

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

CECC

Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques

SPECIFICATION PARTICULIERE:

CONDENSATEURS FIXES
ELECTROLYTIQUES
A L'ALUMINIUM
A ELECTROLYTE NON SOLIDE

Harmonized System of Quality Assessment for
Electronic Components

DETAIL SPECIFICATION:

FIXED ALUMINIUM ELECTROLYTIC
CAPACITORS WITH
NON-SOLID ELECTROLYTE

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

BAUARTSPEZIFIKATION:

ALUMINIUM-ELEKTROLYT-
FESTKONDENSATOREN
MIT FLÜSSIGEM ELEKTROLYTEN



1

Edition
Issue
Ausgabe

CECC 30 301-808

1993

AVA Documents
Document Sharing Hub

Information about the System may be obtained from:



FEN e.V. Secretariat
and
CECC General Secretariat
Gartenstraße 179
D - 60596 Frankfurt
Telephone:
Int. + 49 69 639171
Telefax: Int. + 49 69 639427

or from the National Authorized Institutions
of the participating countries listed
who can supply copies of:

- 1 The Internal Regulations of the FEN e.V.
- 2 The Rules of Procedure of the System
- 3 CECC Specifications of the FEN and National Specifications for the System
- 4 CECC 00 200: Register of Firms, Products, and Services Approved under the CECC System
- 5 CECC 00 300: Register of National Documents Implementing CECC Publications and CECC European Standards
- 6 CECC 00 301: Register of CECC Specifications and Related Detail Specifications
- 7 Other CECC Publications and publicity documents

AUSTRIA

Österreichischer Verband für Elektrotechnik (ÖVE)
Eschenbachgasse 9
A-1010 VIENNA

BELGIUM

Comité Electrotechnique Belge
Galerie Ravenstein 28 (Boîte 2)
B-1000 BRUSSELS

DENMARK

Dansk Elektroteknisk Komite
Dansk Standard
Electrotechnical Sector
Baunegårdsvej 73
DK-2900 HELLERUP

FINLAND

Finnish Electrotechnical Standards Association (SESKO)
P.O. Box 134
SF-00211 HELSINKI 21

FRANCE

Union technique de l'Electricité
Participation française au CECC
F-92052 PARIS La Défense Cedex 64

GERMANY

Deutsche Elektrotechnische Kommission im DIN und VDE (DKE)
Stresemannallee 15
D-60596 FRANKFURT

IRELAND

EOLAS - The Irish Science and Technology Agency
Glasnevin
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Viale Monza, 259
I-20126 MILAN

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N-0212 OSLO 2

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Rua José Estevão, 83A
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SPAIN

New Spanish Member
to be determined.

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Svenska Elektriska Kommissionen (SEK)
Box 1284
S-16428 KISTA-STOCKHOLM

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CH-8034 ZÜRICH

UNITED KINGDOM

UK Electronic Components Policy Council
Electrical Department
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2, Park Street
GB-LONDON W1A 2BS



Documents

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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 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, and copies of it can be obtained from the addresses shown on the blue fly sheet.

PREFACE

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

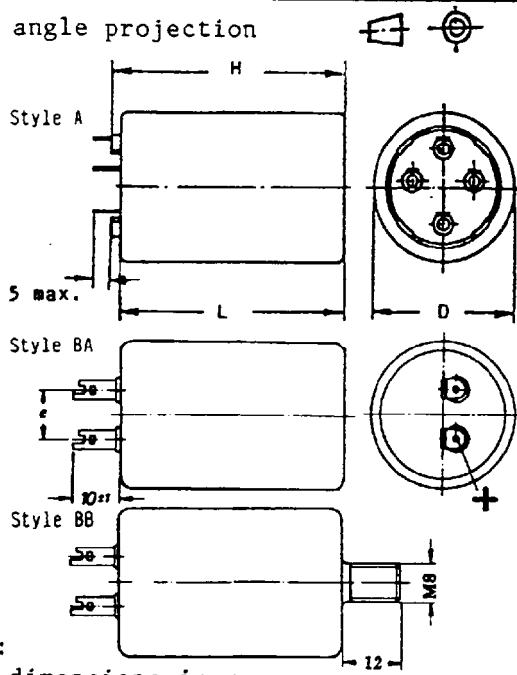
It is based, wherever possible, on the Publications of the International Electrotechnical Commission (IEC).

