CAPACITORS, FIXED, RECONSTITUTED MICA,

HIGH VOLTAGE,

BASED ON TYPE HT86PS

ESCC Detail Specification No. 3006/022

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ESA/SCC Detail Specification No. 3006/022

space components
coordination group

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		SCCG Chairman	ESA Director General or his Deputy
Issue 1	January 1998		
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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
'A'	Sept. '98	P1. Cover page		None
		P2. DCN		None
		P19. Table 6	: No. 2, "Change" and "Δ" added to Tangent of Loss Angle	221483
			: No. 9, "Change" and "Δ" added to Tangent of Loss Angle	221483
		P20. Table 6	: No. 11, "Change" and "Δ" added to Tangent of Loss Angle	221483
'B'	Jun. '00	P1. Cover page		None
		P2. DCN		None
		P13. Para. 4.2.5	: (e) Deviation for "Low Air Pressure" deleted	221560

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TABLES

FIGURES

APPENDICES (Applicable to specific Manufacturers only)
None.

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Capacitors, Fixed, Reconstituted Mica, High Voltage, premoulded for encapsulation, based on Type HT86PS. It shall be read in conjunction with ESA/SCC Generic Specification No. 3006, the requirements of which are supplemented herein.

1.2 RANGE OF COMPONENTS

The range of capacitors covered by this specification is scheduled in Table 1(a).

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the capacitors specified herein, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the capacitors specified herein are shown in Figure 2.

1.6 FUNCTIONAL DIAGRAM

The functional diagram for the capacitors specified herein is shown in Figure 3.

2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:-

(a) ESA/SCC Generic Specification No. 3006 for Capacitors, Fixed, Metallised Plastic Dielectric, Hermetically Sealed in Metal Cases.

(b) IEC 270; Partial Discharge Measurements.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall apply. In addition, the following symbol is used:

V_T = Test Voltage.

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

TABLE 1(a) - RANGE OF COMPONENTS

(1) Item No.	(2) Capacitance Value (C) (pF)	(3) Tolerance (±%)	(4) Rated Voltage (U_R) (V)	(5) Dimensions (mm) L ±1.0	h ±1.0	e ±1.0	W +10% -0.05	(6) Weight (g)
01	33 000	10, 20	1 500	35	10	4.0	1.0	4.0
02	39 000	10	1 500	35	12	6.0	1.0	6.5
03	47 000	10, 20	1 500	35	12	6.0	1.0	6.5
04	56 000	10	1 500	35	16	6.0	1.0	8.5
05	68 000	10, 20	1 500	35	16	6.0	1.0	8.5
06	82 000	10	1 500	35	24	6.0	1.0	12.5
07	100 000	10, 20	1 500	35	24	6.0	1.0	12.5
08	120 000	10	1 500	35	30	8.0	1.0	20
09	150 000	10, 20	1 500	35	30	8.0	1.0	20
10	180 000	10	1 500	35	40	8.0	1.0	26.5
11	220 000	10, 20	1 500	35	40	8.0	1.0	26.5
12	270 000	10	1 500	61	24	8.0	1.0	28
13	330 000	10, 20	1 500	61	24	8.0	1.0	28
14	390 000	10	1 500	61	38	8.0	1.0	44
15	470 000	10, 20	1 500	61	38	8.0	1.0	44
16	560 000	10	1 500	79	45	8.0	1.2	67
17	820 000	10, 20	1 500	79	45	8.0	1.2	67
18	1 000 000	10	1 500	79	47	10	1.2	85
19	1 200 000	10, 20	1 500	79	47	10	1.2	85
20	1 500 000	10	1 500	105	47	10	1.2	115
21	1 800 000	10, 20	1 500	105	47	10	1.2	115
22	2 200 000	10	1 500	105	50	14	1.2	175
23	15 000	10, 20	2 500	25	12	4.0	1.0	4.0
24	22 000	10, 20	2 500	35	10	4.0	1.0	4.0
25	27 000	10	2 500	35	12	6.0	1.0	6.5
26	33 000	10, 20	2 500	35	12	6.0	1.0	6.5
27	39 000	10	2 500	35	16	6.0	1.0	8.5
28	47 000	10, 20	2 500	35	16	6.0	1.0	8.5
29	56 000	10	2 500	35	24	6.0	1.0	12.5
30	68 000	10, 20	2 500	35	24	6.0	1.0	12.5
31	82 000	10	2 500	35	30	8.0	1.0	20
32	100 000	10, 20	2 500	35	30	8.0	1.0	20
33	120 000	10	2 500	35	40	8.0	1.0	26.5
34	150 000	10, 20	2 500	35	40	8.0	1.0	26.5
35	180 000	10	2 500	61	38	8.0	1.0	28
36	220 000	10, 20	2 500	61	38	8.0	1.0	28
37	270 000	10	2 500	61	45	8.0	1.0	44
38	330 000	10, 20	2 500	61	45	8.0	1.0	44
39	390 000	10	2 500	79	45	8.0	1.2	67

