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**Področna specifikacija: nespremenljivi tantalovi kondenzatorji z netrdnim ali trdnim elektrolitom**

Sectional Specification: Fixed tantalum capacitors with non-solid or solid electrolyte

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Descriptors: Quality, electronic components, capacitors

English version

**Sectional Specification:**

**Fixed Tantalum Capacitors with Non-Solid or Solid Electrolyte**

**Spécification intermédiaire:**  
**Condensateurs fixes au tantale à**  
**électrolyte non solide ou solide**

**Rahmenspezifikation:**  
**Tantal-Festkondensatoren mit**  
**festem oder flüssigem Elektrolyten**

This European Standard was approved by the CENELEC Electronic Components Committee (CECC) on 27 January 1992. CENELEC members are bound to comply with CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom. The membership of the CECC is identical, with the exception of the national electrotechnical committees of Greece, Iceland and Luxembourg.

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**CECC**

CENELEC Electronic Components Committee  
Comité des Composants Electroniques du CENELEC  
CENELEC- Komitee für Bauelemente der Elektronik  
**General Secretariat: Gartenstr. 179, W- 6000 Frankfurt/Main 70**

## 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 acceptable in all member countries without further testing.

This European Standard was prepared by CECC WG 3, Capacitors.

The text of the draft based on document CECC 30 200 Issue 2 : 1985 was submitted to the formal vote for conversion to a European Standard; together with the voting report, circulated as document CECC(Secretariat)2995 it was approved by CECC as EN 130 200 on 27 January 1992. The text of EN 130 200 consists of:

CECC 30 200 Issue 2 (with A1 to A6, A8, Erratum),  
CECC(Sec)2523/01.90 [RV CECC(Sec)2995/12.91],  
CECC(Sec)2874/09.91 [RV CECC(Sec)3088/04.92].

The following dates were fixed:

- |   |       |            |
|---|-------|------------|
| - latest date of announcement of the EN at national level       | (doa) | 1991-09-11 |
| - latest date of publication of an identical national standard  | (dop) | 1992-03-11 |
| - latest date of declaration of national standards obsolescence |       | 1992-03-11 |
| - latest date of withdrawal of conflicting national standards   | (dow) | 2001-09-11 |

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## 1 - GENERAL

### 1.1 Scope

This specification applies to polar and bipolar tantalum electrolytic capacitors with solid or non-solid electrolyte. It comprises capacitors for long-life applications and capacitors for general-purpose applications. Capacitors for special purpose application may need additional requirements. Surface mounting styled capacitors are not covered.

This specification covers three basic sub-families, namely:

Sub-family 1 : Fixed non-solid electrolyte tantalum capacitors with foil electrode

1A: Plain foil electrode

1B: Etched foil electrode

Sub-family 2 : Fixed non-solid electrolyte tantalum capacitors with porous anode

Sub-family 3 : Fixed solid electrolyte tantalum capacitors with porous anode.

The object of this specification is to prescribe preferred ratings and characteristics and to select from the generic specification EN 130 000 the appropriate quality assessment procedures, tests and measuring methods and to give 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 1 (1967)	
Amendment 2 (1977)	
IEC 68	Basic environmental testing procedures
IEC 384-15 (1982)	Sectional specification: Fixed tantalum capacitors with non-solid or solid electrolyte
IEC 410 (1973)	Sampling plans and procedures for inspection by attributes
CECC 00 014 (1986)	CECC Assessed Process Average Procedure (APA)
EN 130 000 (1993)	Generic specification: Fixed capacitors

### 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 Dimensions and outline drawing

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 shall be stated in mm.

**NOTE** - The information may be presented in tabular form.

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 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. 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 the application of the vibration and the bump or shock tests. 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.

**NOTE** - If recommendations for mounting for "normal" use are made, they shall be included in the detail specification under 1.8 "Additional information (not for inspection purposes)". If they are included, a warning can be given that the full vibration, bump and shock performance may not be available if mounting methods other than those specified in 1.1 of the detail specification are used.

