INTERNATIONAL STANDARD

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Waveguide type dielectric resonators -

Part 2: Guidelines for oscillator and filter applications

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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.
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International Standard IEC 61338-2 has been prepared by IEC technical committee 49: Piezoelectric and dielectric devices for frequency control and selection.

This standard cancels and replaces IEC/PAS 61338-2 published in 2000. This first edition constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
49/656/FDIS	49/674/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

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- withdrawn;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

IEC 61338 consists of the following parts, under the general title *Waveguide type dielectric resonators:*

Part 1: Generic specification [1]

Part 1-1: General information and test conditions – General information [2]

Part 1-2: General information and test conditions – Test conditions [2]

Part 1-3: General information and test conditions – Measurement method of complex relative permittivity for dielectric resonator materials at microwave frequency

Part 1-4: General information and test conditions – Measurement method of complex relative permittivity for dielectric resonator materials at millimeter-wave frequency [3]

Part 2: Guidelines for oscillator and filter applications (the present standard)

Part 4: Sectional specification [1]

Part 4-1: Blank detail specification [1]

A bilingual version may be issued at a later date

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1 To be published.

2 To be replaced by IEC 61338-1 in the near future.

3 Under consideration.

INTRODUCTION

This part of IEC 61338 gives practical guidance on the use of waveguide type dielectric resonators that are used in telecommunications and radar systems (for general information, standard values, and test conditions, see the other parts of this series).

The features of these dielectric resonators are small size without degradation of quality factor, low mass, high reliability and high stability against temperature and ageing. The dielectric resonators are suitable for applications to miniaturized oscillators and filters with high performance.

This standard has been compiled in response to a generally expressed desire on the part of both users and manufacturers for guidelines for the use of dielectric resonators, so that the resonators may be used to their best advantage. For this purpose, general and fundamental characteristics have been explained in this standard.

WAVEGUIDE TYPE DIELECTRIC RESONATORS –

Part 2: Guidelines for oscillator and filter applications

1 Scope

This part of IEC 61338, which contains guidelines for use, is limited to the waveguide type dielectric resonators that are used for oscillator and filter applications. These types of resonators are now widely used in oscillators for direct broadcasting or communication satellite systems, oscillators for radio links, voltage-controlled oscillators for mobile communication systems and so on. In addition, these dielectric resonators are also used as an essential component of miniaturized filters for the same kind of applications.

It is not the aim of this standard either to explain theory or to attempt to cover all the eventualities that may arise in practical circumstances. This standard draws attention to some of the more fundamental questions, which should be considered by the user before he places an order for dielectric resonators for a new application. Such a procedure will be the user's insurance against unsatisfactory performance.

Standard specifications, such as those in the IEC 61338 series and national specifications or detail specifications issued by manufacturers, will define the available combinations of resonance frequency, the quality factor, the temperature coefficient of resonance frequency, etc. These specifications are compiled to include a wide range of dielectric resonators with standardized performances. It cannot be over-emphasized that the user should, wherever possible, select his dielectric resonators from these specifications, when available, even if it may lead to making small modifications to his circuit to enable standard resonators to be used. This applies particularly to the selection of the nominal frequency.

2 Normative references

The following referenced documents are indispensable for the application 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 60068-1, *Environmental testing – Part 1: General and guidance*

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

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

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

IEC 60068-2-7, *Environmental testing – Part 2: Tests – Test Ga: Acceleration, steady state*

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

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

IEC 60068-2-20, *Environmental testing – Part 2: Tests – Test T: Soldering*

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

IEC 60068-2-27, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60068-2-29, *Environmental testing – Part 2: Tests – Test Eb and guidance: Bump*

IEC 60068-2-30, *Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*

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)*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 61338-1-1, *Waveguide type dielectric resonators – Part 1-1: General information and test conditions – General information*

IEC 61338-1-2, *Waveguide type dielectric resonators – Part 1-2: General information and test conditions – Test conditions*

IEC 61338-1-3, *Waveguide type dielectric resonators – Part 1-3: General information and test conditions – Measurement method of complex relative permittivity for dielectric resonator materials at microwave frequency*