

Förderverein für Elektrotechnische Normung (FEN) e. V.
Cenelec Electronic Components Committee

CECC



**Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques**

SPECIFICATION PARTICULIERE CADRE:

**CONDENSATEURS FIXES
CHIPS A DIELECTRIQUE
EN CERAMIQUE
MULTICOUCHE**

**Harmonized System of Quality Assessment for
Electronic Components**

**BLANC DETAIL SPECIFICATION:
FIXED MULTILAYER CERAMIC
CHIP CAPACITORS**

**Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik**

**VORDRUCK
FÜR BAUARTSPEZIFIKATION:
VIELSCHICHTKERAMIK-
CHIP-KONDENSATOREN**

1

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FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby accepted by all member countries without further testing.

This blank detail specification has been formally approved by the CECC, and has been prepared for those countries taking part in the System who wish to issue national harmonized specifications for FIXED MULTILAYER CERAMIC CHIP CAPACITORS. It should be read in conjunction with the current regulations for the CECC System.

At the date of printing of this specification the member countries of the CECC are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Copies of it can be obtained from the addresses shown on the blue fly-sheet.

PREFACE

This blank detail specification was prepared by CECC Working Group 3: "Capacitors".

The text of this blank detail specification was circulated to the CECC for voting in the document indicated below and was ratified by the President of the CECC for printing as a CECC Specification.

<u>Document</u>	<u>Voting Date</u>	<u>Report on the Voting</u>
CECC(Secretariat)1886	February 1986	CECC(Secretariat)2019

Identification of the DS and the component

The first page of the DS should have the layout recommended on page 3.

The numbers in square brackets correspond to the indications to be completed thereunder:

- [1] The name of the National Standards Organization under whose authority the DS is published and, if applicable, the organization from whom the DS is available
- [2] The CECC symbol and the number allotted to the DS by the CECC General Secretariat.
- [3] The number and issue number of the CECC generic and sectional specification as relevant; also national reference if different.
- [4] If different from the CECC number, the national number of the DS, date of issue and any further information required by the national system, together with any amendment numbers.
- [5] A brief description of the component or range of components.
- [6] Information on typical construction (where applicable).

For [5] and [6] the text to be given in the DS should be suitable for an entry in CECC 00 200 (QPL) and CECC 00 300 (Library List).

- [7] An outline drawing with main dimensions which are of importance for interchangeability, and/or reference to the appropriate national or international document for outlines. Alternatively, this drawing may be given in an annex to the DS, but [7] should always contain an illustration of the general outer appearance of the component.
- [8] The level(s) of quality assessment covered by the DS.
- [9] Reference data giving information on the most important properties of the component which allow comparison between the various component types intended for the same, or for similar, applications.

Specification available from: (National Standards Organization) /1/	CECC number and mark  /2/
ELECTRONIC COMPONENTS OF ASSESSED QUALITY - DETAIL SPECIFICATION IN ACCORDANCE WITH: (Number of national generic and sectional specification) /3/	(National number of detail specification, date of issue, National type number, if any) /4/
Outline and dimensions: (first angle projection) /7/	DETAIL SPECIFICATION FOR FIXED MULTILAYER CERAMIC CHIP CAPACITORS /5/
	TYPICAL CONSTRUCTION: /6/ (Examples) Strip terminations (if applicable)
	Assessment level E /8/

QUICK REFERENCE DATA: Rated capacitance range, capacitance tolerance, /9/
d.c. rated voltage range, climatic category, performance grade

Information about manufacturers who have components qualified to this detail
specification is available in the current CECC 00 200: Qualified Products
List.

1. General data1.1 Recommended method of mounting

See 1.3.2 of CECC 32 100, Issue 1.

1.2 DimensionsTable 1

Case size reference	Dimensions (in mm)						
	L ₁	W	H	L ₂	L ₃	L ₄	

Note 1: When there is no case size reference, Table 1 may be omitted and the dimensions shall be given in Table 2, which then becomes Table 1.