TABLE 1(a) - RANGE OF COMPONENTS (CONT'D)

(1) Item No.	(2) Capacitance Value (C) (pF)	(3) Tolerance (±%)	(4) Rated Voltage (U_R) (V)	(5) Dimensions (mm) L ±1.0	h ±1.0	e ±1.0	W +10% -0.05	(6) Weight (g)
40	470 00	10, 20	2 500	79	45	8.0	1.2	67
41	560 000	10	2 500	79	47	10	1.2	85
42	680 000	10, 20	2 500	79	47	10	1.2	85
43	820 000	10	2 500	105	47	10	1.2	115
44	1 000 000	10, 20	2 500	105	47	10	1.2	115
45	1 200 000	10	2 500	105	50	14	1.2	175
46	1 500 000	10, 20	2 500	105	50	14	1.2	175
47	15 000	10, 20	3 500	35	10	4.0	1.0	4.0
48	18 000	10	3 500	35	12	6.0	1.0	6.5
49	22 000	10, 20	3 500	35	12	6.0	1.0	6.5
50	27 000	10	3 500	35	16	6.0	1.0	8.5
51	33 000	10, 20	3 500	35	16	6.0	1.0	8.5
52	39 000	10	3 500	35	24	6.0	1.0	12.5
53	47 000	10, 20	3 500	35	24	6.0	1.0	12.5
54	56 000	10	3 500	35	30	8.0	1.0	20
55	68 000	10, 20	3 500	35	30	8.0	1.0	20
56	82 000	10	3 500	35	40	8.0	1.0	26.5
57	100 000	10, 20	3 500	35	40	8.0	1.0	26.5
58	120 000	10	3 500	61	24	8.0	1.0	28
59	150 000	10, 20	3 500	61	24	8.0	1.0	28
60	180 000	10	3 500	61	38	8.0	1.0	44
61	220 000	10, 20	3 500	61	38	8.0	1.0	44
62	270 000	10	3 500	79	45	8.0	1.2	67
63	330 000	10, 20	3 500	79	45	8.0	1.2	67
64	390 000	10	3 500	79	47	10	1.2	85
65	470 000	10, 20	3 500	79	47	10	1.2	85
66	560 000	10	3 500	105	47	10	1.2	115
67	680 000	10, 20	3 500	105	47	10	1.2	115
68	820 000	10	3 500	105	50	14	1.2	175
69	1 000 000	10, 20	3 500	105	50	14	1.2	175
70	6 800	10, 20	5 000	35	10	4.0	1.0	4.0
71	8 200	10	5 000	35	12	6.0	1.0	6.5
72	10 000	10, 20	5 000	35	12	6.0	1.0	6.5
73	12 000	10	5 000	35	16	6.0	1.0	8.5
74	15 000	10, 20	5 000	35	16	6.0	1.0	8.5
75	18 000	10	5 000	35	24	6.0	1.0	12.5
76	22 000	10, 20	5 000	35	24	6.0	1.0	12.5
77	27 000	10	5 000	35	30	8.0	1.0	20
78	33 000	10, 20	5 000	35	30	8.0	1.0	20
79	39 000	10	5 000	35	40	8.0	1.0	26.5
80	47 000	10, 20	5 000	35	40	8.0	1.0	26.5

TABLE 1(a) - RANGE OF COMPONENTS (CONT'D)

