This is a free page sample. Access the full version online.

NSAI Standards

Irish Standard
I.S. EN 62884-1:2017

Measurement techniques of piezoelectric, dielectric and electrostatic oscillators - Part 1: Basic methods for the measurement

© CENELEC 2017 No copying without NSAI permission except as permitted by copyright law.

This is a free page sample. Access the full version online.

I.S. EN 62884-1:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN 62884-1:2017	2017-09-22

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2017-10-10	NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

This is a free page sample. Access the full version online.

National Foreword

I.S. EN 62884-1:2017 is the adopted Irish version of the European Document EN 62884-1:2017, Measurement techniques of piezoelectric, dielectric and electrostatic oscillators - Part 1: Basic methods for the measurement

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This is a free page sample. Access the full version online.

This page is intentionally left blank

This is a free page sample. Access the full version online.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62884-1

September 2017

ICS 31.140

English Version

Measurement techniques of piezoelectric, dielectric and electrostatic oscillators - Part 1: Basic methods for the measurement (IEC 62884-1:2017)

Techniques de mesure des oscillateurs piézoélectriques, diélectriques et électrostatiques - Partie 1 : Méthodes fondamentales pour le mesurage (IEC 62884-1:2017)

Messverfahren für piezoelektrische, dielektrische und elektrostatische Oszillatoren - Teil 1: Grundlegende Messverfahren (IEC 62884-1:2017)

This European Standard was approved by CENELEC on 2017-07-13. 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: Avenue Marnix 17, B-1000 Brussels

© 2017 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN 62884-1:2017 E

This is a free page sample. Access the full version online.

European foreword

The text of document 49/1187A/CDV, future edition 1 of IEC 62884-1, 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 62884-1:2017.

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) 2018-04-13
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-07-13

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 62884-1:2017 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 60122-1:2002	NOTE	Harmonized as EN 60122-1:2002 (not modified).
IEC 60679-3:2012	NOTE	Harmonized as EN 60679-3:2013 (not modified).
IEC 60679-4	NOTE	Harmonized as EN 60679-4.
IEC 60679-5	NOTE	Harmonized as EN 60679-5.
IEC 60749-26	NOTE	Harmonized as EN 60749-26.
IEC 60749-27	NOTE	Harmonized as EN 60749-27.
IEC 61000-4-2	NOTE	Harmonized as EN 61000-4-2.
IEC 61019-1:2004	NOTE	Harmonized as EN 61019-1:2005 (not modified).
IEC 61019-2:2005	NOTE	Harmonized as EN 61019-2:2005 (not modified).
IEC 61837-1:2012	NOTE	Harmonized as EN 61837-1:2012 (not modified).
IEC 61837-2:2011	NOTE	Harmonized as EN 61837-2:2011 (not modified).
IEC 61837-4:2015	NOTE	Harmonized as EN 61837-4:2015 (not modified).
ISO 80000-4:2006	NOTE	Harmonized as EN ISO 80000-4:2013 (not modified).

This is a free page sample. Access the full version online.

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 When 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 60027	series	Letter symbols to be used in electrical technology	EN 60027	series
IEC 60050-561	-	International electrotechnical vocabulary - Part 561: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection	-	-
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-7	-	Basic environmental testing procedures - Part 2-7: Tests - Test Ga and guidance: Acceleration, steady state	EN 60068-2-7	-
IEC 60068-2-10	2005	Environmental testing - Part 2-10: Tests - Test J and guidance: Mould growth	EN 60068-2-10	2005
IEC 60068-2-13	-	Basic environmental testing procedures - Part 2-13: Tests - Test M: Low air pressure	EN 60068-2-13	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-17	1994	Basic environmental testing procedures - Part 2-17: Tests - Test Q: Sealing	EN 60068-2-17	1994

This is a free page sample. Access the full version online.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-20	-	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	-
IEC 60068-2-21	-	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-31	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-45	-	Basic environmental testing procedures - Part 2-45: Tests - Test XA and guidance: Immersion in cleaning solvents	EN 60068-2-45	-
IEC 60068-2-52	-	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	-
IEC 60068-2-58	-	Environmental testing - Part 2-58: Tests - Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)	EN 60068-2-58	-
IEC 60068-2-64	-	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance	EN 60068-2-64	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60469	-	Transitions, pulses and related waveforms - Terms, definitions and algorithms	EN 60469	-
IEC 60617-DB	-	Graphical symbols for diagrams	-	-
IEC 60679-1	2017	Piezoelectric, dielectric and electrostatic oscillators of assessed quality - Part 1 : Generic specification	EN 60679-1	— [1]
ISO 80000-1	-	Quantities and units - Part 1: General	EN ISO 80000-1	-

1) To be published.

This is a free page sample. Access the full version online.