Note 2: The dimensions shall be given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Capacitance range	(See Table 2)
Tolerance on rated capacitance	
Rated voltage	(See Table 2)
Climatic category	
Rated temperature	
Tangent of loss angle	
Insulation resistance	
Temperature coefficient (Class 1)	$\alpha : \dots 10^{-6}/^{\circ}\text{C}$
Temperature characteristics of capacitance (Class 2)	$\dots \%$

Table 2

Values of capacitance and of voltage related to case sizes

Rated voltage				
Rated capacitance (in pF and/or nF)	Case size	Case size	Case size	Case size

1.4 Related document

Generic specification : CECC 30 000 (Issue 3)
 Sectional specification : CECC 32 100 (Issue 1)

1.5 Marking

The marking of the capacitor and the packing shall be in accordance with the requirements of 1.5 of CECC 32 100, Issue 1.

Note: The details of the marking of the component and packing shall be given in full in the detail specification.

1.6 Ordering information

Orders for capacitors covered by this specification shall contain, in clear or in coded form, the following minimum information:

- (1) Rated capacitance
- (2) Tolerance on rated capacitance
- (3) Rated d.c. voltage
- (4) Temperature characteristic of capacitance / temperature coefficient
- (5) Number and issue reference of detail specification and style reference
- (6) Delivery state (bulk or tape; if taped, according to IEC 286-3)

1.7 Certified test records

Required/not required.

1.8 Additional information (not for inspection purposes)

1.9 Additional or increased severities or requirements to those specified in the generic and/or sectional specification

Note: Additional or increased requirements should be specified only when essential.

Table 3

Other characteristics

This table is to be used for defining characteristics which are additional to or tighter than those given in the sectional specification.

2. Inspection requirements

2.1 Procedures

2.1.1 For Qualification Approval the procedures shall be in accordance with 3.4 of CECC 32 100, Issue 1.

2.1.2 For Quality Conformance Inspection the test schedule (Table 4) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of CECC 32 100, Issue 1.

Notes to Tables 4A and 4B

Note 1: Clause numbers of tests and performance requirements refer to CECC 32 100, Issue 1

Note 2: Inspection Levels (IL) and Acceptable Quality Levels (AQL) are selected from IEC 410.

Note 3: In Tables 4A and 4B: P = periodicity (in months)
n = sample size
c = acceptance criterion
D = destructive
ND = non-destructive

Note 4: This group may be omitted if a corresponding test is carried out on each manufacturing batch of dielectric material.

Note 5: Applicable to capacitors with strip terminations.

Note 6: Not applicable to chip capacitors, which according to their detail specification shall be mounted only on alumina substrates.

Note 7: The capacitors found defective after mounting shall not be taken into account when calculating the defectives for the following tests. They shall be replaced by spare capacitors.

Note 8: Not applicable to capacitors with strip terminations.

Table 4 A

Lot-by-lot inspection (Group A and B)

Clause number and test (See Note 1)	D or ND	Conditions of test (See Note 1)	IL (See Note 2)	AQL %	Performance requirements (See Note 1)
<u>Group A1</u> 4.5 Visual examination	ND		S4	2,5	As in 4.5.2 Marking legible and as specified in 1.5 of this specification
4.5 Dimensions (detail)					See Table 1 of this detail specification
<u>Group A2</u> 4.6.1 Capacitance	ND	Frequency: ... Hz Measuring voltage: ... V	II	1,0	Within specified tolerance
4.6.2 Tangent of loss angle		Frequency and measuring voltage as in 4.6.1			As in 4.6.2
4.6.4 Voltage proof (Test point 1a)		Method: ...			No breakdown or flashover
4.6.3 Insulation resistance (Test point 1a)		Method: ...			As in 4.6.3 (3)
<u>Group B1</u> 4.11 Solderability	D		S3	2,5	
4.11.2 Final measurements		Visual examination			As in 4.11.2
<u>Group B2 (See Note 4)</u> 4.7.1 Temperature coefficient and cyclic drift (Class 1 only)	ND	Preliminary drying: 16 h to 24 h Capacitance	S2	2,5	$\left \frac{\Delta C}{C} \right $ as in 2.2.5(2)
		Temperature cyclic drift			As in 4.7.1 (3)
4.7.2 Temperature characteristic of capacitance (Class 2 only)		Special preconditioning as in 4.1 Capacitance			$\left \frac{\Delta C}{C} \right $ as in 2.2.6

