SLOVENSKI STANDARD
SIST EN 134000:2002

01-september-2002

Generic specification: Variable capacitors (Qualification approval and capability approval)

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Fachgrundspezifikation: Einstellbare Kondensatoren (Bauartanerkennung und Befähigungsanerkennung)

Spécification générique: Condensateurs variables (Homologation et agrément de savoir-faire)

Ta slovenski standard je istoveten z: **EN 134000:1994**

ICS:

31.060.60 Spremenljivi kondenzatorji Variable capacitors

SIST EN 134000:2002 **en**

EUROPEAN STANDARD
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Descriptors: Quality, electronic components, capacitors

English version

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This European Standard was approved by the CENELEC Electronic Committee (CECC) on 29 July 1993. CENELEC members are bound to comply with the 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.

CECC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Ref. No. EN 134000:1994 E

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(Sec)3095 was submitted to the formal vote; together with the voting report, circulated as document CECC(Sec)3376, it was approved by CECC as EN 134000 on 29 July 1993. This voting report also covers document CECC WG3(Hayward)2E/02.93.

At its meeting in Nuremberg in May 1993 CECC WG 3 decided to use for publication document CECC WG3(Hayward)2E, a revision of CECC(Sec)3095, wherein Section 3 had been changed in view of the capability approval procedure according to EN 130000. It should be published without voting because the former document had been closed with positive votes only (see minutes of the mentioned meeting CECC WG3(Sec)255 item 8.2).

The text of EN 134000 is based on the following documents:

— CECC CECC(Sec)3095/03.92

[RV CECC(Sec)3376/06.93] and

— CECC WG3(Hayward)2E/02.93

[RV CECC(Sec)3376/06.93].

The following dates were fixed:

— latest date of announcement of the EN at national level	(doa) 1993-11-30
— latest date of publication of an identical national standard	(dop) 1994-05-31
— latest declaration of NS obsolescence	1994-05-31
— latest date of withdrawal of conflicting national standards	(dow) 2003-11-30

Contents

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1 Scope

This specification is applicable to variable capacitors of the following types for use in electronic equipment:

a) Variable tuning capacitors

b) Trimmer capacitors

c) Preset capacitors

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications within the CECC System for electronic components.

2 General

2.1 Order of precedence

Where any discrepancies occur for any reason, documents shall rank in the following order of precedence:

— the detail specification

— the sectional specification

— the generic specification

— the FEN internal regulations

— any other international documents (for example of the IEC) to which reference is made

The same order of precedence shall apply to equivalent national documents.

2.2 Related documents

EN 100114-I (1994)	*Approval of manufacturers and other organizations* (with amendment 1)
Issue 2 (1991)	Internal Regulations of the FEN e.V. (supersedes CECC 00100 Issue 2 1988)
CECC 00014 (1986)	*CECC Assessed Process Average Procedure (APA)*
CECC 00114-II (1992)	*Qualification approval of electronic components* (with amendment 1)
CECC 00114-III (1993)	*Capability approval of an electronic component manufacturing activity* (with amendment and erratum)
ECQAC 1220 (1992)	*ECQAC Policy on Uncertainty of Measurement*
ISO 3 (1973)	*Preferred numbers — Series of preferred numbers*
ISO 497 (1973)	*Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers*
ISO 1000 (1973)	*SI units and recommendations for the use of their multiples and of certain other units*
IEC 27-1 (1971)	*Letter symbols to be used in electrical technology:* Part 1 *General*
IEC 50	*International Electrotechnical Vocabulary*
IEC 62 (1992)	*Marking codes for resistors and capacitors*
IEC 63 (1963)	*Preferred number series for resistors and capacitors*
IEC 68	*Basic environment testing procedure*
IEC 68-1 (1988)	*General*
IEC 68-2-1 (1974)	*Test A: Cold*
68-2-1A (1976)	*First supplement*
IEC 68-2-2 (1974)	*Test B: Dry Heat*
68-2-2A (1976)	*First supplement*
IEC 68-2-3 (1969)	*Test Ca: Damp Heat, steady state*
IEC 68-2-6 (1970)	*Test Fc: Vibration (sinusoidal)*
Amendment 1 (1972)	
Amendment 2 (1985)	
IEC 68-2-13 (1983)	*Test M: Low air pressure*

