

BRITISH STANDARDS INSTITUTION 2 PARK STREET, LONDON. W1A 2BS	BS CECC 30301-031 ISSUE 1. JULY 1982
Specification available from: FILMCAP LTD., RHOSYMEDRE, WREXHAM, / CLWYD. LL14 3YR or as shown in PD 9002 and CECC 00200 TELEPHONE : 0978/824444 TELEX : 61476	27 Pages
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS E9070 (CECC 30000) : 1975 BS CECC 30300 (CECC 30300) : 1978	MANUFACTURER'S TYPE NUMBER PROSEC 85 See PD 9002 or CECC 00200 For ordering information see Clause 6
Outline and dimensions First angle projection Dimensions - See table 1 Marking information see Clause 5	ALUMINIUM ELECTROLYTIC CAPACITORS WITH NON-SOLID ELECTROLYTE LONG-LIFE GRADE.
	TYPICAL CONSTRUCTION: CYLINDRICAL POLAR, INSULATED METALLIC CASE, CLAMP (STYLE A) OR STUD (STYLE B) MOUNTING SCREW TERMINATIONS 82 μ f to 180,000 μ f Tolerance -10% to +50% Rated voltage 6.3V to 400V Climatic category 55/085/56
	ASSESSMENT LEVEL FULL PLUS ADDITIONAL

'This standard calls for the use of substances and/or test procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves either the supplier or the user from statutory obligations relating to health and safety at any stage of manufacture or use.'

Refer to Qualified Products List PD 9002 and/or CECC 00200 for details of manufacturers approved to this specification.

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1. DIMENSIONS

TABLE 1. Dimensions

Case size	Dimensions (mm)								
	$\phi \pm 1$	h max.	L max.	$S \pm 0.5$	X	T	Y	M	$M \pm 2$
A	37	70	60	12.7	5.5	M5	9.2	M8	12
B	37	100	90	12.7	5.5	M5	9.2	M8	12
C	37	135	125	12.7	5.5	M5	9.2	M8	12
D	52	100	90	22.2	5.5	M5	9.2	M12	16
E	52	135	125	22.2	5.5	M5	9.2	M12	16
F	67	135	125	28.5	5.5	M5	9.2	M12	16
G	67	135	125	28.5	5.5	M5	9.2	M12	16
H	75	135	125	31.0	5.5	M5	9.2	M12	16

2. SPECIFIED METHOD OF MOUNTING FOR VIBRATION AND BUMP TESTING

Style A : by the body (clamped)
Style B : by the stud

3. RATINGS AND CHARACTERISTICS

3.1 Application grade	Long-life use
3.2 Rated capacitance range	See table 2
3.3 Capacitance tolerance	-10 % +50 %
3.4 Rated voltage range U_R	See table 2
3.5 Category voltage U_C	As rated voltage
3.6 Category temperature range	-55 °C to +85 °C
3.7 Rated temperature	85 °C
3.8 Insulation resistance	> 100 M Ω
3.9 Climatic category	55/085/56
3.10 Leakage current	(0.003 CU + 4) μ A (see note 3)
3.11 Bump test severity	390 m/s ² , 4000 bumps
3.12 Vibration test severity	10 Hz to 55 Hz, 0.75 mm or 98 m/s ²
3.13 Low air pressure	8.5 kPa (85 mbar)
3.14 Maximum ripple current at 100 Hz	See table 3
3.15 Tangent of loss angle	≤ 1.0 for $U_R \leq 10$ V ≤ 0.5 for 25 V $\geq U_R > 10$ V ≤ 0.3 for $U_R > 25$ V
3.16 Voltage proof	1000 volts for 1 minute
3.17 Maximum impedance at 10 kHz and 20 °C	0.06 Ω for $U_R \leq 63$ V 0.15 Ω for $U_R > 63$ V

TABLE 2. CAPACITANCE AND RATED VOLTAGE

Capacitance uF	Rated Voltage U_R (see note 2)													
	6.3	10	16	25	40	50	63	80	100	160	200	250	350	400
82														A
100													A	
150												A		
180														B
220											A		B	
270														C
330										A		B	C	
390														D
470											B	C	D	
560														E
680									A	B	C	D	E	
820								A						G
1,000										C	D	E	G	
1,200							A							H
1,500					A				B	D	E	G	H	
1,800						A		B						
2,200					A		B	C	C	E	G	H		
2,700							B							
3,300			A	A			C	C	D	G	H			
3,900						B		D						
4,700			A		B				E	H				
5,600						C		D	E					
6,800		A		B	C			E	F					
8,200						D								
10,000	A		B	C	D				G					
12,000						E		G						
15,000		B	C	D	E	F	G							
18,000					F									
22,000	B	C	D	E		G	H							
33,000	C	D	E	F	G									
39,000			F											
47,000	D	E		G	H									
56,000		F												
68,000	E		G	H										
82,000	F		H											
100,000		G												
150,000	G	H												
180,000	H													

(see note 1)

NOTE 1 : The letters indicate case size (see table 1).