Secretariat Note

This detail specification was drafted by members of CEMEC WG PC 1A and discussed as documents CEMEC WG PC 1A(Fidder)21B and CECC WG3(da Costa)2A by WG3 at their meeting in Milan (1992) with the decision to publish it without voting as stated in the minutes of the meeting:

CECC WG3(Secretariat)247, item 15.1.2

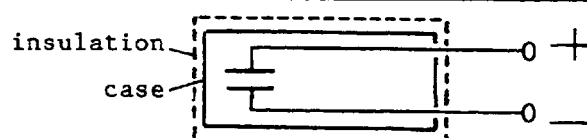
To allow for early publication, this detail specification is issued initially in English only. Corresponding versions in French and German will follow on request of ONHs.

Specification available from: CECC General Secretariat	CECC 30 301-808 Issue 1 1993
ELECTRONIC COMPONENTS OF ASSESSED QUALITY - DETAIL SPECIFICATION IN ACCORDANCE WITH: EN 130 000 : 1993 CECC 30 300 Issue 2, Amdts. 1 to 4	
First angle projection 	WG-DETAIL SPECIFICATION FOR FIXED ALUMINIUM ELECTROLYTIC CAPACITORS WITH NON-SOLID ELECTROLYTE Polar Cylindrical Metallic case Insulating sleeve Rigid terminations Style A: Solder pins for use in printed circuits Style BA: Solder tags; clamp mounting Style BB: Solder tags; stud mounting
Notes: - all dimensions in mm - pressure relief device mandatory - for D, L, H see Table 1 - The polarity must be clearly indicated.	Assessment level E

QUICK REFERENCE DATA:	Rated capacitance range (C_R): 68 μF to 150 000 μF Capacitance tolerance: -20/+20 % Rated voltage range (U_R): 10 V to 400 V d.c. Climatic category: 40/105/56 Performance grade: long-life grade 2000 h
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Circuit diagram

Note:
contact of minus pole
to metallic case not defined



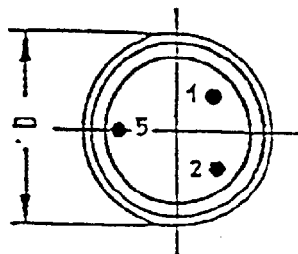
Information about manufacturers who have components qualified to this
detail specification is available in the current CECC 00 200:
Register of Firms, Products, and Services Approved under the CECC System

It is intended that this specification should replace national specifications.
Relevant numbers will be submitted by the National Committees and published
under Issue 2 of this specification.

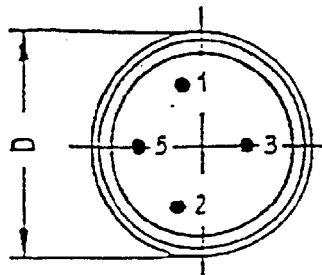
For Style A only:

