INCH-POUND

MIL-C-39006D
AMENDMENT 3
3 April 1997

SUPERSEDING
AMENDMENT 2
30 May 1994

MILITARY SPECIFICATION

CAPACITORS, FIXED, ELECTROLYTIC (NONSOLID ELECTROLYTE),
TANTALUM, ESTABLISHED RELIABILITY,
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-C-39006D, dated 23 December 1992, and is approved for use by all Departments and Agencies of the Department of Defense.

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Following 3.5.3.3.2, add:

"3.5.3.4 Tin plated finishes. Tin plating is prohibited as a final finish or as an undercoat. Tin -lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent (see 6.12)."

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3.14. title, add: "(for qualification only)".

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3.28. title, add: "(for qualification only)".

TABLE III, delete in its entirety and substitute the following:

"TABLE III. Group A inspection.

Inspection	Requirement paragraph	Test paragraph	Sampling procedure
Subgroup 1			
Constant voltage conditioning	3.6	4.7.2	
DC leakage	3.7	4.7.3	
Capacitance	3.8	4.7.4	100% inspection
Dissipation factor	3.9	4.7.5	
Seal, condition A or D (hermetically-sealed styles)	3.10	4.7.6.1	
Subgroup 2 (ppm) 1/			
DC leakage (ppm-2)	3.7	4.7.3	
Capacitance (ppm-2)	3.8	4.7.4	
Dissipation factor (ppm-2)	3.9	4.7.5	See table IV
Mechanical examination (dimensions only) (ppm-3)	3.5	4.7.1	
Subgroup 3			
Solderability	3.15	4.7.11	5 samples 0 failures
Subgroup 4			
Visual examination		4.7.1	
Material	3.1, 3.4, 3.4.1	4.7.1	13 samples
Marking	3.32	4.7.1	0 failures
Workmanship	3.33	4.7.1	

1/ Not applicable for styles which are inactive for new design."

TABLE IV, delete in its entirety and substitute the following:

"TABLE IV. Sampling plans for ppm categories.

Lot size	Sample size ppm-2	Sample size ppm-3
1 - 13	100%	100%
14 - 125	100%	13
126 - 150	125	13
151 - 280	125	20
281 - 500	125	29
501 - 1,200	125	34
1,201 - 3,200	125	42
3,201 - 10,000	192	50
10,001 - 35,000	294	60
35,001 - 150,000	294	74
150,001 - 500,000	345	90
500,001 - UP	435	102

"

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4.6.1.3.3.1, line 1, delete "Thirteen" and substitute "Five".

4.6.1.3.3.3, delete and substitute:

"4.6.1.3.3.3 Disposition of samples. The solderability test is considered a destructive test, and samples submitted to the solderability test shall not be supplied on the contract."

4.6.1.4.1, after the second sentence, add the following: "(NOTE: The manufacturer has the option of using ten sample units from the subgroup 1 tests for subgroup 2 testing.)"

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TABLE V, delete in its entirety and substitute the following:

"TABLE V. Group B inspection.

Test	Requirement paragraph	Test paragraph	Sampling procedure
Subgroup 1			
Stability at low and high temperatures 1/	3.22	4.7.18	13 samples 0 failures
Subgroup 2			
Thermal shock	3.13	4.7.9	10 samples 3/
Life (10,000-hour at 85°C) 2/	3.24.2	4.7.20.2	

1/ For styles CLR79 and CLR81 only. If the manufacturer can demonstrate that this test has been performed five consecutive times with zero failures, this test, with the approval of the qualifying activity, can be performed on an annual basis. If the design, material, construction, or processing of the part is changed, or if there are any quality problems or failures, the qualifying activity may require resumption of the original test frequency.
2/ Unit hours generated shall be used for FR level computation.
3/ No failures allowed for thermal shock test. Life test failures in accordance with MIL-STD-690."

4.6.1.4.2, line 1, delete "group B" and substitute "group B, subgroup 2".

4.6.1.4.3.2, delete and substitute:

"4.6.1.4.3.2 Subgroup 2. A failure in subgroup 2 shall be considered as a noncompliance in accordance with 4.6.2.1.4."

TABLE VI, delete and substitute:

"TABLE VI. Group C inspection.

