

**Harmonized system of quality
assessment for electronic components**

Sectional specification: Aluminium electrolytic capacitors with solid and non-solid electrolyte

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Electronic Components Standards Policy Committee (ECL/-) to Technical Committee ECL/4, upon which the following bodies were represented:

- British Telecommunications plc
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- Electronic Components Industry Federation
- Ministry of Defence
- National Supervising Inspectorate
- Society of British Aerospace Companies Limited

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National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Policy Committee and supersedes BS CECC 30300:1978 which is withdrawn. It is identical with CENELEC Electronic Components Committee (CECC) 30300:1988 “*Harmonized system of quality assessment for electronic components: Sectional specification: Aluminium electrolytic capacitors with solid and non-solid electrolyte*”.

This standard is a harmonized specification within the CECC system and should be read in conjunction with BS CECC 30000:1984 “*Harmonized system of quality assessment for electronic components: Generic specification: Fixed capacitors*”.

Cross-references

The British Standard which implements the CECC system 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 <i>Preferred numbers</i> (Technically equivalent)
IEC 62:1974	BS 1852:1975 <i>Specification for marking codes for resistors and capacitors</i> (Identical)
IEC 63:1963	BS 2488:1966 <i>Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors for telecommunication equipment</i> (Technically equivalent)
IEC 68	BS 2011 <i>Environmental testing</i>
IEC 68-1:1978	Part 1.1:1983 ^a <i>General and guidance</i> (Identical)
IEC 68-2.17:1978	Part 2.1Q:1981 ^a <i>Test Q. Sealing</i> (Identical)
IEC 68-2.47:1982	Section 4.1:1983 <i>Specification for mounting of components, equipment and other articles for dynamic tests</i> (Identical)
CECC 30300 Issue 3: 1983	BS CECC 30000:1984 <i>Harmonized system of quality assessment for electronic components: generic specification: fixed capacitors</i> (Identical)

^a This British Standard issue is identical with the issue of the IEC Publication referenced in the CECC specification.

The Technical Committee has reviewed the provisions of IEC 410:1973, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the CECC title page, pages ii to iv, pages 1 to 30, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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

CECC

Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques

SPECIFICATION INTERMEDIAIRE:
**CONDENSATEURS
ELECTROLYTIQUES
A L'ALUMINIUM A ELECTROLYTE
SOLIDE ET NON SOLIDE**

Harmonized System of Quality Assessment for
Electronic Components

SECTIONAL SPECIFICATION:
**ALUMINIUM ELECTROLYTIC
CAPACITORS WITH SOLID AND
NON-SOLID ELECTROLYTE**

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

RAHMENSPEZIFIKATION:
**ALUMINIUM-ELEKTROLYT-
KONDENSATOREN MIT FESTEM
UND FLÜSSIGEM ELEKTROLYTEN**



2

Edition
Issue
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CECC 30 300

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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 Aluminium electrolytic capacitors with solid and non-solid electrolyte. 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 sectional specification was prepared by CECC WG 3: “Capacitors”. and it is an editorially revised version of CECC 30300, Issue 1.

It is based, wherever possible, on the Publications of the International Electrotechnical Commission and in particular on IEC 384-4:Part 4: *Sectional specification: Aluminium electrolytic capacitors with solid and non-solid electrolyte*.

The text of this sectional specification was circulated to the CECC for voting in the documents listed below and was ratified by the President of the CECC for printing as a CECC Specification.

Documents	Voting Date	Reports on the Voting
CECC(Secretariat)1859	December 1985	CECC(Secretariat)1949 and 1949A
CECC(Secretariat)2109	June 1986	CECC(Secretariat)2175

This second issue of CECC 30300 shall become effective for all new Qualification approvals on 15 October 1988. Issue 1 will continue to remain effective to cover all past approvals.

Section 1. General

1.1 Scope

This specification applies to aluminium electrolytic capacitors with solid and non-solid electrolyte primarily intended for d.c. applications for use in electronic equipment. It covers capacitors for long-life applications and capacitors for general-purpose applications.

Capacitors for special purpose applications may need additional requirements.

It prescribes preferred ratings and characteristics and selects from the specification CECC 30000 the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor.

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 30000	(1983)	Generic specification:
Issue 3		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 quoted 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, the width and height of the body and the wire spacing, or for cylindrical types, the body diameter, and the length and diameter of the terminations. When necessary, for example when a number of items (capacitance values/voltage ranges) are covered by a detail specification, 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. When the capacitor is not designed for use on printed boards, this shall be clearly stated in the detail specification.

