

Harmonized system of quality assessment for electronic components assessment for electronic components — Sectional specification: Tantalum surface mounting capacitors

The European Standard EN 130800:2000, with the incorporation of amendment A1:2003, has the status of a British Standard

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National foreword

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 40XA, Capacitors.

The text of this European Standard consists of the text ratified on 1993-09-15 and two amendments ratified respectively on 1996-12-09 (prAA) and 1997-03-11 (prAB), when it was decided to publish the combined text as EN 130800.

This European Standard supersedes CECC 30 800:1990.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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 - latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2001-05-01
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Foreword to amendment A1

This amendment to the European Standard EN 130800:2000 was prepared by the Technical Committee CENELEC TC 40XA, Capacitors.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 130800:2000 on 2003-03-01.

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Contents

	Page
1 General	4
1.1 Scope	4
1.2 Related documents	4
1.3 Information to be given in a detail specification	4
1.4 Terminology	5
1.5 Marking	6
2 Preferred ratings and characteristics	7
2.1 Preferred climatic categories	7
2.2 Preferred values of ratings	7
3 Quality assessment procedures	8
3.1 Primary stage of manufacture	8
3.2 Structurally similar components	8
3.3 Certified test records	8
3.4 Qualification approval	9
3.5 Quality conformance inspection	10
4 Test and measurement procedures	10
4.1 Preliminary drying	10
4.2 Measuring conditions	10
4.3 Mounting	11
4.4 Visual examination and check of dimensions	11
4.5 Electrical tests	11
4.6 Resistance to soldering heat	13
4.7 Solderability	13
4.8 Shear (adhesion) test	13
4.9 Substrate bending test	13
4.10 Rapid change of temperature	14
4.11 Climatic sequence	14
4.12 Damp heat, steady state	15
4.13 Characteristics at high and low temperature	15
4.14 Surge voltage	15
4.15 Endurance	16
4.16 Reverse voltage	16
4.17 Component solvent resistance	17
4.18 Solvent resistance of the marking	17
Annex A - Test plans for assessment level E	18
Table A.1 - Test plan for qualification approval	18
Table A.2 - Test plan for quality conformance inspection - lot-by-lot tests	19
Table A.3 - Test plan for quality conformance inspection - periodic tests	20
Annex B - Test plans for assessment level EZ	21
Table B.1 - Test plan for qualification approval - Assessment level EZ	21
Table B.2 - Test plan for quality conformance inspection - lot-by-lot tests	22
Table B.3 - Test plan for quality conformance inspection - periodic tests	23
Annex C - Test schedule for assessment levels E and EZ	24

1 General

1.1 Scope

This specification applies to tantalum solid electrolyte surface mounting capacitors. These capacitors are primarily intended to be mounted directly onto substrates for hybrid circuits or onto printed boards.

Two styles are considered: Style 1: protected capacitors
Style 2: unprotected capacitors.

The object of this specification is to prescribe preferred ratings and characteristics and selects from the generic specification EN 130000 the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor.

1.2 Related documents

EN 130000	Generic Specification: Fixed capacitors
IEC 60062	Marking codes for resistors and capacitors (harmonized as EN 60062)
IEC 60063:1963 + A1:1967 + A2:1977	Preferred number series for resistors and capacitors
IEC 60068	Basic environmental testing procedures (harmonized in the HD 323 and EN 60068 series)
IEC 60384-3	Fixed capacitors for use in electronic equipment -- Part 3: Sectional specification: Fixed tantalum chip capacitors
IEC 60410	Sampling plans and procedures for inspection by attributes
ISO 3	Preferred numbers - Series of preferred numbers

NOTE The above references apply to the current editions, except for IEC 60063 for which the referenced edition must be used.

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.

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

The detail specification shall give 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. All dimensions are to be stated in mm.

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

Normally the numerical values shall be given for the length, the width and height of the body. When necessary, for example when a number of case sizes 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.

1.3.2 Mounting

The detail specification shall give guidance on methods of mounting for normal use. Mounting for test and measurement purposes (if required) shall be in accordance with 4.3.

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:

1.3.3.1 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 capacitance values available in each voltage range is given in the Qualified Product List (QPL)".

1.3.3.2 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 of this sectional specification shall be specifically stated.

