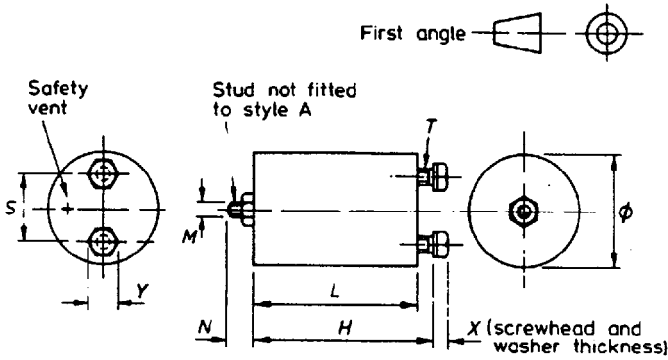


BRITISH STANDARDS INSTITUTION 2 PARK STREET, LONDON W1A 2BS	BS CECC 30301 024 ISSUE 1 MARCH 1981
Specification available from: BRITISH STANDARDS INSTITUTION 101 PENTONVILLE ROAD, LONDON N1 9ND TELEPHONE: 01-837 8801 TELEX 23218	26 pages
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS E9070 (CECC 30000): 1975 BS CECC 30300 (CECC 30300): 1978	MANUFACTURER'S TYPE NUMBER See PD 9002 or CECC 00200 For ordering information see clause 6
Outline and dimensions First angle projection For marking see clause 5 First angle  Dimensions - See table 1	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 680 μF to 150 000 μF Tolerance -10 % to +50 % Rated voltage 6.3 V to 160 V Climatic category 25/085/56 ASSESSMENT LEVEL FULL PLUS ADDITIONAL

WARNING. '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 the relevant Qualified Products List PD 9002 and/or CECC 00200 for details of the availability of components qualified to this specification.

[Clause 1

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1. DIMENSIONS

TABLE 1. Dimensions

Case size	Dimensions (mm)								
	$\varnothing \pm 1$	H max.	L max.	$S \pm 0.5$	X	T	Y	M	$N \pm 2$
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

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	-25 °C to +85 °C
3.7 Rated temperature	85 °C
3.8 Insulation resistance	> 100 M Ω
3.9 Climatic category	25/085/56
3.10 Leakage current	(0.003 CU + 4) 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 $> U_R > 10$ 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 μF	Rated voltage U_R (see note 2)							
	6.3	10	16	25	40	63	100	160
680								B
1 000								C
1 500							B	D
2 200					A	B	C	E
3 300				A		C	D	F
4 700			A		B	D	E	
6 800		A		B	C	E		
10 000	A		B	C	D		F	
15 000		B	C	D	E	F		
22 000	B	C	D	E				
33 000	C	D	E		F			
47 000	D	E		F				
68 000	E		F					
100 000		F						
150 000	F							

(see note 1)

TABLE 3. RATED VALUES OF RIPPLE CURRENT

Capacitance value (μF)	Rated voltage (V)	Ripple current (A) (see note 4)	Capacitance value (μF)	Rated voltage (V)	Ripple current (A) (see note 4)
10 000	6.3	1.4	2 200	40	1.4
22 000		3.1	4 700		3.1
33 000		4.5	6 800		4.5
47 000		5.4	10 000		5.4
68 000		7.7	15 000		7.7
150 000		12.5	33 000		12.5
6 800	10	1.4	2 200	63	3.1
15 000		3.1	3 300		4.5
22 000		4.5	4 700		5.4
33 000		5.4	6 800		7.7
47 000		7.7	15 000		12.5
100 000		12.5			
4 700	16	1.4	1 500	100	3.1
10 000		3.1	2 200		4.5
15 000		4.5	3 300		5.4
22 000		5.4	4 700		7.7
33 000		7.7	10 000		12.5
68 000		12.5			
3 300	25	1.4	680	160	1.4
6 800		3.1	1 000		1.8
10 000		4.5	1 500		2.5
15 000		5.4	2 200		4.0
22 000		7.7	3 300		5.6
47 000		12.5			

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

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

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

BS 2011	Basic environmental testing procedures
BS E9007	Harmonized system of quality assessment for electronic components. 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 30300	Specification for harmonized system of quality assessment for electronic components. Sectional specification: aluminium electrolytic capacitors
BS CECC 30301	Specification for harmonized system of quality assessment for electronic components. Blank detail specification: aluminium electrolytic capacitors with non-solid electrolyte
PD 6002	BS 9000 component selection guide
CECC 00200	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

When ordering capacitors in accordance with this detail specification the following information shall be given:

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

Example

Type XXX BS CECC 30301 024 Issue 1 1981 680 μ F 160 V Style A: 5 mm.

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 0. 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 data package.

The manufacturer shall, within the data package, 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.

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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.

9. CONSTRUCTIONAL REQUIREMENTS



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TABLE 4. TEST SCHEDULE

Appendix number and test	D or ND (see note 2)	Conditions of test	Periodicity and sample size	Inspection requirements
GROUP A IN-PROCESS INSPECTION To be conducted on a sampling basis, lot-by-lot				
<u>Sub-group A01</u> A.1.1(a) Weld test (Tear) A.2 Thickness of foils	D	As appendix A As appendix A	2 samples to be taken twice daily from each welding head	As A.1.1(a) As A.2
<u>Sub-group A02</u> Electrolyte B.1 Chloride test B.2 Sulphate test	D	As B.1 As B.2	1 sample to be taken daily from storage tank	$\leq 10 \times 10^{-6}$ Halide radicals $\leq 10 \times 10^{-6}$ Sulphate radicals
<u>Sub-group A03</u> A.1.1(b) Weld test (Visual) A.1.1(c) Weld test (Microsection)	D	As appendix A As appendix A	2 samples to be taken weekly from each welding head	As A.1.1(b) As A.1.1(c)

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 % (see note 3)	Performance requirements (see note 1)
GROUP A INSPECTION					
To be conducted on a sampling basis, lot-by-lot					
Sub-group A1	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
Sub-group A2	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					
Sub-group B1	ND		S-3	2.5	
4. Storage at upper category temperature		$96 \pm 4 \text{ h}$ at UCT			
Visual examination		After 16 h recovery			No leakage of electrolyte or other visible damage
4.4 Leakage current					$\leq 2 \times$ the initial limit

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)
<u>Sub-group B1</u> (continued)					
4.5 Capacitance		At 100 Hz			$\Delta C \leq 10\%$ of initial measurements
4.6 Tangent of loss angle		At 100 Hz			$\leq 1.2 \times$ the initial limit
<u>Sub-group B2</u>	ND		S-3	2.5	
4.19 Impedance at low temperature		At 100 Hz -25 °C and 20 °C Test A. Cold of BS 2011: Part 2.1A			The ratio of impedance at -25 °C to that at 20 °C shall not exceed 5 for U_R = 6.3 V 4 for U_R > 6.3 V but ≤ 16 V 3 for U_R > 16 V but ≤ 160 V
Sample size and criterion of accept- ability (see note 2)					
			p	n	c
GROUP C INSPECTION					
To be conducted on a sampling basis at the periodicity given in months in column p					
<u>Sub-group C1</u> (all samples) Initial measurements	ND				
4.5 Capacitance		At 100 Hz	6	27	1
					Within the specified tolerance

Notes at the end of table 4.