použitie v zariadeniach s povrchovými akustickými vlnami (SAW) Špecifikácie a metódy merania	STN EN IEC 63541 35 8450
------------	---	--

Lithium tantalate and lithium niobate crystals for surface acoustic wave (SAW) device applications - Specifications and measuring methods

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. 06/26

Obsahuje: EN IEC 63541:2026, IEC 63541:2025

142617



EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 63541

February 2026

ICS 31.140

English Version

**Lithium tantalate and lithium niobate crystals for surface acoustic wave (SAW) device applications - Specifications and measuring methods
(IEC 63541:2025)**

Cristaux de tantalate de lithium et de niobate de lithium
pour applications utilisant des dispositifs à ondes
acoustiques de surface (OAS) - Spécifications et méthodes
de mesure
(IEC 63541:2025)

Lithiumtantalat- und Lithiumniobat-Kristalle für
Oberflächenwellen-Bauelemente (SAW) – Spezifikationen
und Messverfahren
(IEC 63541:2025)

This European Standard was approved by CENELEC on 2026-01-23. 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, Türkiye 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 63541:2026 (E)**European foreword**

The text of document 49/1496/CDV, future edition 1 of IEC 63541, prepared by 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 63541:2026.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2027-02-28 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2029-02-28 document have to be withdrawn

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 63541:2025 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 62276:2025 NOTE Approved as EN IEC 62276:2025 (not modified)



IEC 63541

Edition 1.0 2025-12

INTERNATIONAL STANDARD

**Lithium tantalate and lithium niobate crystals for surface acoustic wave (SAW)
device applications - Specifications and measuring methods**

**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2025 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 Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
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 corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

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

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

IEC Customer Service Centre - 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: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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

IEC 63541:2025 © IEC 2025

CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references	5
3 Terms and definitions	5
4 Requirements	7
4.1 Material specification	7
4.1.1 LN	7
4.1.2 LT.....	7
4.2 Requirements for as-grown crystal.....	7
4.2.1 Specifications	7
4.2.2 Macroscopic quality	8
4.2.3 Single domain	8
4.2.4 Curie temperature and tolerance	8
4.2.5 Lattice parameter	8
4.3 Requirements for lumbered crystal	8
4.3.1 As-grown crystal for lumbered crystal	8
4.3.2 Specifications	8
5 Sampling and inspection	9
5.1 General.....	9
5.2 Sampling and inspection plan	9
5.3 Determination of inspection results	10
6 Test methods.....	10
6.1 Test methods for as-grown crystal	10
6.1.1 Diameter and cylinder length	10
6.1.2 Macroscopic quality	10
6.1.3 Single domain	10
6.1.4 Curie temperature	10
6.1.5 Lattice parameter	10
6.2 Test methods for lumbered crystal	11
6.2.1 Surface orientation.....	11
6.2.2 Diameter.....	11
6.2.3 Orientation of orientation flat	11
6.2.4 Width of orientation flat	11
6.2.5 Effective length	11
6.2.6 Cylindricity	11
6.2.7 Verticality	11
7 Identification, labelling, packaging, delivery condition	11
7.1 Packaging	11
7.2 Labelling and identification	11
7.3 Terms of delivery	11
Annex A (normative) Measurement of single domain for LT and LN crystals	12
A.1 General.....	12
A.2 Measurement principle	12
A.3 Measurement	12
A.3.1 Scattered light path method.....	12
A.3.2 Etching method	13

IEC 63541:2025 © IEC 2025

A.3.3	Electromotive voltage method.....	15
Annex B (normative)	Measurement of Curie temperature	17
B.1	General.....	17
B.2	DTA method.....	17
B.3	DSC method	18
B.4	Dielectric constant method	18
Annex C (normative)	Measurement of lattice parameter (Bond method).....	20
Annex D (normative)	Measurement of cylindricity for LT and LN crystals	22
D.1	General.....	22
D.2	Measurement	22
D.2.1	Equipment	22
D.2.2	Measuring procedure	22
D.2.3	Other instructions.....	23
Annex E (normative)	Measurement of verticality for LT and LN crystals.....	24
E.1	General.....	24
E.2	Measurement	24
E.2.1	Equipment	24
E.2.2	Measuring procedure	24
Bibliography		25
Figure 1	– Schematic diagram of lumbered crystal.....	6
Figure 2	– Schematic diagram of verticality for lumbered crystal	7
Figure A.1	– Schematic diagram of sample position	14
Figure A.2	– Schematic diagram of measurement points	14
Figure A.3	– Examples of 42°Y-X LT after etching	14
Figure A.4	– Examples of 128°Y-X LN after etching	15
Figure A.5	– Schematic diagram of waveform for single-domain crystals	15
Figure A.6	– Schematic diagram of waveform for non-single-domain crystals	16
Figure B.1	– Schematic of a DTA system.....	17
Figure B.2	– Schematic of a DSC system	18
Figure B.3	– Schematic of a dielectric constant measurement system	19
Figure C.1	– The Bond method.....	21
Figure D.1	– Measurement schematic diagram of cylindricity	22
Figure E.1	– Measurement schematic diagram of verticality	24
Table 1	– Typical specifications of as-grown crystal.....	8
Table 2	– The centre value and tolerance of Curie temperature specification.....	8
Table 3	– Typical specifications of lumbered crystal.....	9
Table 4	– Sampling and inspection plan	10

IEC 63541:2025 © IEC 2025

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Lithium tantalate and lithium niobate crystals
for surface acoustic wave (SAW) device applications -
Specifications and measuring methods**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63541 has been prepared by IEC technical committee 49: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection. It is an International Standard.

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

Draft	Report on voting
49/1496/CDV	49/1517/RVC

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.

IEC 63541:2025 © IEC 2025

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/publications.

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, or
- revised.

1 Scope

This document applies to lithium tantalate (LT) and lithium niobate (LN) crystals for surface acoustic wave devices, including the as-grown crystals and lumbered crystals.

2 Normative references

There are no normative references in this document.

koniec náhľadu – text ďalej pokračuje v platenej verzii STN