### 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 SIST EN 130200:2006

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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 Register of Approvals, CECC 00 200".

### 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.

### 1.3.3.3 Soldering

The detail specification shall prescribe the test methods, severities and requirements applicable for the solderability test 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 EN 130 000 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 Performance grade

The performance grade shall be noted in the detail specification.

#### 1.4.2.1 Long-life grade capacitors

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

#### 1.4.2.2 General-purpose grade capacitors

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

### 1.4.3 Rated voltage ( $U_R$ )

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

NOTE 1 - The sum of the d.c. voltage and the peak alternating voltage applied to the capacitor shall not exceed the rated voltage.

NOTE 2 - For short periods, however, the rated voltage may be exceeded (see 2.2.6 and 4.13).

## 1.5 Marking

See 2.4 of EN 130 000 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) Polarity of the terminations: Polar capacitors shall be marked with a positive sign near the positive terminations. Bipolar capacitors shall be marked positive at both ends and, if space permits, in addition with the letters "BP"
- (4) Tolerance on rated capacitance
- (5) Reference to the grade (for long-life grade capacitors only). The abbreviation "LL" may be used for marking purposes.
- (6) Year and month (or week) of manufacture
- (7) Category voltage and category temperatures (for long-life grade capacitors only), if applicable
- (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.

1.5.2 The capacitor shall be clearly marked with (1), (2) and (3) 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.

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

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## 2 - PREFERRED RATINGS AND CHARACTERISTICS

The values given in detail specifications 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 68-1.

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

Lower category temperature : -55 °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

The severities for the cold and dry heat tests are the lower and 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 the rated capacitance

Preferred values of tolerances on rated capacitance are:

Solid electrolyte capacitors	Non-solid electrolyte capacitors
Tolerance	Tolerance
± 5 %	±10 %
±10 %	±20 %
±20 %	-10/+30 %
	-10/+50 %

#### 2.2.3 Rated voltage ( $U_R$ )

Preferred values of rated direct voltages taken from the R5 series of ISO 3 are 1,0 - 1,6 - 2,5 - 4,0 - 6,3 and their decimal multiples.

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

#### 2.2.4 Category voltage ( $U_C$ )

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

#### 2.2.5 Reverse voltage

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

#### **2.2.6 Surge voltage**

For capacitors of sub-families 1 and 2, the preferred value of the surge voltage shall be 1,15 times the rated or category voltage, rounded off to the nearest volt.

For capacitors of sub-family 3, the preferred value of the surge voltage shall be 1,3 times the rated or category voltage, rounded off to the nearest volt.

#### **2.2.7 Ripple (if applicable)**

Ripple current and/or ripple voltage shall be specified in the detail specification.

#### **2.2.8 Rated temperature**

The value of the rated temperature is 85 °C unless otherwise stated in the detail specification.

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### 3 - QUALITY ASSESSMENT PROCEDURES

#### 3.1 Primary stage of manufacture

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

#### 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 of released lots

The information required in 3.9 of EN 130 000 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, tangent of loss angle and the leakage current.

#### 3.4 Qualification approval

The procedures for qualification approval testing are given in 3.5 of the generic specification, EN 130 000.

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.

##### 3.4.1 Sampling

The fixed sample size procedure is described in 3.5.3.2 of EN 130 000. 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 smallest and largest case size. When there are more than four case sizes, an intermediate case size shall also be tested. In each of these case size/voltage combinations (values) the highest capacitance shall be chosen. Thus for the approval of a range, testing is required of either four or six values. When the range consists of less than four values, the number of specimens to be tested shall be that required for four values.

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Spare specimens are permitted as follows:

- (1) One per value which may be used to replace the permitted defective in Group "0".
- (2) One per value which may be used as replacements for specimens which are defective because of incidents not attributable to the manufacturer.

The numbers given in Group "0" assume that all groups are applicable. If this is not so, the numbers may be reduced accordingly.