REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	Correction to testing parameters	14 August 2007	Michael A. Radecki

Prepared in accordance with ASME Y14.100-2000

Source control drawing

REV STATUS OF PAGES																		
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PMIC N/A	**PREPARED BY** Ken Bernier	**DESIGN ACTIVITY:** **DEFENSE SUPPLY CENTER, COLUMBUS** **COLUMBUS, OH**
Original date of drawing	**CHECKED BY** Ken Bernier	**TITLE** CAPACITORS, FIXED ELECTROLYTIC (NONSOLID ELECTROLYTE), TANTALUM ANODE AND CATHODE
	APPROVED BY Michael A. Radecki	
	SIZE A / **CODE IDENT. NO.** 037Z3	**DWG NO.** 05017
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AMSC N/A

5910-E366

1. SCOPE

1.1 Scope. This drawing is a replacement for the canceled MIL-PRF-83500/1 and describes the complete requirements for capacitors, fixed electrolytic ((nonsolid electrolyte), tantalum anode and cathode).

1.2 Part or Identifying Number (PIN). The complete PIN is as follows:

05017	-	XXXX
Drawing number		Dash number (see Table I)

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202	-	Electronic and Electrical Component Parts.
MIL-STD-810	-	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1285	-	Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

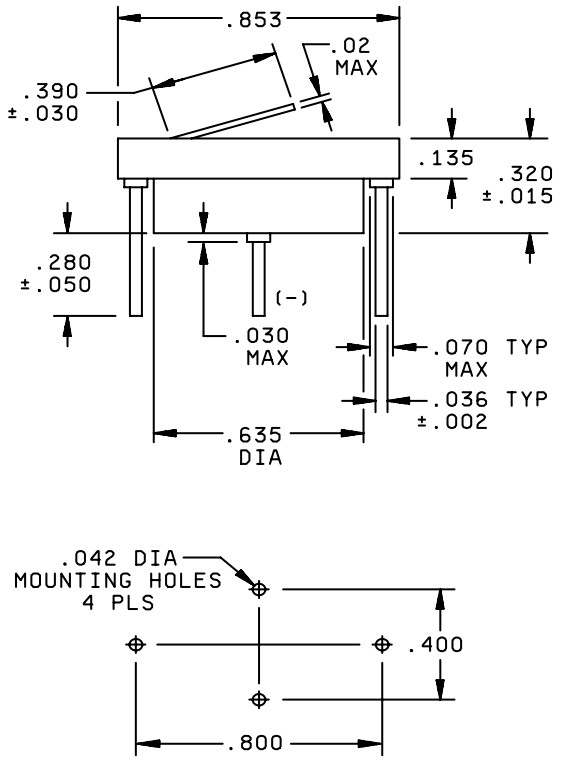

FIGURE 1A.

NOTES:

1. All dimensions in inches.
2. Metric equivalents (to the nearest 0.01 mm) are given for general information only.
3. Unless otherwise specified, tolerance is ± .062 (1.57 mm).

Inches	mm	Inches	mm
.002	0.05	.135	3.43
.015	0.38	.280	7.11
.020	0.50	.320	8.13
.030	0.76	.390	9.91
.036	0.91	.400	10.16
.042	1.07	.635	16.13
.050	1.27	.800	20.32
.070	1.78	.853	21.67

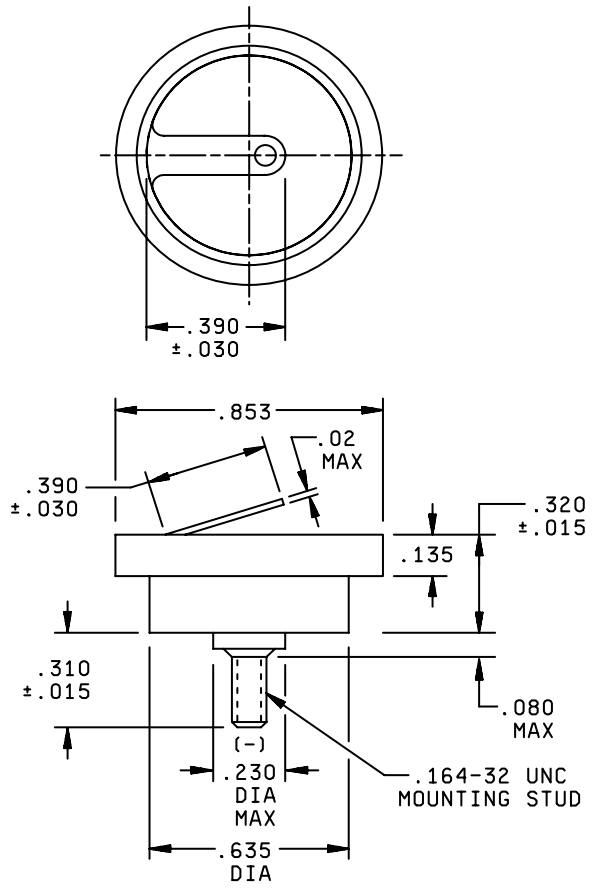

FIGURE 1B.