NOTE 2 : The capacitors may be used for any lower voltage rating.

TABLE 3. RATED VALUES OF RIPPLE CURRENT

Capacitance Value (uF)	Rated Voltage (V)	Ripple current (A) (see note 4)
10,000	6.3	6.5
22,000		11.5
33,000		15.6
47,000		18.2
68,000		23.8
82,000		23.8
150,000		29.8
180,000		30.9
6,800	10	6.1
15,000		10.8
22,000		14.7
33,000		17.4
47,000		22.8
56,000		23.0
100,000		29.3
150,000		29.6
3,300	16	5.6
4,700		5.9
10,000		10.4
15,000		14.2
22,000		16.9
33,000		22.2
39,000		22.4
68,000		28.6
82,000		29.9
3,300	25	5.6
6,800		9.9
10,000		13.5
15,000		16.2
22,000		21.5
33,000		21.8
47,000		28.2
68,000		29.1
1,500	40	4.4
2,200		5.0
4,700		9.0
6,800		12.3
10,000		14.9
15,000		19.9
18,000		20.6
33,000		27.1
47,000		28.7
1,800	50	3.8
3,900		6.9
5,600		9.5
8,200		11.8
12,000		16.0
15,000		17.0
22,000		22.6
33,000		25.4
1,200	63	3.4
2,200		5.9
2,700		6.4
3,300		8.3
3,900		8.8
4,700		10.4
5,600		10.9
6,800		13.9
8,200		14.9
10,000		15.9
15,000		21.4
22,000		24.4

Capacitance Value (uF)	Rated Voltage (V)	Ripple current (A) (see note 4)
820	80	2.9
1,800		5.4
2,700		7.5
3,900		9.5
5,600		12.8
6,800		13.9
12,000		19.6
15,000		21.8
680	100	2.8
1,500		4.5
2,200		7.3
3,300		9.3
4,700		12.6
5,600		13.5
10,000		19.2
12,000		21.2
330	160	1.8
680		3.6
1,000		4.5
1,500		5.8
2,200		6.8
3,300		11.7
4,700		13.9
220	200	1.6
470		2.9
680		3.8
1,000		5.2
1,500		7.2
2,200		8.5
3,300		12.5
150	250	1.2
330		2.4
470		2.8
680		3.6
1,000		5.6
1,500		7.8
2,200		10.0
100	350	1.2
220		2.0
330		2.7
470		3.8
680		4.8
1,000		6.5
1,200		7.9
82	400	0.95
180		1.8
270		2.6
390		3.2
560		4.5
820		6.2
1,200		7.9

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NOTE 3. Leakage current maximum permissible values are derived from the empirical term $(0.003 CU + 4) \mu A$, where C is the rated capacitance of the capacitor, in μF , and U is the rated voltage of the capacitor, in volts. The dimensions of C and U are not required in this derivation.

NOTE 4. The ripple currents shown above are the maximum permissible values at a frequency of 100 Hz and temperature of 85 °C.

To obtain the ripple current rating at 50 Hz, the figure for 100 Hz is multiplied by $1/\sqrt{2}$.

It should be noted that the life of a capacitor is extended by operating at lower ripple currents and low ambient temperatures.

NOTE 5. A capacitor may be mounted in any position, but preferably with the vent uppermost. The capacitors are not intended for mounting by their terminations only.

NOTE 6. Terminal screws supplied shall be of sufficient length to enable the requirements of the torque test (test Ud) to be satisfied when clamping a connection of thickness as detailed in the ordering information, clause 6.

4. RELATED DOCUMENTS

IEC 68	Basic environmental testing procedures
BS6001	Harmonized system of quality assessment for electronic components.
BSE 9000	Basic specification: sampling plans and procedures for inspection by attributes
BS E9070	Harmonized system of quality assessment for electronic components.
	Generic specification for fixed capacitors
BS CECC 30000	Specification for harmonized system of quality assessment for electronic components. Sectional specification: aluminium electrolytic capacitors
BS CECC 30300	Specification for harmonized system of quality assessment for electronic components. Blank detail specification: aluminium electrolytic capacitors with non-solid electrolyte
BS CECC 30301	Specification for harmonized system of quality assessment for electronic components. Blank detail specification: aluminium electrolytic capacitors with non-solid electrolyte
PD 9002	BS 9000 component selection guide
CECC 00200	CECC Qualified products list

5. MARKING

Items (a) to (e) shall be marked on the capacitor:

- (a) rated capacitance in μF ;
- (b) rated voltage and category temperature;
- (c) polarity of the terminations;
- (d) tolerance on rated capacitance;
- (e) long-life grade.