PIN CONFIGURATIONS FOR NOMINAL CASE DIAMETERS

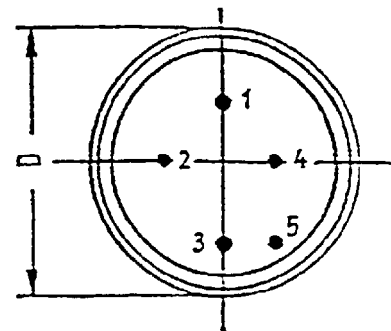
Ø 25 mm



Ø 30 and 35 mm



Ø 40 mm

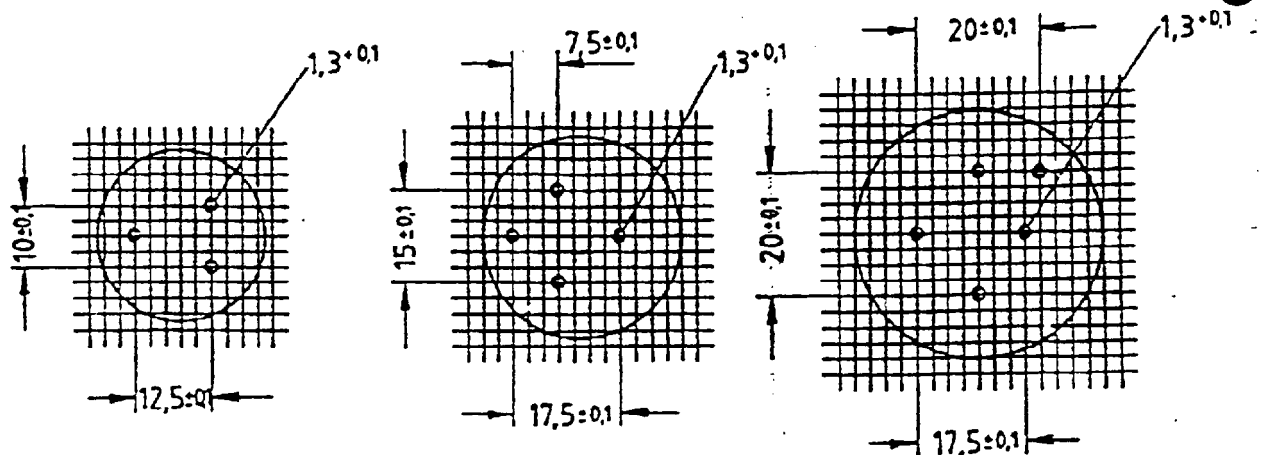


Mounting holes corresponding to pin configurations below

Pin 1 Positive, Pin 5 Negative, in all cases.

The remaining pins are for mounting purposes only and are not necessarily insulated from the negative terminal due to the presence of electrolyte.

Dimensions in millimetres.



Piercing diagrams viewed from mounted side

1. GENERAL DATA1.1 METHOD OF MOUNTING FOR VIBRATION AND SHOCK TESTS

The capacitor is to be mounted by its body which shall be rigidly clamped to the work surface. See 1.3.2 of CECC 30 300 Issue 2.

1.2 DIMENSIONS

Table 1

Case size reference	Dimensions in mm				
	D		L	H	s
	nominal	max. ¹⁾	max. ¹⁾	max. ¹⁾	
1	25	26,5	38	42	10
2	25	26,5	48	52	10
3	30	31,5	48	52	10
4	35	36,5	48	52	10
5	35	36,5	58	62	10
6	40	41,5	48	52	10 or 20
7	40	41,5	58	62	10 or 20
8	40	41,5	78	82	10 or 20
9	40	41,5	108	112	10 or 20

¹⁾ including insulation sleeve

1.3 RATINGS AND CHARACTERISTICS

Rated capacitance range (C_R)	68 μ F to 150 000 μ F
Tolerance on rated capacitance	-20/+20 %
Rated voltage range (U_R)	10 V to 400 V d.c.
Category voltage (U_C)	rated voltage
Climatic category	40/105/56 ^{*)}
Rated temperature	105 °C ^{*)}
Rated ripple current	see Table 2B
Equivalent series resistance	see Table 2B and sub-clause 1.8
Leakage current	see Table 2B
Impedance	see Table 2B

^{*)} see sub-clause 1.9

Table 2B

Equivalent series resistance ESR, impedance,
rated ripple current, and leakage current

Rated voltage (V d.c.)	Rated capacitance (at 20 °C and 100 Hz) (µF)	ESR ^{*)} _{max.} (at 20 °C and 100 Hz) (Ohms)	Impedance _{max.} (at 20 °C and 10 kHz) (Ohms)	Rated ripple current ⁺⁾ (at 105 °C and 100 Hz) (A)	Leakage current _{max.} (at 20 °C and 5 min) (mA)
10	10 000	0,048	0,037	3,2	0,60
	15 000	0,034	0,027	4,2	0,90
	22 000	0,029	0,023	5,1	1,3
	33 000	0,027	0,022	5,6	2,0
	47 000	0,026	0,021	6,2	2,8
	68 000	0,021	0,018	7,6	4,1
	100 000	0,016	0,015	10	6,0
	150 000	0,013	0,012	13	9,0
16	6 800	0,050	0,037	3,1	0,66
	10 000	0,037	0,027	4,1	0,96
	15 000	0,030	0,023	5,0	1,4
	22 000	0,029	0,022	5,5	2,1
	33 000	0,028	0,021	6,1	3,2
	47 000	0,022	0,018	7,5	4,5
	68 000	0,017	0,015	9,7	6,5
	100 000	0,013	0,012	12	9,6
25	4 700	0,066	0,037	2,9	0,71
	6 800	0,039	0,027	3,9	1,0
	10 000	0,032	0,023	4,8	1,5
	15 000	0,030	0,022	5,4	2,3
	22 000	0,029	0,021	6,0	3,3
	33 000	0,023	0,018	7,3	5,0
	47 000	0,018	0,015	9,4	7,1
	68 000	0,014	0,012	12	10

+) For information only, not for inspection purposes.

To obtain the ripple current values at 50 Hz, the 100 Hz ripple current values are to be multiplied by 0,8.

