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Sectional specification: Waveguide type dielectric resonators

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Rahmenspezifikation: Dielektrische Resonatoren vom Wellenleitertyp

Spécification intermédiaire: Résonateurs diélectriques à modes guidés

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 49, Piezoelectric devices for frequency control and selection.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 170100 on 2000-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-02-01

- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-08-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annexes A, B and C are normative.

CONTENTS

1 Scope

This sectional specification applies to waveguide type dielectric resonators as custom built products or as standard catalogue items whose quality is assessed on the basis of capability approval.

It prescribes the preferred ratings and characteristics with the appropriate tests and measuring methods contained in the generic specification EN 170000, and gives the general performance requirements to be used in detail specifications for waveguide type dielectric resonators.

The concept of preferred values is in general directly applicable to standard catalogue items but does not necessarily apply to custom built products.

2 General, preferred ratings and guidance on detail specifications

2.1 Related documents

EN 60068-1	Environmental testing - Part 1: General and guidance (IEC 60068-1)
EN 170000	Generic specification: Waveguide type dielectric resonators.
CECC 00016	Basic requirements for the use of Statistical Process Control (SPC) in the CECC system.

NOTE The above references apply to the current editions except for EN 60068-1 for which the referred edition and the applicable test clauses defined in EN 170000 shall be used.

2.2 Preferred ratings and characteristics

The values given in detail specifications shall preferably be selected from those stated in 2.4 of the generic specification EN 170000.

2.3 Information to be prescribed in detail specifications
(for both custom built and standard catalogue items)

Guidance on the preparation of detail specifications is given in the blank detail specification.

Each detail specification shall state all the tests and measurements required for inspection. For standard catalogue items this shall, as a minimum, include the relevant tests given in the blank detail specification, with methods and severities.

The following information shall be given in each detail specification.

2.3.1 Outline drawing and dimensions

The detail specification shall include a dimensional drawing of the waveguide type dielectric resonator and/or reference to an appropriate international standard, to permit easy recognition and to provide information for dimensioning and gauging procedures.

The dimensions shall include the overall dimensions of the body of the component and the size and spacing of the terminations. All dimensions shall be stated in mm.

2.3.2 Marking

The detail specification shall prescribe the content of the marking on the waveguide type dielectric resonator primary package in accordance with 2.5 of EN 170000.

2.3.3 Ordering information

The detail specification shall prescribe that the following information is required when ordering a waveguide type dielectric resonator.

a) Quantity

b) Detail specification number, issue number and date

and where applicable

c) Nominal frequency in MHz or GHz

d) Full description of any additional requirements to identify the waveguide type dielectric resonator.

2.3.4 Additional information (not for inspection purposes)

The detail specification may include information which is not normally required to be verified by the inspection procedure, such as circuit diagrams, curves, drawings and notes needed for clarification.

3 Capability approval

3.1 Eligibility for capability approval

Prior to making an application for capability approval a manufacturer shall first obtain manufacturer's inspection approval in accordance with EN 100114-1.

The primary stage of manufacture shall be as defined in 3.1 of the generic specification EN 170000.

3.2 Structural similarity

Structural similarity is not applicable to Capability Approval. However, it is applicable to released lots as defined in 3.14.1 of this specification.

3.3 Procedures for capability approval

3.3.1 General

Capability approval in waveguide type dielectric resonator technology covers:

- the complete design, material preparation and manufacturing techniques, including control procedures and tests;
- the performance limits claimed for the processes and products, that is those specified for the Capability Qualifying Components (CQCs);
- the range of mechanical structures for which approval is granted.

3.3.2 Application for capability approval

In order to obtain capability approval the manufacturer shall apply the rules of procedure given in 2.4 of CECC 00 114-3.

In an application for capability approval the manufacturer shall define the boundaries of the capability for which approval is sought in accordance with 3.5.

3.3.3 Granting of capability approval

Capability approval shall be granted when the manufacturer has:

- prepared a capability manual describing the capability for which he wishes to be approved, to the satisfaction of the ONS;
- agreed with the ONS the range of CQCs, as defined in 2.7 of CECC 00 114-3, to be used for the assessment of capability;
- successfully demonstrated that he can design and manufacture components which satisfy the requirements of this sectional specification, within the limits of his capability;
- prepared a capability approval test report to the satisfaction of the ONS.

3.4 Description of capability

The manufacturer shall prepare a manual describing his capability (see 2.5 of CECC 00 114-3), in relation to the technologies involved.

The manual shall be approved by the ONS who shall ensure that it is a true and complete record of procedures carried out by the manufacturer during the design, production, testing, inspection and release of his products. The manual is a document that shall be treated as 'commercial in confidence'.