The marking on the package shall include all the items in accordance with 1.4 of BS CECC 30300: 1978.

6. ORDERING INFORMATION

Orders for components to this specification shall include the following minimum information.

- (a) Quantity
- (b) manufacturer's type number;
- (c) number of this detail specification, issue number and date;
- (d) capacitance and rated voltage;
- (e) style;
- (f) thickness of connection: e.g. busbar.

Example

Type XXX BS CECC 30301 031 Issue 1 July 1982 680µf 160V Style A: 5mm.

7. QUALIFICATION APPROVAL AND QUALITY CONFORMANCE INSPECTION

7.1 For qualification approval test and quality conformance inspection, the test schedule severities and requirements given in table 4 apply.

7.2 For qualification approval testing, see 3.3 of BS CECC 30300: 1978. Subgroups A1 and A2 are combined together to form group O. All subgroups of group C are required with numbers of samples and permissible defectives as shown in table 1 of BS CECC 30300: 1978. For sub-group C7, the numbers are as shown in table 4 of this detail specification.

7.3 Case size grouping in accordance with 3.4.2 of BS CECC 30300: 1978.

7.4 Voltage rating grouping in accordance with 3.4.2 of BS CECC 30300: 1978.

7.5 Samples submitted to tests marked D shall not be accepted for release under BS E9000.

7.6 The requirement for visual examination for intermediate or final measurement is as follows:

'There shall be no damage that will affect the capability for the use for which the product was intended.'

7.7 Drying in accordance with 4.3 of BS E9070: 1975 is not required.

7.8 In-process inspection to be applied in accordance with tests in group A0 which shall be included in the manufacturer's quality manual.

The manufacturer shall, within the manual, describe:

(a) For aluminium materials:

- (1) The requirements of the purchasing specification.
- (2) Receiving, evaluation, identification and issue procedures.

(b) Process control:

- (1) Tabs to foil/terminal weld tests.
- (2) Electrolyte tests.

This information shall be declared by the manufacturer when seeking Qualification Approval.

8. CERTIFIED TEST RECORDS

Certified test records are required in accordance with BS CECC 30300.

TABLE 4. TEST SCHEDULE

Appendix number and test	D or ND (see note 2)	Conditions of test	Periodicity and sample size	Inspection requirements
GROUP A0.				
IN-PROCESS INSPECTION. To be conducted on set-up and during production at intervals detailed in manufacturers Quality Manual,				
<u>Sub-group A01</u>	D			
A.1.1(a) Weld test (Tear)		As appendix A		As A.1.1(a)
A.2 Thickness of foils		As appendix A		As A.2
<u>Sub-group A02</u>	D			
Electrolyte				
B.1 Chloride test		AS detailed in Quality Manual.		$< 10 \times 10^{-6}$ Halide radicals
B.2 Sulphate test				$< 10 \times 10^{-6}$ Sulphate radicals
<u>Sub-group A03</u>	D			
A.1.1(b) Weld test (Visual)		As appendix A		As A.1.1(b)
A.1.1(c) Weld test (Microsection)		As appendix A		As A.1.1(c)
Should failures be found in sub-group A01 or A03, all similar foils produced since last satisfactory test shall be quarantined. The appropriate action to be taken with quarantined batches shall be detailed in the manufacturers Quality Manual.				

Notes at the end of Table 4.

Clause number and test (see note 1)	D or ND (2)	Conditions of test	IL (see note 3)	AQL %	Performance requirements (see note 1)
GROUP A INSPECTION					
To be conducted on a sampling basis, lot-by-lot					
<u>Sub-group A1</u>	ND		S-4	2.5	
4.3 Visual examination					No leakage of electrolyte or other visible damage
Marking		As clause 5 of this detail specification			Legible marking
4.3 Dimensions					As in table 1
<u>Sub-group A2</u>	ND		II	1	
4.2 Preconditioning					
4.4 Leakage current					$\leq (0.003 \text{ CU} + 4) \mu\text{A}$
4.5 Capacitance		At 100 Hz			Within specified tolerance
4.6 Tangent of loss angle		At 100 Hz			Not to exceed the limit in clause 3
4.7 HF impedance		At 10 kHz			Not to exceed the limit in clause 3
GROUP B INSPECTION					
To be conducted on a sampling basis, lot-by-lot					
<u>Sub-group B1</u>	ND		S-3	2.5	
4. Storage at upper category temperature		$96 \pm 4 \text{ h at } 85^{\circ}\text{C}$			
Visual examination		After 16 h recovery			No leakage of electrolyte or other visible damage
4.4 Leakage current					$\leq 2 \times \text{the initial limit}$

Notes at the end of table 4.