(1) Item No.	(2) Capacitance Value (C) (pF)	(3) Tolerance (±%)	(4) Rated Voltage (U_R) (V)	(5) Dimensions (mm) L ±1.0	h ±1.0	e ±1.0	W +10% -0.05	(6) Weight (g)
81	56 000	10	5 000	61	24	8.0	1.0	28
82	68 000	10, 20	5 000	61	24	8.0	1.0	28
83	82 000	10	5 000	61	38	8.0	1.0	44
84	100 000	10, 20	5 000	61	38	8.0	1.0	44
85	120 000	10	5 000	79	45	8.0	1.2	67
86	150 000	10, 20	5 000	79	45	8.0	1.2	67
87	180 000	10	5 000	79	47	10	1.2	85
88	220 000	10, 20	5 000	79	47	10	1.2	85
89	270 000	10	5 000	105	47	10	1.2	115
90	330 000	10, 20	5 000	105	47	10	1.2	115
91	390 000	10	5 000	105	50	14	1.2	175
92	470 000	10, 20	5 000	105	50	14	1.2	175
93	2 200	10, 20	7 500	35	10	4.0	1.0	4.0
94	2 700	10	7 500	35	12	6.0	1.0	6.5
95	3 300	10, 20	7 500	35	12	6.0	1.0	6.5
96	3 900	10	7 500	35	16	6.0	1.0	8.5
97	4 700	10, 20	7 500	35	16	6.0	1.0	8.5
98	5 600	10	7 500	35	24	6.0	1.0	12.5
99	6 800	10, 20	7 500	35	24	6.0	1.0	12.5
100	8 200	10	7 500	35	30	8.0	1.0	20
101	10 000	10, 20	7 500	35	30	8.0	1.0	20
102	12 000	10	7 500	35	40	8.0	1.0	26.5
103	15 000	10, 20	7 500	35	40	8.0	1.0	26.5
104	18 000	10	7 500	61	24	8.0	1.0	28
105	22 000	10, 20	7 500	61	24	8.0	1.0	28
106	27 000	10	7 500	61	38	8.0	1.0	44
107	33 000	10, 20	7 500	61	38	8.0	1.0	44
108	39 000	10	7 500	61	45	8.0	1.0	52
109	47 000	10, 20	7 500	61	45	8.0	1.0	52
110	56 000	10	7 500	79	47	8.0	1.2	67
111	68 000	10, 20	7 500	79	47	8.0	1.2	67
112	82 000	10	7 500	79	47	10	1.2	85
113	100 000	10, 20	7 500	79	47	10	1.2	85
114	120 000	10	7 500	105	47	10	1.2	115
115	150 000	10, 20	7 500	105	47	10	1.2	115
116	180 000	10	7 500	105	50	14	1.2	175
117	220 000	10, 20	7 500	105	50	14	1.2	175
118	1 000	10, 20	10 000	35	10	4.0	1.0	4.0
119	1 200	10	10 000	35	12	6.0	1.0	6.5
120	1 500	10, 20	10 000	35	12	6.0	1.0	6.5
121	1 800	10	10 000	35	16	6.0	1.0	8.5

TABLE 1(a) - RANGE OF COMPONENTS (CONT'D)

(1) Item No.	(2) Capacitance Value (C) (pF)	(3) Tolerance (±%)	(4) Rated Voltage (U_R) (V)	(5) Dimensions (mm) L ±1.0	h ±1.0	e ±1.0	W +10% -0.05	(6) Weight (g)
122	2 200	10,20	10 000	35	16	6.0	1.0	8.5
123	2 700	10	10 000	35	24	6.0	1.0	12.5
124	3 300	10,20	10 000	35	24	6.0	1.0	12.5
125	3 900	10	10 000	35	30	8.0	1.0	20
126	4 700	10,20	10 000	35	30	8.0	1.0	20
127	5 600	10	10 000	35	40	8.0	1.0	26.5
128	6 800	10,20	10 000	35	40	8.0	1.0	26.5
129	8 200	10	10 000	61	24	8.0	1.0	28
130	10 000	10,20	10 000	61	24	8.0	1.0	28
131	12 000	10	10 000	61	38	8.0	1.0	44
132	15 000	10,20	10 000	61	38	8.0	1.0	44
133	18 000	10	10 000	61	45	8.0	1.0	52
134	22 000	10,20	10 000	61	45	8.0	1.0	52
135	27 000	10	10 000	79	45	8.0	1.2	67
136	33 000	10,20	10 000	79	45	8.0	1.2	67
137	39 000	10	10 000	79	47	10	1.2	85
138	47 000	10,20	10 000	79	47	10	1.2	85
139	56 000	10	10 000	105	47	10	1.2	115
140	68 000	10,20	10 000	105	47	10	1.2	115
141	82 000	10	10 000	105	50	14	1.2	175
142	100 000	10,20	10 000	105	50	14	1.2	175
143	3 300	10,20	12 500	61	20	4.0	1.0	14
144	3 900	10	12 500	61	22	6.0	1.0	21
145	4 700	10,20	12 500	61	22	6.0	1.0	21
146	5 600	10	12 500	61	24	8.0	1.0	28
147	6 800	10,20	12 500	61	24	8.0	1.0	28
148	8 200	10	12 500	61	38	8.0	1.0	44
149	10 000	10,20	12 500	61	38	8.0	1.0	44
150	12 000	10	12 500	61	45	8.0	1.0	52
151	15 000	10,20	12 500	61	45	8.0	1.0	52
152	18 000	10	12 500	79	45	8.0	1.2	67
153	22 000	10,20	12 500	79	45	8.0	1.2	67
154	27 000	10	12 500	79	47	10	1.2	85
155	33 000	10,20	12 500	79	47	10	1.2	85
156	39 000	10	12 500	105	47	10	1.2	115
157	47 000	10,20	12 500	105	47	10	1.2	115
158	56 000	10	12 500	105	50	14	1.2	175
160	68 000	10,20	12 500	105	50	14	1.2	175
161	1 500	10,20	15 000	61	20	4.0	1.0	14
162	1 800	10	15 000	61	22	6.0	1.0	21
163	2 200	10,20	15 000	61	22	6.0	1.0	21