The manual shall include the following as a minimum:

- A general introduction and description of the technologies involved;
- Aspects of customer liaison including provision of design rules (if appropriate) and assistance to customers in the formulation of their requirements;
- A detailed description of the design rules to be used;
- The procedure for checking that the design rules are complied with for waveguide type dielectric resonators manufactured to a detail specification;
- A list of all materials used, with references to the corresponding purchasing specifications and goods inward inspection;
- A flow chart for the total process showing quality control points and permitted rework loops and containing references to all process and quality control procedures which may invoke SPC procedures (see CECC 00 016);
- A declaration of processes for which approval has been sought in accordance with 3.5.1;
- A declaration of boundaries for which approval has been sought in accordance with 3.5.2;
- A list of CQCs used to assess the capability, with a general description of each, supported by a detailed table showing where the declared boundaries of capability are demonstrated by a particular CQC design;
- A detail specification for each CQC. These shall be produced to the satisfaction of the ONS. (see annexes B and C).

3.5 Capability Qualifying Components (CQCs)

The manufacturer shall agree with the ONS the range of capability qualifying components, selected in accordance with the general plan (see 3.11.2) specified in the capability manual.

The CQCs shall comply with the following requirements:

a) The range of CQCs used shall cover all the processes, component types and limits of the declared capability

b) The CQCs shall be one of the following:
   - waveguide type dielectric resonators in production;
   - test pieces designed for assessment of a process or range of processes;
   - a combination of both of these.

When CQCs are designed and produced solely for capability approval, the manufacturer shall satisfy the ONS that the same design rules, materials and manufacturing processes will be applied to released products.

The CQC specifications may refer to internal control documentation which specifies production testing and recording in order to demonstrate control and maintenance of processes and boundaries including the use of SPC procedures where appropriate.

3.5.1 Process

The CQC specifications shall include the following processes to be assessed. This list is not exclusive:

- Sintering see 3.11.3.1
- Deposition of electrodes (when applicable) see 3.11.3.2

3.5.2 Boundaries

CQCs shall demonstrate a set of boundaries which shall include the following:

- Temperature range see 3.11.4 (2)
- Ageing limits (when claimed) see 3.11.4 (4)
- Climatic category see 3.11.4 (2)
- Mechanical test severities see 3.11.4 (2)

This list is not exclusive. Where additional boundaries are claimed these shall be covered by one or more CQCs.

3.6 Inspection requirements for CQCs

The inspection requirements shall be contained in the CQC detail specifications together with environmental tests, measurements, severities and end point limits, where appropriate (see 3.11). Where possible the tests applied to CQCs shall be selected from section 4 of the generic specification EN 170000.

For capability approval and the subsequent maintenance of that approval, the inspection requirements shall ensure that processes and design features meet the declared capability.

3.7 Programme for capability approval

The manufacturer shall prepare a programme for the assessment of the declared capability to the satisfaction of the ONS. This programme shall be designed so that each declared boundary condition is verified by the appropriate CQC. (see 2.6.1 of CECC 00114-3).

The programme shall contain the following:

- a bar chart or other means of showing the proposed timetable for the approval exercise;
- details of all the CQCs to be used with references to their detail specifications;
- a chart showing the features to be demonstrated by each CQC.

3.8 Capability approval report

The report shall contain the following information;

- the issue number and date of the capability approval manual;
- a programme for capability approval in accordance with 3.7;
- a test results obtained during the performance of the programme;
- the test methods used.

The report shall be signed by the Chief Inspector as a true statement of the results obtained and submitted to the ONS for approval. (see 2.6.3 of CECC 00 114-3).

3.9 Abstract of description of capability

The abstract, as required by 2.8 of CECC 00 114-3, is intended for formal publication in CECC 00 200 when capability approval is granted by the national authorised institution (ONH) on the recommendation of the ONS.

It shall include a concise description of the manufacturer's capability and give sufficient information on the technologies, methods of construction, packaging and range of products for which the manufacture has been approved. The layout shall conform to annex A of this specification indicating the boundary conditions for which approval has been granted.

3.10 Modifications likely to affect the capability approval

Any modification likely to affect the capability approval shall satisfy the requirements of 2.11 of CECC 00 114-3.

3.11 Initial capability approval

The test plans given below are to be applied to appropriately selected groups of CQCs.

The test plans are in categories as follows:

a) Process CQCs
b) Boundary CQCs

The tests referred to in each test plan are defined in table 1. These tests have been grouped to prove particular design areas covering materials, processes, resonator performance and durability.

The tests in each group shall be carried out in the given order.

The approval is granted when the selected range of CQCs has collectively satisfied the assessment requirements of the CQC detail specifications with no non-conformances allowed.

A CQC is counted as a non-conforming CQC if it has not satisfied the whole or part of the tests of a group.

3.11.1 Procedure in the event of CQC failures

In the event of the failure of specimens to meet the test requirements, the manufacturer shall apply the procedures given in 2.6.2 of CECC 000 114-3.