*) see sub-clause 1.9

Table 2B, continued

Equivalent series resistance ESR, impedance,
rated ripple current, and leakage current

Rated voltage (V d.c.)	Rated capacitance (at 20 °C and 100 Hz) (μF)	ESR _{max.} ^{*)} (at 20 °C and 100 Hz) (Ohms)	Impedance _{max.} (at 20 °C and 10 kHz) (Ohms)	Rated ripple current ⁺⁾ (at 105 °C and 100 Hz) (A)	Leakage current _{max.} (at 20 °C and 5 min) (mA)
35 ⁺⁺⁾	3 300	0,071	0,042	2,6	0,70
	4 700	0,051	0,031	3,4	0,99
	6 800	0,042	0,028	4,2	1,4
	10 000	0,041	0,027	4,7	2,1
	15 000	0,040	0,026	5,1	3,2
	22 000	0,032	0,022	6,2	4,6
	33 000	0,023	0,017	8,3	6,9
	47 000	0,018	0,014	11	9,9
40	2 200	0,087	0,054	2,4	0,53
	3 300	0,060	0,038	3,2	0,80
	4 700	0,043	0,033	3,9	1,1
	6 800	0,042	0,031	4,6	1,6
	10 000	0,041	0,029	5,0	2,4
	15 000	0,033	0,024	6,1	3,6
	22 000	0,023	0,018	8,3	5,3
	33 000	0,018	0,015	11	7,9
50 ⁺⁺⁾	1 500	0,11	0,060	2,1	0,45
	2 200	0,074	0,042	2,9	0,66
	3 300	0,056	0,034	3,6	0,99
	4 700	0,047	0,031	4,3	1,4
	6 800	0,043	0,029	4,9	2,0
	10 000	0,034	0,024	6,0	3,0
	15 000	0,024	0,018	8,2	4,5
	22 000	0,018	0,015	11	6,6

+) For information only, not for inspection purposes.

To obtain the ripple current values at 50 Hz, the 100 Hz ripple current values are to be multiplied by 0,8.

++) non-preferred voltage

*) see sub-clause 1.9

Table 2B, continued

Equivalent series resistance ESR, impedance,
rated ripple current, and leakage current

Rated voltage (V d.c.)	Rated capacitance (at 20 °C and 100 Hz) (µF)	ESR ^{*)} _{max.} (at 20 °C and 100 Hz) (Ohms)	Impedance _{max.} (at 20 °C and 10 kHz) (Ohms)	Rated ripple current ⁺⁾ (at 105 °C and 100 Hz) (A)	Leakage current _{max.} (at 20 °C and 5 min) (mA)
63	1 000	0,20	0,16	1,6	0,38
	1 500	0,14	0,11	2,1	0,57
	2 200	0,10	0,079	2,7	0,84
	3 300	0,075	0,061	3,4	1,3
	4 700	0,062	0,053	4,1	1,8
	6 800	0,047	0,040	5,1	2,6
	10 000	0,034	0,029	6,9	3,8
	15 000	0,025	0,021	9,3	5,7
100	470	0,24	0,16	1,4	0,29
	680	0,17	0,11	1,9	0,41
	1 000	0,12	0,079	2,5	0,60
	1 500	0,088	0,061	3,2	0,90
	2 200	0,072	0,053	3,8	1,3
	3 300	0,053	0,040	4,8	2,0
	4 700	0,038	0,029	6,5	2,8
	6 800	0,028	0,021	8,8	4,1
160	220	0,71	0,54	0,83	0,22
	330	0,48	0,36	1,1	0,32
	470	0,35	0,27	1,5	0,46
	680	0,25	0,20	1,9	0,66
	1 000	0,19	0,15	2,4	0,96
	1 500	0,13	0,11	3,1	1,4
	2 200	0,092	0,075	4,2	2,1
	3 300	0,063	0,053	5,9	3,2

+) For information only, not for inspection purposes.

To obtain the ripple current values at 50 Hz, the 100 Hz ripple current values are to be multiplied by 0,8.