TABLE 1(a) - RANGE OF COMPONENTS (CONT'D)

(1) Item No.	(2) Capacitance Value (C) (pF)	(3) Tolerance (±%)	(4) Rated Voltage (U_R) (V)	(5) Dimensions (mm)				(6) Weight (g)
				L ±1.0	h ±1.0	e ±1.0	W +10% -0.05	
164	2 700	10	15 000	61	24	8.0	1.0	28
165	3 300	10, 20	15 000	61	24	8.0	1.0	28
166	3 900	10	15 000	61	38	8.0	1.0	44
167	4 700	10, 20	15 000	61	38	8.0	1.0	44
168	5 600	10	15 000	61	45	8.0	1.0	52
169	6 800	10, 20	15 000	61	45	8.0	1.0	52
170	8 200	10	15 000	79	45	8.0	1.2	67
171	10 000	10, 20	15 000	79	45	8.0	1.2	67
172	12 000	10	15 000	79	47	10	1.2	85
173	15 000	10, 20	15 000	79	47	10	1.2	85
174	18 000	10	15 000	105	47	10	1.2	115
175	22 000	10, 20	15 000	105	47	10	1.2	115
176	27 000	10	15 000	105	50	14	1.2	175
177	33 000	10, 20	15 000	105	50	14	1.2	175
178	680	10, 20	20 000	61	20	4.0	1.0	14
179	820	10	20 000	61	22	6.0	1.0	21
180	1 000	10, 20	20 000	61	22	6.0	1.0	21
181	1 200	10	20 000	61	24	8.0	1.0	28
182	1 500	10, 20	20 000	61	24	8.0	1.0	28
183	1 800	10	20 000	61	38	8.0	1.0	44
184	2 200	10, 20	20 000	61	38	8.0	1.0	44
185	2 700	10	20 000	61	45	8.0	1.0	52
186	3 300	10, 20	20 000	61	45	8.0	1.0	52
187	3 900	10	20 000	79	45	8.0	1.2	67
188	4 700	10, 20	20 000	79	45	8.0	1.2	67
189	5 600	10	20 000	79	47	10	1.2	85
190	6 800	10, 20	20 000	79	47	10	1.2	85
191	8 200	10	20 000	105	47	10	1.2	115
192	10 000	10, 20	20 000	105	47	10	1.2	115
193	12 000	10	20 000	105	50	14	1.2	175
194	15 000	10, 20	20 000	105	50	14	1.2	175

