
British Standard

Harmonized system of quality assessment for electronic components

Sectional specification: Fixed chip capacitors with
metallized electrodes and polyethylene-terephthalate dielectric
for direct current

Système harmonisé d'assurance de la qualité des composants électroniques

Specification intermédiaire: Condensateurs fixes chipsés pour courant continu à diélectrique en film de
polytéraphthalate d'éthylène métallisé

Harmonisiertes Gütebestätigungssystem für Bauelemente der Elektronik

Rahmenspezifikation: Gleichspannungs-Chip-Kondensatoren mit metallisierten
Polyethylen-Terephthalat-Folien als Dielektrikum

National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Committee. It is identical with CENELEC Electronic Components Committee (CECC) 32200 : 1987 'Harmonized system of quality assessment for electronic components: Sectional specification: Fixed chip capacitors with metallized electrodes and polyethylene-terephthalate dielectric for direct current'.

This standard is a harmonized specification within the CECC system.

Terminology and conventions. The text of the CECC specification has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Cross-references. The British Standard which implements CECC 00100 is BS 9000 : 'General requirements for a system for electronic components of assessed quality': Part 2 : 1983 'Specification for national implementation of CECC basic rules and rules of procedure'.

International standard	Corresponding British Standard
ISO 3 : 1973	BS 2045 : 1965 Preferred numbers (Technically equivalent)
IEC 62 : 1974	BS 1852 : 1975 Specification for marking codes for resistors and capacitors (Identical)
IEC 63 : 1963	BS 2488 : 1966 Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors for telecommunications equipment (Technically equivalent)
IEC 68-1 : 1982	BS 2011 Basic environmental testing procedures. Part 1.1 : 1983 General (Identical)
IEC 68-2-20 : 1979	BS 2011 Basic environmental testing procedures Part 2. 1T : 1981 Test T. Soldering (Identical)
IEC 68-2-45 : 1980	BS 2011 Basic environmental testing procedures Part 2.1XA : 1981 Test XA and guidance. Immersion in cleaning solvents. (Identical)
IEC 384-14 : 1981	BS 6201 Fixed capacitors for use in electronic equipment. Part 3 : 1982 Specification for fixed capacitors for radio interference suppression. Selection of methods of test and general requirements (Identical)
IEC 410 : 1973	BS 6001 Sampling procedures for inspection by attributes Part 1 : 1972 Specification for sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (Technically equivalent)
CECC 30000 : 1983	BS CECC 30000 : 1984 Harmonized system of quality assessment for electronic components : Generic specification : Fixed capacitors (Identical)

A related standard to IEC 249-2 Specification No. 5 is BS 4584 'Metal-clad base materials for printed wiring boards'. Part 3 : 1972 'Epoxide woven glass fabric, copper clad laminated sheet, flame retardant grade: EP-GC-Cu-3'.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

English version

Harmonized System of Quality Assessment for
Electronic Components

SECTIONAL SPECIFICATION:

**FIXED CHIP CAPACITORS WITH
METALLIZED ELECTRODES AND
POLYETHYLENE-
TEREPHTHALATE
DIELECTRIC
FOR DIRECT CURRENT**

Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques

SPECIFICATION INTERMEDIAIRE:

**CONDENSATEURS FIXES
CHIPS POUR COURANT
CONTINU A DIELECTRIQUE EN
FILM DE POLYTEREPHTALATE
D'ETHYLENE METALLISE**

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

RAHMENSPEZIFIKATION:

**GLEICHSPANNUNGS-CHIP-
KONDENSATOREN MIT
METALLISIERTEN POLYETHYLEN-
TEREPHTHALAT-FOLIEN
ALS DIELEKTRIKUM**



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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 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 CHIP CAPACITORS WITH METALLIZED ELECTRODES AND POLYETHYLENE-TEREPHTHALATE DIELECTRIC FOR DIRECT CURRENT**. 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.