IEC 68-2-14 (1974) Amendment 1 (1986)	*Test N: Change of temperature*
IEC 68-2-20 (1979) Amendment 1 (1986) Amendment 2 (1987)	*Test T: Soldering*
IEC 68-2-21 (1975) Amendment 1 (1985)	*Test U: Robustness of terminations and integral mounting devices*
IEC 68-2-27 (1972)	*Test Ea: Shock*
IEC 68-2-29 (1968)	*Test Eb: Bump*
IEC 68-2-30 (1980) Amendment 1 (1985)	*Test Db: Damp heat, cyclic*
IEC 68-2-45 (1980)	*Test XA and guidance. Immersion in Cleaning Solvents* Amendment No. 1 (1993)
IEC 410 (1973)	*Sampling plans and procedures for inspection by attributes*
IEC 418	*Variable Capacitors*
IEC 617	*Recommended graphical symbols*

NOTE The above references apply to the current editions, except for IEC 68 for which the referenced edition shall be used.

2.3 Units and symbols

Units, graphical symbols, letter symbols and terminology will whenever possible be taken from the following publications: ISO 1000, IEC 27, IEC 50, IEC 617.

When further items are required they shall be derived in accordance with the principles of the documents listed above.

2.4 Terminology

For the purpose of this standard the following definitions apply:

2.4.1
variable capacitor

a capacitor which is designed to enable its capacitance to be varied continuously over its complete range

2.4.2
differential capacitor

a capacitor comprising two isolated stators which function with one rotor, arranged so that as the capacitance between the rotor and one stator increases, the capacitance between the rotor and the other stator decreases; but the sum of the two capacitance values remains substantially constant for all settings

2.4.3
split stator capacitor

a capacitor comprising two isolated stators which function in series with a common rotor

2.4.4
section

a stator and its corresponding rotor/moving electrode

2.4.5
multi-section capacitor

a capacitor which has several sections, the capacitance value of which are varied simultaneously by a common actuating device

2.4.6
reference section

that section to which other sections can be matched

2.4.7
matching section

a section matched to a reference section

2.4.8
type (function)

capacitors of one type comprise those having similar design features exclusive of mounting accessories

NOTE The segregation of capacitors into types is determined by the function and is governed by the ability of the capacitor to withstand various severities of mechanical endurance.

1) **Type A — Tuner capacitor**

A variable capacitor whose activating device is intended to be operated frequently throughout its life.

2) **Type B — Trimmer capacitor**

A variable capacitor used for trimming or for other similar purposes, where the amount and duration of movement of the rotable electrode is considerable less than that of a tuner capacitor.

3) **Type C — Preset capacitor**

A variable capacitor used specifically as a preset capacitor where a comparatively small number of movements are required during its life.

2.4.9
style

products of the same type (function) having similar means of varying the capacitance

a) **Style 1 — Concentric**

An air dielectric capacitor of which the capacitance can be varied by the axial movement of a rotor in a stator.

b) **Style 2 — Vane**

A capacitor of which the capacitance can be varied by rotating the rotor vanes between the stator vanes.

c) **Style 3 — Tubular**

A capacitor of which the capacitance can be varied by the axial movement of an electrode within a tube.

d) **Style 4 — Compression**

A capacitor of which the capacitance can be varied by compressing a stack of electrode and dielectric layers.

e) **Style 5 — Disc**

A solid dielectric capacitor of which the capacitance can be varied by rotating a metal or metallized disc.

2.4.10
pattern

a pattern is a variation within a style and usually describes a variable capacitor of unique design

2.4.11
maximum capacitance

the capacitance measured in the position of highest capacitance

2.4.12
maximum rated capacitance

maximum capacitance specified for which the capacitor has been designed

2.4.13
minimum capacitance

the capacitance measured in the position of lowest capacitance

2.4.14
minimum rated capacitance

minimum capacitance specified for which the capacitor has been designed

2.4.15
capacitance swing

the difference between the maximum and minimum capacitance values

2.4.16
capacitance law

the relationship between capacitance and the position of the actuating device

2.4.17
total angle of rotation

the angle (or number of turns) through which the rotor moves between the end stops. If there are no end stops, then the total angle of rotation is the effective angle of rotation