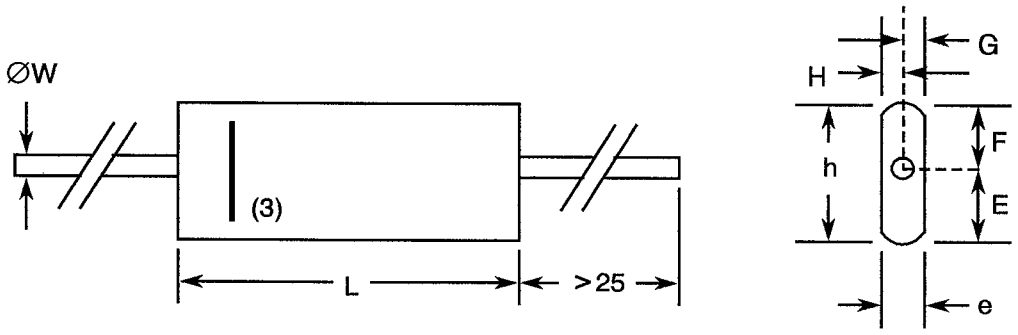
TABLE 1(b) - MAXIMUM RATINGS

No.	Characteristics	Symbol	Limit Ratings	Unit	Remarks
1	Rated Voltage	U_R	See Table 1(a)	V_{dc}	
2	Ripple Voltage Peak to Peak (Note 1)	U_{Rip}	0.2 U_R 0.15 U_R 0.04 U_R 0.01 U_R	V_{pp}	At 50Hz At 100Hz At 1 000Hz At 10 000Hz
3	Operating Air Pressure Range	P_{op}	Less than 10^{-3} or greater than 750	mbar	Note 2
4	Operating Temperature Range	T_{amb}	-55 to +125	°C	Without derating
5	Storage Temperature Range	T_{stg}	-55 to +125	°C	
6	Soldering Temperature	T_{sol}	+260°C	°C	Note 3

NOTES

1. Ripple voltage plus applied d.c. voltage shall never exceed U_R.
2. Capacitors are designed for dielectric fluid use or encapsulation.
3. Duration 5 seconds maximum at 4.0mm from the device body and the same terminal shall not be resoldered until 3 minutes have passed.

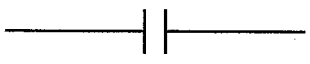
FIGURE 2 - PHYSICAL DIMENSIONS



NOTES

1. For dimension L, h, e, ØW: see Table 1(a).
2. Dimensions E, F, G, H <2.0mm.
3. This heavy line indicates the external electrode which shall be connected to the lowest potential.

FIGURE 3 - FUNCTIONAL DIAGRAM



4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the capacitors specified herein are stated in this specification and ESA/SCC Generic Specification No. 3006 for Capacitors, Fixed, Film Dielectric. Deviations from the Generic Specification, applicable to this specification only, are listed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESA/SCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Special In-process Controls

None.

4.2.2 Deviations from Final Production Tests (Chart II)

(a) Para. 9.2, Seal Test: Not applicable.

(b) Para. 9.3, Rapid Change of Temperature: As per Para. 9.3 except that the duration of exposure at each temperature extreme shall be 3 hours and the transfer time between extremes shall be 1 hour ±5 min.

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.2, Seal Test: Not applicable.

(b) Para. 9.3, Rapid Change of Temperature: As per Para. 9.3 except that the duration of exposure at each temperature extreme shall be 3 hours and the transfer time between extremes shall be 1 hour ±5 minutes.

(c) Para. 9.12, Vibration:
Para. 9.12.2: d.c. potential shall not be applied.
Para. 9.12.3, Measurements during Vibration: Not applicable.

(d) Paras. 9.13.1, Shock and 9.13.2, Bump:
Para. 9.13.x.2: d.c. potential shall not be applied.
Para. 9.13.x.3, Measurements during Shock or Bump: Not applicable.

(e) Para. 9.14, Climatic Sequence:
Para. 9.14.5, Low Air Pressure: As per Para. 9.14.5 except:

Pressure	:	Below 10^{-5} mbar.
Temperature	:	+50 (+5−0) °C.
Rated Voltage	:	Applied during the last 5 minutes of the 1.0 hour period.
Duration	:	1.0 hours.

Para. 9.14.3 and 9.14.6, Damp Heat Accelerated: Test condition: +55°C; Variant 2. The applied voltage shall be 100V instead of U_R.

Para. 9.14.7: Partial Discharge (A.C.) measurements shall be performed as specified in Table 6 of this specification at $V_{rms} = 10\% U_R$.

(f) Para.9.16, Operating Life:
Para.9.16(c): The applied voltage shall be $1.15U_R$.
Para.9.16(e): Partial Discharge (A.C.) measurements shall be performed as specified in Table 6 of this specification.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.2, Seal Test: Not applicable.

(b) Para. 9.3, Rapid Change of Temperature: As per Para. 9.3 except that the duration of exposure at each temperature extreme shall be 3 hours and the transfer time between extremes shall be 1 hour ±5 minutes.

(c) Para. 9.12, Vibration:
Para. 9.12.2: d.c. potential shall not be applied.
Para. 9.12.3, Measurements during Vibration: Not applicable.

(d) Paras. 9.13.1, Shock and 9.13.2, Bump:
Para. 9.13.x.2: d.c. potential shall not be applied.
Para. 9.13.x.3, Measurements during Shock or Bump: Not applicable.

(e) Para. 9.14, Climatic Sequence:
Para. 9.14.3 and 9.14.6, Damp Heat Accelerated: Test condition: +55°C; Variant 2. The applied voltage shall be 100V instead of U_R.