PREFACE

This specification was prepared by CECC WG 3: "Capacitors".

It is based, wherever possible, on the Publications of the International Electrotechnical Commission.

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

<u>Document</u>	<u>Date of Voting</u>	<u>Report on the Voting</u>
CECC(Secretariat)1858	November 1985	CECC(Secretariat)1955

SECTION 1 - GENERAL

1.1 Scope

This specification applies to fixed chip capacitors for direct current, with metallized electrodes and polyethylene-terephthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards.

It prescribes preferred ratings and characteristics and selects from CECC 30 000 the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor.

Capacitors for radio interference suppression are not included, but are covered by IEC Publication 384-14.

1.2 Related documents

ISO 3	(1973)	Preferred numbers - Series of preferred numbers
IEC 62	(1974)	Marking codes for resistors and capacitors
IEC 63	(1963)	Preferred number series for resistors and capacitors
Amendment No. 1	(1967)	
Amendment No. 2	(1977)	
IEC 68		Basic environmental testing procedures
CECC 30 000 Issue 3	(1983)	Generic specification: Fixed capacitors
IEC 410	(1973)	Sampling plans and procedures for inspection by attributes

Note: The above references apply to the current editions except for IEC 68.

1.3 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specification.

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in 1.9 of the detail specification and indicated in the test schedules, for example by an asterisk.

Note: The information given in 1.3.1 may for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values specified shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.3.1 Outline drawing and dimensions

There shall be an illustration of the capacitor as an aid to easy recognition and for comparison of the capacitor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions are preferably to be stated in mm.

Normally the numerical values shall be given for the length, width and height of the body. When necessary, for example when a detail specification covers several items (sizes and capacitance/voltage ranges), the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the capacitor.

1.3.2 Mounting

The detail specification shall give guidance on the method of mounting for normal use. Mounting for test and measurement purposes (when required) shall be in accordance with 4.1.

1.3.3 Ratings and characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of this specification, together with the following:

(1) Rated capacitance range

See 2.2.1.

Note: When products approved to the detail specification may have different ranges, the following statement should be added: "The range of capacitance values available in each voltage range is given in the Qualified Products List".

(2) Particular characteristics

Additional characteristics may be listed, when they are considered necessary to specify adequately the component for design and application purposes.

1.3.4 Marking

The detail specification shall specify the content of the marking on the capacitor and on the package. Deviations from 1.5 shall be specifically stated.

1.4 Terminology

In addition to the applicable terms and definitions of CECC 30 000 the following definitions apply:

1.4.1 Chip capacitor

A capacitor whose small dimensions and nature or shape of terminations make it suitable for surface mounting on hybrid circuits or printed boards.

1.4.2 Performance grade 1 capacitors (long life)

Capacitors for long-life applications with stringent requirements for the electrical parameters.

1.4.3 Performance grade 2 capacitors (general purpose)

Capacitors for general application where the stringent requirements for grade 1 capacitors are not necessary.

1.4.4 Rated voltage (U_R)

The rated voltage is the maximum d.c. voltage which may be applied continuously to a capacitor at the rated temperature.

Note: The sum of the d.c. voltage and the peak a.c. voltage applied to the capacitor shall not exceed the rated voltage. The value of the peak a.c. voltage shall not exceed the following percentages of the rated voltage at the frequencies stated and shall not be greater than 280 V:

50 Hz	: 20 %
100 Hz	: 15 %
1 000 Hz	: 3 %
10 000 Hz	: 1 %

unless otherwise specified in the detail specification.