IEC 62884-1

Edition 1.0 2017-06

INTERNATIONAL STANDARD

colour inside

Measurement techniques of piezoelectric, dielectric and electrostatic oscillators –
Part 1: Basic methods for the measurement

IEC 62884-1:2017-06(en)

This is a free page sample. Access the full version online.

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 Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
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 corrigenda or an amendment might have been published.

IEC Catalogue - 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
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 also once a month by email.

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

This is a free page sample. Access the full version online.

IEC 62884-1

Edition 1.0 2017-06

INTERNATIONAL STANDARD

colour inside

Measurement techniques of piezoelectric, dielectric and electrostatic oscillators –
Part 1: Basic methods for the measurement

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.140

ISBN 978-2-8322-4395-4

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

® Registered trademark of the International Electrotechnical Commission

This is a free page sample. Access the full version online.

CONTENTS

FOREWORD 6
1 Scope 8
2 Normative references 8
3 Terms and definitions 9
3.1 General 9
3.2 Terms and definitions 10
4 Test and measurement procedures 10
4.1 General 10
4.2 Test and measurement conditions 10
4.2.1 Standard conditions for testing 10
4.2.2 Equilibrium conditions 10
4.2.3 Air flow conditions for temperature tests 10
4.2.4 Power supplies 11
4.2.5 Precision of measurement 11
4.2.6 Precautions 11
4.2.7 Alternative test methods 11
4.3 Visual inspection 11
4.3.1 General 11
4.3.2 Visual test A 11
4.3.3 Visual test B 11
4.3.4 Visual test C 12
4.4 Dimensions and gauging procedures 12
4.4.1 Dimensions – Test A 12
4.4.2 Dimensions – Test B 12
4.5 Electrical test procedures 12
4.5.1 Insulation resistance 12
4.5.2 Voltage proof 12
4.5.3 Input power 13
4.5.4 Output frequency 14
4.5.5 Frequency/temperature characteristics 15
4.5.6 Frequency/load coefficient 16
4.5.7 Frequency/voltage coefficient 17
4.5.8 Frequency stability with thermal transient 17
4.5.9 Oscillation start-up 18
4.5.10 Stabilization time 22
4.5.11 Frequency adjustment range 22
4.5.12 Retrace characteristics 22
4.5.13 Oscillator output voltage (sinusoidal) 23
4.5.14 Oscillator output voltage (pulse waveform) 24
4.5.15 Oscillator output waveform (sinusoidal) 25
4.5.16 Oscillator output waveform (pulse) 27
4.5.17 Oscillator output power (sinusoidal) 27
4.5.18 Oscillator output impedance (sinusoidal) 27
4.5.19 Re-entrant isolation 28
4.5.20 Output suppression of gated oscillators 28
4.5.21 3-state output characteristics 29
4.5.22 Amplitude modulation characteristics 30

This is a free page sample. Access the full version online.

4.5.23 Frequency modulation characteristics 36
4.5.24 Spurious response 40
4.5.25 Phase noise 40
4.5.26 Phase noise – vibration 41
4.5.27 Phase noise – acoustic 41
4.5.28 Noise pedestal 42
4.5.29 Spectral purity 43
4.5.30 Incidental frequency modulation 43
4.5.31 RMS fractional frequency fluctuations 44
4.5.32 Electromagnetic interference (radiated) 48
4.6 Mechanical and environmental test procedures 52
4.6.1 Robustness of terminations (destructive) 52
4.6.2 Sealing test (non-destructive) 54
4.6.3 Soldering (solderability and resistance to soldering heat) (destructive) 54
4.6.4 Rapid change of temperature: severe shock by liquid immersion (non-destructive) 57
4.6.5 Rapid change of temperature: thermal shock in air (non-destructive) 57
4.6.6 Bump (destructive) 57
4.6.7 Vibration (destructive) 58
4.6.8 Shock (destructive) 58
4.6.9 Free fall (destructive) 59
4.6.10 Acceleration, steady-state (non-destructive) 59
4.6.11 Acceleration – 2g tip over 59
4.6.12 Acceleration noise 59
4.6.13 Low air pressure (non-destructive) 59
4.6.14 Dry heat (non-destructive) 59
4.6.15 Damp heat, cyclic (destructive) 59
4.6.16 Cold (non-destructive) 60
4.6.17 Climatic sequence (destructive) 60
4.6.18 Damp heat, steady-state (destructive) 60
4.6.19 Salt mist, cyclic (destructive) 60
4.6.20 Mould growth (non-destructive) 60
4.6.21 Immersion in cleaning solvent (non-destructive) 60
4.6.22 Radiation hardness 60
Bibliography 61

Figure 1 – Test circuits for insulation resistance measurements 12
Figure 2 – Test circuit for voltage proof test 13
Figure 3 – Test circuit for oscillator input power measurement 13
Figure 4 – Test circuit for oven and oscillator input power measurement 14
Figure 5 – Test circuit for measurement of output frequency, method1 15
Figure 6 – Test circuit for measurement of output frequency, method 2 15
Figure 7 – Test circuit for measurement of frequency/temperature characteristics 16
Figure 8 – Thermal transient behaviour of typical oscillator 18
Figure 9 – Generalized oscillator circuit 19
Figure 10 – Test circuit for start-up behaviour and start-up time measurement 20
Figure 11 – Typical start-up behaviour with slow supply voltage ramp 20

This is a free page sample. Access the full version online.