NOTES:

1. All dimensions in inches.
2. Metric equivalents (to the nearest 0.01 mm) are given for general information only.
3. Unless otherwise specified, tolerance is ± .062 (1.57 mm).

Inches	mm	Inches	mm
.015	0.38	.310	7.87
.020	0.50	.320	8.13
.030	0.76	.390	9.91
.080	2.03	.635	16.13
.135	3.43	.853	21.67
.230	5.84		

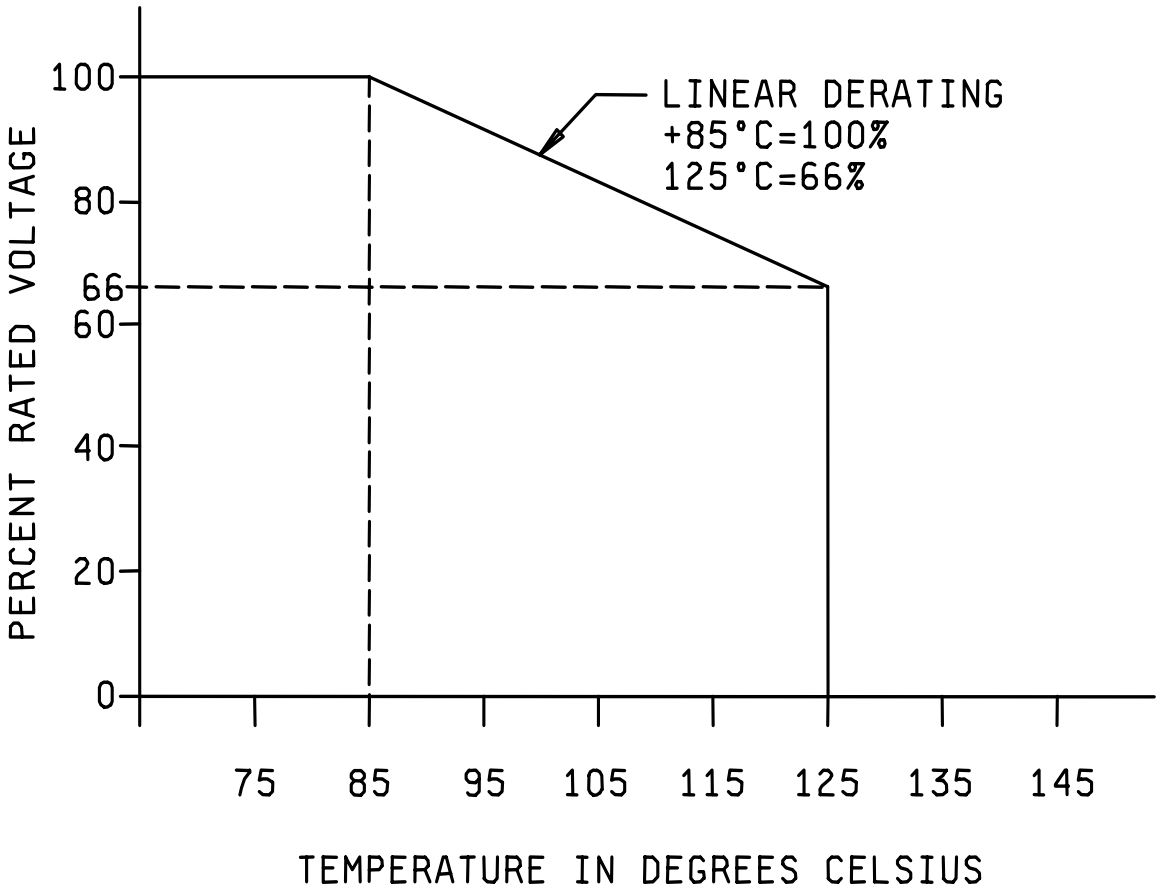

FIGURE 2. Voltage derating with temperature.

TABLE I. Capacitor characteristics.