1.5 Marking

1.5.1 The information given in the marking is normally selected from the following list; the relative importance of each item is indicated by its position in the list:

- 1) Rated capacitance (in clear or code according to IEC 62)
- 2) Rated voltage (d.c. voltage may be indicated by the symbol
----- or -----)
- 3) Tolerance on rated capacitance
- 4) Category voltage
- 5) Year and month (or week) of manufacture
- 6) Manufacturer's name or trade mark
- 7) Climatic category
- 8) Manufacturer's type designation
- 9) Reference to the detail specification
- 10) CECC Mark

1.5.2 Chip capacitors are generally not marked on the body. If some marking can be applied, the capacitor shall be clearly marked with as many as possible of the above items as is considered useful. Any duplication of information in the marking on the capacitor should be avoided.

1.5.3 The package containing the capacitor(s) shall be clearly marked with all the information listed in 1.5.1.

1.5.4 Any additional marking shall be so applied that no confusion can arise.

SECTION 2 - PREFERRED RATINGS AND CHARACTERISTICS

2.1 Preferred climatic categories

The capacitors covered by this specification are classified into climatic categories according to the general rules given in IEC 68-1.

The lower and upper category temperature and the duration of the damp heat, steady state test shall be chosen from the following:

Lower category temperature: - 55 °C, - 40 °C, and 25 °C

Upper category temperature: + 85 °C, + 100 °C and + 125 °C

Duration of the damp heat, steady state test: 4, 10, 21 and 56 days

Note: Where continuous operation at 125 °C in excess of the endurance test time is required, accelerated ageing has to be considered (see detail specification).

The severities for the cold and dry heat tests are the lower and the upper category temperatures respectively.

2.2 Preferred values of ratings

2.2.1 Rated capacitance (C_R)

Preferred values of rated capacitance are:

1 - 1,5 - 2,2 - 3,3 - 4,7 and 6,8 and their decimal multiples.

These values conform to the E6 series of preferred values given in IEC 63: Preferred number series for resistors and capacitors.

If other values are required they shall preferably be chosen from the E12 series.

2.2.2 Tolerance on rated capacitance

The preferred tolerances on the rated capacitance are $\pm 10 \%$ and $\pm 20 \%$.

2.2.3 Rated voltage (U_R)

The preferred values of rated voltage are: 25 - 40 - 63 - 100 - 160 - 250 and 400 V. These values conform to the basic series of preferred values R5 given in ISO 3: Preferred numbers.

2.2.4 Category voltage (U_C)

The category voltage is:

0,8 U_R for upper category temperature 100 °C
0,5 U_R for upper category temperature 125 °C.

2.2.5 Rated temperature

The standard value of rated temperature is 85 °C.

SECTION 3 - QUALITY ASSESSMENT PROCEDURES

3.1 Primary stage of manufacture

The primary stage of manufacture is the winding of the capacitor element or the equivalent operation.

3.2 Structurally similar components

Capacitors considered as being structurally similar are capacitors produced with similar processes and materials, though they may be of different case sizes and capacitance and voltage values.

3.3 Certified test records

The information required in 3.5.1 of CECC 30 000 shall be made available when prescribed in the detail specification and when requested by a purchaser. After the endurance test the parameters for which variables information is required are the capacitance change, $\tan \delta$ and the insulation resistance.

3.4 Qualification approval

The procedures for qualification approval testing are given in 3.4 of CECC 30 000. The schedule to be used for qualification approval testing on the basis of lot-by-lot and periodic tests is given in 3.5 of this specification. The procedure using a fixed sample size schedule is given in 3.4.1 and 3.4.2 below. For the two procedures the sample sizes and the number of permissible defectives shall be of comparable order. The test conditions and requirements shall be the same.

3.4.1 Sampling

The fixed sample size procedure is described in 3.4.2 (2) of CECC 30 000. The sample shall be representative of the range of capacitors for which approval is sought. This may or may not be the complete range covered by the detail specification.

The sample shall consist of specimens having the lowest and highest voltages, and for these voltages the lowest and highest capacitances. When there are more than four rated voltages an intermediate voltage shall also be tested. Thus for the approval of a range, testing is required of either four or six values (capacitance/voltage combinations). When the range consists of less than four values, the number of specimens to be tested shall be that required for four values.