1.4 Terminology

In addition to the applicable terms and definitions of EN 130000 the following definitions apply:

1.4.1 Surface mounting capacitor

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

1.4.2 Rated voltage (U_R)

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

NOTE 1 The sum of the DC voltage and the peak AC voltage applied to the capacitor shall not exceed the rated voltage.

NOTE 2 For short periods, however, the rated voltage may be exceeded (see 2.2.5 and 4.14).

1.5 Marking

See 2.4 of EN 130000 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) Polarity of the terminations (unless identified by the construction);
- (2) Rated capacitance;
- (3) Rated voltage (DC voltage may be indicated by the symbol $\equiv$ or —);
- (4) Tolerance on rated capacitance;
- (5) Style (in accordance with 1.1);
- (6) Year and month (or week) of manufacture;
- (7) Manufacturer's name or trade mark;
- (8) Climatic category;
- (9) Manufacturer's type designation;
- (10) Reference to the detail specification.

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

1.5.3 Any marking shall be legible and not easily smeared or removed by rubbing with the finger.

1.5.4 The package containing the capacitor(s) shall be marked with all the information listed in 1.5.1, except polarity, unless this is applicable to the method of packaging.

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

1.5.6 Where space does not permit the marking of the capacitor in accordance with IEC 60062 the following code may be used.

Capacitance coding:

The rated capacitance value in picofarad is given by the following letter and digit code.

Letter	Value
A	1,0
C	1,2
E	1,5
G	1,8
J	2,2
L	2,7
N	3,3
Q	3,9
S	4,7
U	5,6
W	6,8
Y	8,2

Digit	Multiplier
9	10^{-1}
0	10^0
1	10^1
2	10^2
3	10^3
4	10^4
5	10^5
6	10^6
7	10^7
8	10^8

Voltage coding:

Rated voltage	2	4	6,3	10	16	20	25	35	50
Code letter	Z	G	J	A	C	D	E	V	T

EXAMPLE: W6G = 6,8 μ F 4V

2 Preferred ratings and characteristics

The values given in the detail specification shall preferably be selected from the following:

2.1 Preferred climatic categories

The capacitors covered by this specification are classified into climatic categories according to the general rules given in IEC 60068-1.

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

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

Duration of the damp heat, steady state test: Style 1: 21 and 56 days
Style 2: ---.

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

1,0 - 1,5 - 2,2 - 3,3 - 4,7 - 6,8 and their decimal multiples.

These values conform to the E6 series of preferred values given in IEC 60063: Preferred number series for resistors and capacitors.

2.2.2 Tolerances on rated capacitance

Preferred tolerances on rated capacitance are

$\pm 10 \%$ and $\pm 20 \%$.

2.2.3 Rated voltage (U_R)

The preferred values of rated voltage taken from the R5 series of ISO 3 are

1,0 - 1,6 - 2,5 - 4,0 - 6,3 V and their decimal multiples.

If other values are required they shall preferably be chosen from the R10 series.

2.2.4 Category voltage (U_C)

For capacitors having an upper category temperature of 125 °C category voltages are given in the following table:

U_R (V)	2,5	4	6,3	10	16	25	40	63	100
U_C (V)	1,6	2,5	4	6,3	10	16	25	40	63

2.2.5 Surge voltage

The surge voltage shall be 1,3 times the rated voltage or 1,3 times the category voltage rounded off to the nearest volt.

2.2.6 Rated temperature

The standard value of rated temperature is 85 °C.

A1

2.2.7 Capacitance for the selection of performance requirements

2.2.7.1 Capacitance drift

The requirements for the capacitance drift shall be given for rated values of capacitance:

$$C_R \leq 330\mu\text{F}$$

$$C_R > 330\mu\text{F}$$

2.2.7.2 Tangent of loss angle

The categories for the selection of tangent of loss angle limits are defined by the table below:

Case size	Standard category $C_R \times U_R/(\mu\text{F} \times \text{V})$	High CV category $C_R \times U_R/(\mu\text{F} \times \text{V})$
A	≤ 80	> 80
B	≤ 360	> 360
C	≤ 760	> 760
D	$\leq 1\,200$	$> 1\,200$
E	$\leq 2\,500$	$> 2\,500$

A1

3 Quality assessment procedures

3.1 Primary stage of manufacture

The primary stage of manufacture is the forming of the tantalum oxide dielectric.

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 3.9 of EN 130000 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, tangent of loss angle and the leakage current.