Test	Requirement paragraph	Test paragraph	Number of sample units to be inspected	Number of failures allowed 1/
Subgroup 1 (every 2 months)				
Seal, condition C (hermetically sealed styles)	3.10	4.7.6.2		
Shock (specified pulse)	3.11	4.7.7	12	
Vibration, high frequency	3.12	4.7.8		
Random vibration 2/	3.26	4.7.22		
Subgroup 2 (every 2 months)				
Terminal strength 3/	3.16	4.7.12		
Surge voltage 3/	3.17	4.7.13		
Moisture resistance 3/	3.18	4.7.14	12	1
Dielectric withstanding voltage (insulated styles) 3/	3.19	4.7.15		
Insulation resistance (insulated styles) 3/	3.20	4.7.16		
Subgroup 3 (every 2 months)				
Reverse voltage (when specified, see 3.1) 3/	3.23	4.7.19	12	
Subgroup 4 (CLR79 and CLR81 only) (every 12 months)				
AC ripple life at 85°C	3.25	4.7.21	4/ 32	1
Subgroup 5 (every 2 months)				
Low temperature (storage) 5/	3.21	4.7.17	12	1
Subgroup 6 (every 12 months)				
Resistance to solvents 5/	3.30	4.7.26	6	1
Resistance to soldering heat 5/	3.31	4.7.27		
Subgroup 7 (CLR79 and CLR81 only) (every 12 months)				
Thermal shock	3.13	4.7.9	6/ 24	1
Subgroup 8 (every month)				
Thermal shock	3.13	4.7.9	10	0
Life (2,000-hour at 125°C)	3.27.1	4.7.23.1	10	1

1/ A sample having one or more defects shall be considered a single failure.
2/ CLR25, CLR27, CLR35, CLR37, CLR71, CLR73, CLR79, and CLR81 "H" designated units only.
3/ If the manufacturer can demonstrate that this test has been performed five consecutive times with zero failures, this test, with the approval of the qualifying activity, can be performed on an annual basis. If the design, material, construction, or processing of the part has changed, or if there are any quality problems or failures, the qualifying activity may require resumption of the original test frequency.
4/ Thirty-two units, eight of each case size.
5/ If the manufacturer can demonstrate that this test has been performed five consecutive times with zero failures, this test, with the approval of the qualifying activity, can be deleted. The manufacturer, however, shall perform this test every three years after the deletion as part of long-term design verification. If the design, material, construction, or processing of the part has changed, or if there are any quality problems, the qualifying activity may require resumption of the specified testing. Deletion of testing does not relieve the manufacturer from meeting the test requirements in case of dispute.
6/ Twenty-four units, six of each case size."

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4.7.2, line 1, delete "85°C" and substitute "85°C, +6°C, -0°C".

* 4.7.2, line 2, delete "48 +5, -0 hours." and substitute "48 hours minimum."

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4.7.9b, delete "+125° +4°, -0°C." and substitute "+125°C, +7°C, -0°C.".

4.7.9c, delete in its entirety and substitute:

"c. Number of cycles: 30. CLR79 and CLR81 only: 300 cycles for qualification and group C, subgroup 7; 30 cycles for group B and group C, subgroup 8."

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4.7.10, title, add: "(for qualification only)".

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4.7.13, line 2, delete "85°C." and substitute "85°C, +6°C, -0°C.".

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4.7.17b, line 1, delete "+125°C +4°C, -0°C" and substitute "125°C, +7°C, -0°C".

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TABLE VII, Temperature column, step 4, delete "+85°C +3°C, -0°C" and substitute "85°C, +6°C, -0°C".

TABLE VII, Temperature column, step 5, delete "+125°C +4°C, -0°C" and substitute "125°C, +7°C, -0°C".

4.7.19, line 3, delete "85°C" (2 places) and substitute "85°C, +6°C, -0°C".

4.7.20.1c, delete "85°C +3°C, -0°C." and substitute "85°C, +6°C, -0°C.".

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4.7.21c, delete "85°C +3°C, -0°C." and substitute "85°C, +6°C, -0°C.".

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4.7.23a, delete "125°C +4°C, -0°C." and substitute "125°C, +7°C, -0°C.".

4.7.23.1c, line 1, delete "125°C" and substitute "125°C, +7°C, -0°C".

4.7.24, title, add: "(for qualification only)".

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Following 6.11, add:

"6.12 Tin plated finishes. Tin plating is prohibited (see 3.5.3.4) because it may result in tin whisker growth. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information, see ASTM B545, Standard Specification for Electrodeposited Coating of Tin."

The margins of this amendment are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 85
NASA - NA

Review activities:
Army - AR
Navy - AS, MC, OS, SH
Air Force - 19, 99

Preparing activity:
DLA - CC

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