Para. 9.14.7: Partial Discharge (A.C.) measurements shall be performed as specified in Table 6 of this specification at $V_{rms} = 10\% U_R$.

(f) Para.9.16, Operating Life:
Para.9.16(c): The applied voltage shall be $1.15U_R$.
Para.9.16(e): Partial Discharge (A.C.) measurements shall be performed as specified in Table 6 of this specification.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the capacitors specified herein shall be checked. They shall conform to those shown in Figure 2 and Table 1(a).

4.3.2 Weight

The maximum weight of the capacitors specified herein shall be as specified in Table 1(a).

4.3.3 Robustness of Terminations

The requirements for robustness of terminations testing are specified in Section 9 of ESA/SCC Generic Specification No. 3006. The test conditions shall be as follows:-

Test Condition:	Ua, Tensile.	Test Condition:	Torsion.
Applied Force:	20 Newtons.	2 successive rotations of 180°C (half of terminations).	
Duration:	10 ± 1 seconds.	Test Condition:	Bending.
		2 consecutive bends (other half of terminations).	

After these tests, the capacitors shall be examined for evidence of breaking or loosening of terminals.

4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the capacitors specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 Case

Epoxy resin in accordance with Para. 4.5 of ESA/SCC Generic Specification No. 3006.

4.4.2 Lead Material and Finish

The lead material shall be Type 'A' with Type '3 or 4' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500.

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700 and the following paragraphs. When the component is too small to accommodate all of the marking specified, as much as space permits shall be marked and the marking information, in full, shall accompany the component in its primary package.

The information to be marked and the order of precedence, shall be as follows:-

(a) Lead Identification.

(b) The SCC Component Number.

(c) Electrical Characteristics and Ratings.

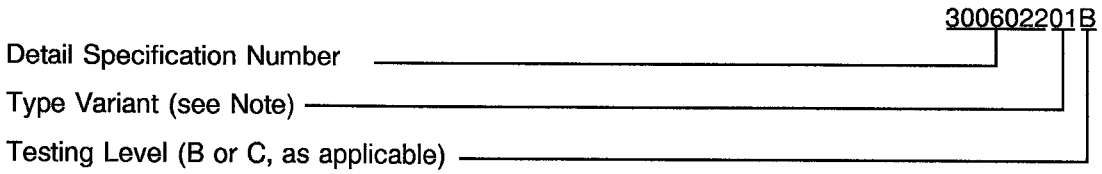
(d) Traceability Information.

4.5.2 Lead Identification

Lead identification shall be marked on the component as shown in Figure 2.

4.5.3 The SCC Component Number

The SCC Component Number shall be constituted and marked as follows:-



N.B.
Marking of the Type Variant Number is mandatory. No further reference to type variants is made in this specification.

4.5.4 Electrical Characteristics and Ratings

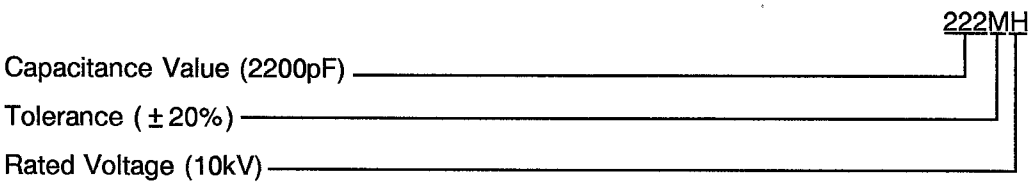
The electrical characteristics and ratings to be marked in the following order of precedence are:-

(a) Capacitance Value.

(b) Tolerance.

(c) Rated Voltage.

The information shall be constituted and marked as follows:-



4.5.4.1 Capacitance Values

Capacitance values shall be coded as follows. The unit quantity for marking shall be picofarads.

Numerical Value	Code
$XX10^1$	XX1
$XX10^2$	XX2
$XX10^3$	XX3
$XX10^4$	XX4
$XX10^5$	XX5

4.5.4.2 Tolerances

The tolerances on capacitance values shall be indicated by the code letters specified hereafter.

Tolerance (±%)	Code Letter
10	K
20	M

4.5.4.3 Rated Voltage

The rated voltage shall be indicated by the code letters specified hereafter.

Rated Voltage (kV)	Code Letter
1.5	C
2.5	D
3.5	E
5.0	F
7.5	G
10	H
12.5	J
15	K
20	L

4.5.5 Traceability Information

Traceability information shall be marked in accordance with the requirements of ESA/SCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured at room temperature are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3.