*) see sub-clause 1.9

Table 2B, continued

Equivalent series resistance ESR, impedance,
rated ripple current, and leakage current

Rated voltage (V d.c.)	Rated capacitance (at 20 °C and 100 Hz) (μF)	ESR _{max.} ^{*)} (at 20 °C and 100 Hz) (Ohms)	Impedance _{max.} (at 20 °C and 10 kHz) (Ohms)	Rated ripple current +) (at 105 °C and 100 Hz) (A)	Leakage current _{max.} (at 20 °C and 5 min) (mA)
200 ⁺⁺⁾	150	0,95	0,71	0,72	0,18
	220	0,65	0,49	0,96	0,27
	330	0,44	0,33	1,3	0,40
	470	0,32	0,24	1,7	0,57
	680	0,24	0,19	2,1	0,82
	1 000	0,17	0,13	2,7	1,2
	1 500	0,11	0,090	3,8	1,8
	2 200	0,079	0,062	5,2	2,6
250	100	1,1	0,71	0,67	0,15
	150	0,71	0,49	0,92	0,23
	220	0,49	0,33	1,3	0,33
	330	0,33	0,24	1,7	0,50
	470	0,26	0,19	2,0	0,71
	680	0,18	0,13	2,6	1,0
	1 000	0,13	0,090	3,6	1,5
	1 500	0,085	0,062	5,1	2,3
385 ⁺⁺⁾	68	1,7	1,3	0,61	0,16
	100	1,1	0,86	0,82	0,24
	150	0,76	0,58	1,1	0,35
	220	0,53	0,41	1,4	0,51
	330	0,36	0,28	1,8	0,77
	470	0,26	0,21	2,4	1,1
	680	0,18	0,14	3,2	1,6
	1 000	0,13	0,10	4,5	2,3

+) For information only, not for inspection purposes.

To obtain the ripple current values at 50 Hz, the 100 Hz ripple current values are to be multiplied by 0,8.

++) non-preferred voltage

*) see sub-clause 1.9

Table 2B, continued

Equivalent series resistance ESR, impedance,
rated ripple current, and leakage current

Rated voltage (V d.c.)	Rated capacitance (at 20 °C and 100 Hz) (µF)	ESR _{max.} ^{*)} (at 20 °C and 100 Hz) (Ohms)	Impedance _{max.} (at 20 °C and 10 kHz) (Ohms)	Rated ripple current ⁺ (at 105 °C and 100 Hz) (A)	Leakage current _{max.} (at 20 °C and 5 min) (mA)
400	68	3,2	2,7	0,39	0,17
	100	2,2	1,8	0,53	0,24
	150	1,5	1,2	0,72	0,36
	220	1,0	0,84	0,94	0,53
	330	0,68	0,57	1,2	0,80
	470	0,49	0,41	1,6	1,1
	680	0,34	0,28	2,2	1,6
	1 000	0,23	0,19	3,1	2,4

+) For information only, not for inspection purposes.

To obtain the ripple current values at 50 Hz, the 100 Hz ripple current values are to be multiplied by 0,8.

*) see sub-clause 1.9

1.4 RELATED DOCUMENTS

Generic specification
Sectional specification

EN 130 000 : 1993
CECC 30 300, Issue 2, Amdts. 1 to 4

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
- (4) Tolerance on rated capacitance
- (5) Reference to the grade; the abbreviation "LL" may be used for marking purposes
- (6) Year and month (or week) of manufacture
- (7) Manufacturer's name or trade mark
- (8) Rated ripple current
- (9) Climatic category
- (10) Manufacturer's type designation
- (11) Reference to the detail specification
- (12) CECC Mark

1.5.2 The capacitor shall be clearly marked with (1) to (5) listed in 1.5.1 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 given by the items (1), (2), (6), (7), (10) and (12) listed in 1.5.1 and as many of the remaining items considered necessary by the manufacturer.

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

1.6 ORDERING INFORMATION

Detail specification number, number of issue

Rated capacitance

Tolerance on rated capacitance

Rated d. c. voltage

Style

Case size reference

1.7 CERTIFIED TEST RECORDS OF RELEASED LOTS

Not required.

1.8 ADDITIONAL INFORMATION (not for inspection purposes)

1.8.1 Equivalent series resistance ESR, see Table 2B

In this specification, ESR limits are given instead of tangent of loss angle values. In no case are ESR limits less severe than corresponding maximum values of the tangent of the loss angle given in CECC 30 300. To ensure that this basic requirement is fulfilled, the following formula has been used:

$$ESR_{\max.} = \frac{\tan \delta_{\max.}}{2 \times \pi \times f \times C_{\max.}}$$

1.8.2 Vibration and shock performance

Full vibration and shock performance may not be available if mounting methods other than those specified in 1.1 of this specification are used.

1.8.3 Useful life

If useful life is to be indicated, the following definition of useful life applies:

A) Load Conditions

Load conditions for definition of useful life are:

- rated voltage
- rated ripple current (The peak voltage of the alternating voltage superimposed on the d. c. voltage must not exceed the value of the rated voltage.)
- rated temperature