2.4.18
effective angle of rotation

the angle or number of turns through which the rotor moves between the positions of maximum and minimum capacitance

2.4.19
nominal angle of rotation

the angle of the rotor used to determine the measuring points

2.4.20
backlash

the difference in capacitance (expressed as a ratio) obtained at a prescribed measuring angle when the actuating device is moved to approach this measuring angle from a clockwise and then from an anti-clockwise direction

2.4.21
capacitance drift after adjustment

the change in capacitance (expressed as a ratio to a stated capacitance) obtained in a stated time following the actuating device being rotated at a specified speed

2.4.22
apparent power

the maximum VA rating at which the capacitor can be used in relation to temperature rise

2.4.23
category temperature range

the range of ambient temperature for which the capacitor has been designed to operated continuously: this is defined by the temperature limits of the climatic category

2.4.24
lower category temperature

the minimum ambient temperature for which a capacitor has been designed to operate continuously

2.4.25
upper category temperature

the maximum ambient temperature for which a capacitor has been designed to operate continuously

2.4.26
rated temperature

the maximum temperature at which the capacitor can be used at its rated voltage

2.4.27
temperature coefficient of capacitance

the rate of change of capacitance with temperature measured over a specified range of temperature. It is normally expressed in parts per million per degree Celsius (10^{-6}/°C)

2.4.28
rated voltage

the maximum voltage which may be applied continuously to the terminals of a capacitor between the lower category temperature and the rated temperature

2.4.29
capability qualifying component (CQC)

a test specimen used to assess in part or in whole a declared capability. It may be either a specially designed test specimen or a normal product capacitor, or a combination of both

2.4.30
process test vehicle

a specimen, not necessarily of a complete variable capacitor, but representative of at least one operation in the production sequence for the capacitor to be approved, and on which tests can be carried out to validate control of one or more processes

2.5 Marking

2.5.1 ***General***

The sectional specification shall indicate the identification criteria and other information to be shown on the capacitor and/or packaging. The order of priority for marking small capacitors shall be specified.

2.5.2 ***Coding***

When coding is used for capacitor value, tolerance or date of manufacture, the method shall be selected from those given in IEC 62.

3 Quality assessment procedures

3.1 General

Before capacitors are qualified according to the procedures of this section the manufacturer shall obtain approval of his organisation following the provisions of EN 100114-I.

Two methods are available for the approval of capacitors of assessed quality. These are qualification approval according to the provisions of CECC 00114-II and capability approval according to the provisions of CECC 00114-III. For a given sub-family of capacitors separate sectional specifications for qualification approval and capability approval are necessary, and capability approval is therefore available only when a relevant sectional specification has been published.

3.1.1 ***Applicability of qualification approval***

Qualification approval is appropriate for a standard range of capacitors manufactured to similar design and production processes and conforming to a published detail specification.

The programme of tests defined in the detail specification for the appropriate assessment and performance levels applies directly to the capacitor range to be qualified, as prescribed in **3.5** and the relevant sectional specification.

3.1.2 ***Applicability of capability approval***

Capability approval is appropriate when capacitors based on common design rules are fabricated by a group of common processes. It is particularly appropriate when capacitors are manufactured to a user's specific requirements.

Under capability approval detail specifications fall into the following three categories for:

3.1.2.1 *Capability Qualifying Components (CQCs), including process validation test vehicles*

A detail specification shall be prepared for each CQC as agreed with the ONS. It shall identify the purpose of CQC and include all relevant test severities and limits.

3.1.2.2 *Components for listing in the Register of Approvals (Standard catalogue items)*

When the manufacturer desires that a capacitor covered by the capability approval procedure should be listed in the CECC Register of Approvals, a capability approval detail specification complying with the blank detail specification shall be written. Such specifications shall be registered by the CECC and the component may be listed in CECC 00200: Register of Approvals. See § 4.3 of CECC 00114-III.

3.1.2.3 *Customer specified capacitors*

The content of the detail specification (often known as a Customer Detail Specification CDS) shall be by agreement between the manufacturer and customer in accordance with § 4.3 of CECC 00114-III.

Further information on these detail specifications is given in the relevant sectional specification.