Each capacitance value shall be considered as constituting a complete lot. For qualification or lot acceptance testing, the sample size shall be as specified in ESA/SCC Generic Specification No. 3006.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 BURN-IN TESTS

4.7.1 Parameter Drift Values

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at $T_{amb} = +22 \pm 3$ °C. The parameter drift values (Δ) applicable to the parameters scheduled shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 3006. The conditions for burn-in shall be as specified in Table 5 of this specification.

On completion of burn-in, a recovery period of 24 ± 2 hours is necessary before the end-measurements.

4.7.3 Electrical Circuits for Burn-in (Figure 5)

Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESA/SCC 3006 Test Method	Test Condition	Limits		Unit
					Min.	Max.	
1	Capacitance	C	Para. 9.6.1.2	Para. 9.6.1.2	See Table 1(a) (Note 1)		µF
2	Tangent of Loss Angle	T_{gd}	Para. 9.6.1.3	V_T = 1.0V Test frequency = 1.0kHz	-	50	10^{-4}
3	Insulation Resistance Terminal to Terminal	Ri	Para. 9.6.1.4	Para. 9.6.1.4 C ≤ 0.22µF C > 0.22µF	 25 5000	 - -	 GΩ sec
4	Insulation Resistance Terminals to Case	Ri_B	Para. 9.6.1.4		25	-	GΩ
5	Voltage Proof Terminal to Terminal	VP	Para. 9.6.1.1	Para. 9.6.1.1	$1.6U_R$ (2) (3)	-	V
6	Voltage Proof Terminals to Case	VP_B	Para. 9.6.1.1		$1.6U_R$ (2) (3)	-	V
7	Partial Discharge (A.C.)	QAC	IEC 270	V_{rms} = 5% U_R V_{rms} = 10% U_R (Notes 2 and 4)	- -	0 1000	pC

NOTES

1. ± Ordered Tolerance.
2. For U_R, see Column 4 of Table 1(a).
3. Duration 1minute during final production tests only, 5 seconds for all subsequent measurements.
4. Partial discharge to be measured at two different levels of voltage.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	Characteristics	Symbol	ESA/SCC 3006 Test Method	Test Condition (Note 1)	Limits		Unit
					Min.	Max.	
1(a)	Capacitance Change	$\frac{\Delta C}{C}$	Para. 9.6.1.2	Para. 9.6.1.2 T_{amb} = −55(+3−0) °C	−3.0 (2)	-	%
1(b)	Capacitance Change	$\frac{\Delta C}{C}$	Para. 9.6.1.2	Para. 9.6.1.2 T_{amb} = +125(+0−5) °C	-	+10 (2)	%
3	Insulation Resistance Terminal to Terminal	Ri	Para. 9.6.1.4	Para. 9.6.1.4 C < 0.22uF C > 0.22uF T_{amb} = +125(+0−5) °C	 250 50	 - -	 MΩ s.
8	Leakage Current	I_L	-	T_{amb} = +125(+0−5) °C $V_T = U_R$ (3)	-	Note 4	(nA)

NOTES

1. These measurements shall be performed on a sample basis (see Para. 7.4.2 of ESA/SCC Generic Specification No. 3006), AQL = 2.5%.
2. Related to value recorded at T_{amb} = +22°C.
3. For U_R, see Column 4 of Table 1(a).
4. Limit is I_L (nA) < U_R (V) x C(nF)/100.

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.

TABLE 4 - PARAMETER DRIFT VALUES

No.	Characteristics	Symbol	Spec. and/or Test Method	Test Conditions	Change Limits (Δ)	Unit
1	Capacitance Change	$\frac{\Delta C}{C}$	As per Table 2	As per Table 2	±3.0	%

TABLE 5 - CONDITIONS FOR BURN-IN AND OPERATING LIFE TESTS

No.	Characteristic	Symbol	Condition (1)	Unit
1	Ambient Temperature	T_{amb}	+125(+0−5)	°C
2	Test Voltage	V_T	1.15 U_R (Note 2)	V

NOTES

1. Series resistor during burn-in : 1.0MΩ.
2. For U_R, see Column 4 of Table 1(a).

FIGURE 5 - ELECTRICAL CIRCUIT FOR BURN-IN AND OPERATING LIFE TESTS

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC BASIC SPECIFICATION No. 3006)

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at T_{amb} = +22 ± 3 °C.

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points during endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at Tamb = +22 ± 3 °C.

4.8.3 Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at T_{amb} = +22 ± 3 °C.

4.8.4 Conditions for Operating Life Tests (Part of Endurance Testing)

The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 3006. The conditions for operating life testing shall be as specified in Table 5 for the burn-in test.