Figure 12 – Definition of start-up time 21
Figure 13 – Supply voltage waveform for periodical t_{SU} measurement 22
Figure 14 – Typical oscillator stabilization characteristic 22
Figure 15 – Example of retrace characteristic 23
Figure 16 – Test circuit for the measurement of output voltage 24
Figure 17 – Test circuit for the measurement of pulse outputs 24
Figure 18 – Characteristics of an output waveform 24
Figure 19 – Test circuit for harmonic distortion measurement 25
Figure 20 – Quasi-sinusoidal output waveforms 25
Figure 21 – Frequency spectrum for harmonic distortion 26
Figure 22 – Test circuit for the determination of isolation between output ports 28
Figure 23 – Test circuit for measuring suppression of gated oscillators 29
Figure 24 – Test circuit for 3-state disable mode output current 29
Figure 25 – Test circuit for output gating time – 3-state 30
Figure 26 – Test circuit for modulation index measurement 31
Figure 27 – Modulation waveform for index calculation 31
Figure 28 – Logarithmic signal amplitude scale 31
Figure 29 – Test circuit to determine amplitude modulation sensitivity 33
Figure 30 – Frequency spectrum of amplitude modulation distortion 33
Figure 31 – Test circuit to determine pulse amplitude modulation 34
Figure 32 – Pulse modulation characteristic 35
Figure 33 – Test circuit for the determination of modulation input impedance 36
Figure 34 – Test circuit for the measurement of f.m. deviation 36
Figure 35 – Test circuit for the measurement of f.m. sensitivity 38
Figure 36 – Test circuit for the measurement of frequency modulation distortion 39
Figure 37 – Test circuit for the measurement of single-sideband phase noise 40
Figure 38 – Typical noise pedestal spectrum 42
Figure 39 – Test circuit for the measurement of incidental frequency modulation 44
Figure 40 – Test circuit for method 1 45
Figure 41 – Test circuit for method 2 46
Figure 42 – Circuit modifications for methods 1 and 2 47
Figure 43 – Time-domain short-term frequency stability of a typical 5 MHz precision oscillator 48
Figure 44 – Radiated interference tests 49
Figure 45 – Characteristics of line impedance of stabilizing network 50
Figure 46 – Circuit diagram of line impedance of stabilizing network 51
Figure 47 – Reflow temperature profile for solderability 55
Figure 48 – Reflow temperature profile for resistance to soldering heat 56

Table 1 – Measuring sets bandwidth 52
Table 2 – Tensile force 52
Table 3 – Thrust force 53
Table 4 – Bending force 53

This is a free page sample. Access the full version online.

Table 5 – Torque force 54
Table 6 – Solderability – Test condition, reflow method 55
Table 7 – Resistance to soldering heat – Test condition and severity, reflow method 57

This is a free page sample. Access the full version online.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASUREMENT TECHNIQUES OF PIEZOELECTRIC, DIELECTRIC AND ELECTROSTATIC OSCILLATORS –

Part 1: Basic methods for the measurement

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 62884-1 has been prepared by IEC technical committee 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
49/1187A/CDV	49/1200/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.

This is a free page sample. Access the full version online.

A list of all parts in the IEC 62884 series, published under the general title *Measurement techniques of piezoelectric, dielectric and electrostatic oscillators*, can be found on the IEC website.

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.

This is a free page sample. Access the full version online.

MEASUREMENT TECHNIQUES OF PIEZOELECTRIC, DIELECTRIC AND ELECTROSTATIC OSCILLATORS –

Part 1: Basic methods for the measurement

1 Scope

This part of IEC 62884 specifies the measurement techniques for piezoelectric, dielectric and electrostatic oscillators, including Dielectric Resonator Oscillators (DROs) and oscillators using FBAR (hereinafter referred to as "Oscillator").

NOTE Dielectric Resonator Oscillators (DROs) and oscillators using FBAR are under consideration.

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, *International electrotechnical vocabulary – Part 561: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection*. Available at http://www.electropedia.org

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-7, *Basic environmental testing procedures – Part 2-7: Tests – Test Ga and guidance: Acceleration, steady state*

IEC 60068-2-10:2005, *Environmental testing – Part 2-10: Tests – Test J and guidance: Mould growth*

IEC 60068-2-13, *Basic environmental testing procedures – Part 2-13: Tests – Test M: Low air pressure*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-17:1994, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

SAI GLOBAL

This is a free preview. Purchase the entire publication at the link below:

Product Page

Looking for additional Standards? Visit Intertek Inform Infostore

Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation