



IEC 62884-3

Edition 1.0 2018-03

# INTERNATIONAL STANDARD

---

**Measurement techniques of piezoelectric, dielectric and electrostatic**

**oscillators –**

**Part 3: Frequency aging test methods**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 31.140

ISBN 978-2-8322-5494-3

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

## CONTENTS

FOREWORD .....	3
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions, units and symbols .....	6
3.1 Terms and definitions .....	6
3.2 Units and symbols .....	7
4 Frequency aging test .....	7
4.1 General .....	7
4.2 Test and measurement conditions .....	7
4.2.1 General .....	7
4.2.2 Active aging test (non-destructive) .....	7
4.2.3 Data fitting .....	8
4.2.4 Accelerated aging (non-active) .....	9
4.2.5 Extended aging .....	10
Annex A (normative) Experimental verification of the frequency aging performance .....	11
Bibliography .....	13
Table 1 – Measurement parameters depending on the oscillator type .....	8
Table 2 – Time acceleration factors for $E_a = 0,38 \text{ eV}$ .....	10
Table A.1 – Procedure for the determination of the frequency aging parameters .....	12

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MEASUREMENT TECHNIQUES OF PIEZOELECTRIC,  
DIELECTRIC AND ELECTROSTATIC OSCILLATORS –****Part 3: Frequency aging test 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) 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 62884-3 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
49/1248/CDV	49/1272/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 62884 series, published under the general title *Measurement techniques of piezoelectric, dielectric and electrostatic oscillators*, 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.

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

## INTRODUCTION

This document was developed from the works related to IEC 60679-1:2007 (third edition), the measurement techniques of which were restructured into different parts under a new project reference. This document describes the measurement method for frequency aging only.

## MEASUREMENT TECHNIQUES OF PIEZOELECTRIC, DIELECTRIC AND ELECTROSTATIC OSCILLATORS –

### Part 3: Frequency aging test methods

#### 1 Scope

This part of IEC 62884 describes the methods for the measurement and evaluation of frequency aging tests of piezoelectric, dielectric and electrostatic oscillators, including Dielectric Resonator Oscillators (DRO) and oscillators using FBAR (hereinafter referred to as "Oscillator"). The purpose of those tests is to provide statistical data supporting aging predictions.

#### 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*

IEC 60469, *Transitions, pulses and related waveforms – Terms, definitions and algorithms*

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

IEC 60679-1, *Piezoelectric, dielectric and electrostatic oscillators of assessed qualify – Part 1: Generic specification*

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

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