1.3.2 Mounting

The detail specification shall specify the method of mounting to be applied for normal use and for the application of the vibration and the bump or shock tests. The capacitors shall be mounted by their normal means. The design of the capacitor may be such that special mounting fixtures are required in its use. In this case the detail specification shall describe the mounting fixtures and they shall be used in the application of the vibration and bump or shock tests.

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 have different ranges, the following statement should be added: "The range of 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.

3) Soldering

The detail specification shall prescribe the test methods, severities and requirements applicable for the solderability and the resistance to soldering heat test.

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 of this sectional specification shall be specifically stated.

1.4 Terminology

In addition to the applicable terms and definitions of CECC 30000 the following definitions apply:

1.4.1

capacitance of an electrolytic capacitor

the capacitance of an equivalent circuit having capacitance and resistance in series measured with alternating current of approximately sinusoidal wave form of the specified frequency

1.4.2

long-life grade capacitors

capacitors intended for applications where a high degree of stability of characteristics over a long life is essential

1.4.3

general-purpose grade capacitors

capacitors intended for applications where the high performance level of long-life grade capacitors is not required

1.4.4

reverse voltage (for polar capacitors only)

see 2.2.22 of CECC 30000

1.5 Marking

See 2.4 of CECC 30000 with the following details:

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
- 2) Rated voltage (d.c. voltage may be indicated by the symbol  or )
- 3) Category voltage and category temperatures (for long-life grade capacitors only)
- 4) Polarity of the terminations

For multi-section capacitors, the rated capacitance and rated voltage of the sections connected to each termination shall be shown in an unambiguous way. The termination of a capacitor section which is intended for direct connection to the rectifier (so called reservoir section) shall be marked with the number 1 or with the colour red;

- 5) Tolerance on rated capacitance

- 6) Reference to the grade (for long-life grade capacitors only); the abbreviation “LL” may be used for marking purposes.
- 7) Year and month (or week) of manufacture
- 8) Manufacturer’s name or trade mark
- 9) Indication of the sub-family (for example 1, 2 or 3)
- 10) Climatic category
- 11) Manufacturer’s type designation
- 12) Reference to the detail specification
- 13) CECC Mark

1.5.2 The capacitor shall be clearly marked with 1) to 6) above and with as many as possible of the remaining items as is considered necessary. 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**, except item 4).

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: $-55\text{ }^{\circ}\text{C}$, $-40\text{ }^{\circ}\text{C}$, $-25\text{ }^{\circ}\text{C}$ and $-10\text{ }^{\circ}\text{C}$

Upper category temperature: $+70\text{ }^{\circ}\text{C}$, $+85\text{ }^{\circ}\text{C}$, $+100\text{ }^{\circ}\text{C}$ and $+125\text{ }^{\circ}\text{C}$

Duration of the damp heat,

steady state test: 4, 10, 21 and 56 days

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 chosen from the E3 series of IEC 63 and their decimal multiples. If other values are needed, they shall preferably be chosen from the E6 series.

2.2.2 Tolerance on rated capacitance

Preferred values of tolerances on rated capacitance are:

$-10/+10\%$	$-10/+75\%$
$-10/+30\%$	$-10/+100\%$
$-10/+50\%$	$-20/+20\%$

2.2.3 Rated voltage (U_R)

Preferred values of rated direct voltages taken from the R5 and R10 series of ISO Standard 3 are:

For voltage values $< 250\text{ V}$: 1 – 1,6 – 2,5 – 4 – 6,3 V
and their decimal multiples (R5 series)

For voltage values $\geq 250\text{ V}$: 250 – 315 – 350 – 400 – 450 V
(250 – 315 and 400 V are in accordance with the R10 series; 350 and 450 V are permitted in addition.)

2.2.4 Category voltage (U_C)

The category voltage is equal to the rated voltage, unless otherwise stated in the detail specification.

2.2.5 Ripple voltage

An alternating voltage may be applied provided that the peak voltage resulting from the alternating voltage superimposed on the direct voltage does not exceed the value of rated direct voltage and that the rated ripple current (see 2.2.8) and the permissible reverse voltage (see detail specification) are not exceeded.

2.2.6 Reverse voltage

The permissible reverse voltage shall be given in the detail specification.

2.2.7 Surge voltage

The surge voltage shall be 1,15 times the rated or category voltage for rated voltages $\leq 315\text{ V}$, or 1,10 times the rated or category voltage for rated voltages $> 315\text{ V}$.

See also 4.14.

2.2.8 Rated ripple current

The rated ripple current at 100 Hz or 120 Hz and at upper category temperature shall be given in the detail specification. Alternatively, for capacitors for switched mode power supply application, the rated ripple current shall be stated at the relevant frequency.

NOTE This value is determined by the dimensions of the capacitor and several other factors, for example the tangent of loss angle and the permissible temperature rise.

See also 2.2.5.