4.8.5 Electrical Circuits for Operating Life Tests (Figure 5)

Not applicable.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

NO.	ESA/SCC GENERIC SPEC. NO. 3006		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
01	Seal Test (Hermetically Sealed)	Para. 9.2	Not applicable					
02	Rapid Change of Temperature	Paras. 9.3.2, 4.2.4 and 4.2.5 of this spec.	**Initial Measurements** Capacitance **Final Measurements** Visual Examination Capacitance Change Tangent of Loss Angle Change	 Table 2 Item 1 After recovery of 24 ± 2 hours No damage Table 2 Item 1 Table 2 Item 2	 C ΔC/C ΔTgd	 Record values −1.0 -	 +1.0 +10	 % 10^{-4}
03	Corrosion (Hermetically Sealed)	Para. 9.8, Half without sleeving (2)	Not applicable					
04	Robustness of Terminations	Para. 9.9 and Para. 4.3.3 of this spec.	**Final Measurements** Visual Examination	 No damage	 -	 -	 -	
05	Resistance to Soldering Heat	Para. 9.10	**Initial Measurements** Capacitance **Final Measurements** Insulation Resistance Capacitance Change Tangent of Loss Angle	 Table 2 Item 1 After recovery of 1 to 2 hrs Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	 C Ri ΔC/C Tgd	 Record values Table 2 −1.0 -	 - +1.0 Table 2	 %
06	Solderability	Para. 9.11 Method 1	**Final Measurements** Visual Examination	 IEC No. 68-2-20 Para. 4.6.4, 4.7.4 or 4.9.3	 -	 -	 -	
07	Vibration	Paras. 9.12, 4.2.4 and 4.2.5 of this spec.	**Final Measurements** Visual Examination	 No evidence of damage	 -	 -	 -	
08	Shock or Bump	Paras. 9.13, 4.2.4 and 4.2.5 of this spec.	**Final Measurements** Visual Examination	 No evidence of damage, breakdown, arcing or fractures	 -	 -	 -	
09	Climatic Sequence	Paras. 9.14, 4.2.4 and 4.2.5 of this spec.	**Initial Measurements** Capacitance **Final Measurements** Visual Examination Voltage Proof (2) Insulation Resistance (2) Voltage Proof Voltage Proof Insulation Resistance Insulation Resistance Capacitance Change Tangent of Loss Angle Change Partial Discharge (A.C.)	 Table 2 Item 1 After recovery of 24 hrs max. No evidence of corrosion ESA/SCC No. 3006 Para. 9.6.1.1 ESA/SCC No. 3006 Para. 9.6.1.4 Table 2 Item 5 Table 2 Item 6 Table 2 Item 3 Table 2 Item 4 Table 2 Item 1 Table 2 Item 2 Table 2 Item 7	 C - VP_S Ri_S VP VP_B Ri Ri_B ΔC/C ΔTgd QAC	 Record values - Not applicable Not applicable U_R (3) U_R (3) Note 4 Note 4 5.0 −3.0 -	 - - - - - +3.0 +10 2000	 MΩ sec. GΩ % 10^{-4} pC

NOTES: See Page 20.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (CONT'D)

NO.	ESA/SCC GENERIC SPEC. NO. 3006		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
10	Temperature Coefficient	Para. 9.15	Not applicable					
11	Operating Life	Paras. 9.16, 4.2.4 and 4.2.5 of this spec.	**Initial Measurements** Capacitance **During Tests** **Intermediate Measurements** Capacitance Change **Final Measurements** Capacitance Change Tangent of Loss Angle Change Insulation Resistance Insulation Resistance Partial Discharge (A.C.) Visual Examination	 Table 2 Item 1 115% U_R (3) After recovery of 24 ± 2 hours Table 2 Item 1 After 24 hrs recovery Table 2 Item 1 Table 2 Item 2 Table 2 Item 3 Table 2 Item 4 Table 2 Item 7 No evidence of damage or corrosion	 C $\Delta C/C$ $\Delta C/C$ ΔTgd Ri Ri_B QAC -	 Record values -5.0 -5.0 - Note 4 5.0 - -	 +5.0 +5.0 +10 - - 0 - 2000 -	 % % 10^{-4} - GΩ pC pC
12	Permanence of Marking	Para. 9.17	**Final Measurements** Visual Examination	 No corrosion or obliteration of marking	-	-	-	

NOTES

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. If applicable.
3. For U_R, see Column 4 of Table 1(a).
4. Greater than 50% of the value given in Table 2.