Table 4B
Periodic tests

Clause number and test (See Note 1)	D or ND	Conditions of test (See Note 1)	P	n	c	Performance requirements (See Note 1)
<u>GROUP C1</u>	D		3	12	1	
4.16 Robustness of terminations (See Note 5)		Test Ua, Force: 2,5 N Test Ub, Method 1, Force: 2,5 N, number of bends: 1 Visual examination				No visible damage
4.10 Resistance to soldering heat		Special preconditioning as in 4.1 (Class 2 only) Method 1A Duration: ... s Recovery: (24 ± 2) h				
4.10.2 Initial measurement		Capacitance				
4.10.4 Final measurements		Visual examination Capacitance				As in 4.10.4 As in 4.10.4
<u>Group C2</u>	D		3	12	1	
4.9 Bond strength of the end face plating (See Note 6)		Capacitance (with board in bent position) Visual examination				$\left \frac{\Delta C}{C} \right \leq 10 \%$ No visible damage
<u>Group C3</u>	D					
4.4 Mounting (See Note 7)		Visual examination Capacitance Tangent of loss angle Voltage proof Insulation resistance				As in 4.5.2 Within specified tolerance As in 4.6.2 No breakdown or flashover As in 4.6.3 (3)

Clause number and test (See Note 1)	D or ND	Conditions of test (See Note 1)	P (See Note 3)	n	c	Performance requirements (See Note 1)
Group C3.1	D		6	27	1	
4.8 Adhesion (See Note 8)		Visual examination				No visible damage
4.12 Rapid change of temperature		Special preconditioning as in 4.1 (Class 2 only) T_A = Lower category temperature T_B = Upper category temperature				
4.12.2 Initial measurement		Capacitance				
4.12.3		Five cycles Duration $t = 30$ min				
4.12.4		Recovery : (24 ± 2) h				
4.12.5 Final measurements		Visual examination Capacitance				No visible damage $\left \frac{\Delta C}{C} \right $ as in 4.12.5
4.13 Climatic sequence		Special preconditioning as in 4.1 (Class 2 only)				
4.13.2 Initial measurement		Capacitance				
4.13.3 Dry heat		Upper category temp. Duration: 16 h				
4.13.4 Damp heat, cyclic, first cycle						
4.13.5 Cold		Lower category temp. Duration: 2 h Visual examination				No visible damage
4.13.6 Damp heat, cyclic, remaining cycles						

Clause number and test (See Note 1)	D or ND	Conditions of test (See Note 1)	P	n	c	Performance requirements (See Note 1)
4.13.6(2) Test conditions		No voltage applied				
4.13.6(3) Recovery		Class 1: 1 h to 2 h Class 2: (24 + 2) h				
4.13.7 Final measurements		Visual examination				No visible damage Marking legible
		Capacitance				$\left \frac{\Delta C}{C} \right $ as in 4.13.7
		Tangent of loss angle				As in 4.13.7
		Insulation resistance				As in 4.13.7
<u>Group C3.2</u>	D		6	15	1	
4.14 Damp heat, steady state		Special preconditioning as in 4.1 (Class 2 only)				
4.14.2 Initial measurement		Capacitance				
4.14.4 Recovery		Class 1: 1 to 2 h Class 2: (24 + 2) h				
4.14.5 Final measurements		Visual examination				No visible damage Marking legible
		Capacitance				$\left \frac{\Delta C}{C} \right $ as in 4.14.5
		Tangent of loss angle				As in 4.14.5
		Insulation resistance				As in 4.14.5
<u>Group C3.3</u>	D		3	15	1	
4.15 Endurance		Special preconditioning as in 4.1 (Class 2 only)				
		Duration: 1 000 h Voltage: 1,5 U _R Upper category temp.				
4.15.2 Initial measurement		Capacitance				
4.15.4 Recovery		(24 + 2) h				