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# INTERNATIONAL STANDARD



## Synthetic quartz crystal – Specifications and guidelines for use



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# SYNTHETIC QUARTZ CRYSTAL – SPECIFICATIONS AND GUIDELINES FOR USE

## FOREWORD

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International Standard IEC 60758 has been prepared by IEC technical committee 49: Piezoelectric and dielectric devices for frequency control and selection.

This fourth edition cancels and replaces the third edition, published in 2004. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- preparation of AT-cut slice sample for etching is changed to make it easier;
- etch channel grade classification is changed considering request of the user;
- explanation of quartz axes difference between IEEE and IEC is added as Annex F.

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

| FDIS | Report on voting |
|---|---|
| 49/808/FDIS | 49/814/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 the maintenance result date indicated on the IEC web site 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- withdrawn,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.

# SYNTHETIC QUARTZ CRYSTAL – SPECIFICATIONS AND GUIDELINES FOR USE

## 1 Scope

This International Standard applies to synthetic quartz single crystals intended for manufacturing piezoelectric elements for frequency control and selection.

## 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 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1: 1992

IEC 60122-1:2002, *Quartz crystal units of assessed quality – Part 1: Generic specification*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 61994 (all parts), *Piezoelectric and dielectric devices for frequency control and selection – Glossary*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in IEC 61994, apply.

**3.1**
**hydrothermal crystal growth**
literally, crystal growth in the presence of water, elevated temperatures and pressures by a crystal growth process believed to proceed geologically within the earth's crust. The industrial synthetic quartz growth processes utilize alkaline water solutions confined within autoclaves at supercritical temperatures (330 °C to 400 °C) and pressures (700 to 2 000 atmospheres).

NOTE The autoclave is divided into two chambers: the dissolving chamber, containing raw quartz chips at the higher temperature; the growing chamber, containing cut seeds at the lower temperature (see 7.1.2)

**3.2**
**synthetic quartz crystal**
single crystal of $\alpha$ quartz grown by the hydrothermal method. The crystal is of either handedness and in the as-grown condition. Cultured quartz has the same meaning as synthetic quartz crystal

**3.2.1**
**as-grown synthetic quartz crystal**
single crystal quartz grown hydrothermally. As-grown refers to the state of processing and indicates a state prior to whatever treatment might occur after growth, excluding quality control operations