PIN	Cap At 50 Hz	Rated voltage	Derated voltage	Dissipation Factor at 50 Hz		Capacitance change			DC Leakage current		Impedance	Figure
	±20%	85°C	125°C	25°C	125°C	-55°C	85°C	125°C	25°C	125°C	-55°C	
	µF	Volts	Volts	percent	percent	percent	percent	percent	µA	µA	Ohms	
0001	1200	6	4.0	75.0	95.0	-90.0	30	35	15.0	50	5.0	1A
1001	1200	6	4.0	75.0	95.0	-90.0	30	35	15.0	50	5.0	1B
0002	1000	8	5.3	65.0	85.0	-90	27	30	10.0	50	5.0	1A
1002	1000	8	5.3	65.0	85.0	-90	27	30	10.0	50	5.0	1B
0003	820	10	6.6	55.0	70.0	-85	22	25	10.0	50	5.0	1A
1003	820	10	6.6	55.0	70.0	-85	22	25	10.0	50	5.0	1B
0005	680	15	10.0	45.0	55.0	-85	17.5	20	8.0	50	5.0	1A
1005	680	15	10.0	45.0	55.0	-85	17.5	20	8.0	50	5.0	1B
0007	560	20	13.4	35.0	45.0	-85	17.5	20	5.0	50	5.0	1A
1007	560	20	13.4	35.0	45.0	-85	17.5	20	5.0	50	5.0	1B
0009	470	20	13.4	30.0	40.0	-85	12.5	15	5.0	50	5.0	1A
1009	470	20	13.4	30.0	40.0	-85	12.5	15	5.0	50	5.0	1B
0011	390	20	13.4	25.0	30.0	-80	12.5	15	5.0	50	5.0	1A
1011	390	20	13.4	25.0	30.0	-80	12.5	15	5.0	50	5.0	1B
0013	330	30	20.0	20.0	25.0	-75	12.5	15	5.0	50	5.0	1A
1013	330	30	20.0	20.0	25.0	-75	12.5	15	5.0	50	5.0	1B
0015	270	30	20.0	17.0	20.0	-70	12.5	15	5.0	50	5.0	1A
1015	270	30	20.0	17.0	20.0	-70	12.5	15	5.0	50	5.0	1B
0017	220	50	33.3	14.0	18.0	-70	12.5	15	3.0	50	5.0	1A
1017	220	50	33.3	14.0	18.0	-70	12.5	15	3.0	50	5.0	1B
0019	180	50	33.3	11.5	15.0	-65	12.5	15	3.0	50	5.0	1A
1019	180	50	33.3	11.5	15.0	-65	12.5	15	3.0	50	5.0	1B
0021	150	50	33.3	9.5	12.0	-65	10	12.5	3.0	50	5.0	1A
1021	150	50	33.3	9.5	12.0	-65	10	12.5	3.0	50	5.0	1B
0023	120	75	50.0	7.5	10.0	-55	10	12.5	3.0	50	5.0	1A
1023	120	75	50.0	7.5	10.0	-55	10	12.5	3.0	50	5.0	1B
0025	100	75	50.0	7.0	9.0	-40	10	12.5	3.0	50	5.0	1A
1025	100	75	50.0	7.0	9.0	-40	10	12.5	3.0	50	5.0	1B
0027	82	75	50.0	5.5	7.0	-30	10	12.5	3.0	50	5.0	1A
1027	82	75	50.0	5.5	7.0	-30	10	12.5	3.0	50	5.0	1B
0029	68	75	50.0	5.0	6.5	-30	8	10	3.0	50	5.0	1A
1029	68	75	50.0	5.0	6.5	-30	8	10	3.0	50	5.0	1B
0031	56	100	66.7	3.5	4.5	-25	8	10	3.0	50	5.0	1A
1031	56	100	66.7	3.5	4.5	-25	8	10	3.0	50	5.0	1B
0033	47	125	83.3	3.0	4.0	-20	8	10	3.0	50	5.0	1A
1033	47	125	83.3	3.0	4.0	-20	8	10	3.0	50	5.0	1B

3. REQUIREMENTS

3.1 Design and construction:

3.1.1 Dimensions and configuration: See figure 1A, and figure 1B.

3.1.2 Case type: Tantalum anode and cathode with outer jacket of nickel.

3.1.3 Seal type: Nonhermetic.

3.1.4 Terminals: See figure 1A, and figure 1B.

3.1.5 Materials. Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the capacitors and retainers to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.1.5.1 Pure tin. The use of pure tin is prohibited both internally and externally. Tin content of capacitor components and solder shall not exceed 97 percent. Tin shall be alloyed with a minimum of 3 percent lead. (see 6.6).

3.1.6 Rated temperature: -55°C to +85°C, voltage de-rated linearly to a maximum of 66 percent of rated voltage between +85°C to +125°C.

3.1.7 Inspection conditions: Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in the “GENERAL REQUIREMENTS” of MIL-STD-202, except relative humidity shall not exceed 75 percent. Unless otherwise specified, accuracy of all test voltage measurements shall be within ±2.0 percent of specified voltage.

3.2 Electrical characteristics

3.2.1 Rated voltage: See table I.

3.2.2 Burn-in. Capacitors shall be subjected to five cycles of thermal shock as specified in 3.3.3. Capacitors shall be conditioned at +85°C +6°C -0°C with the applicable rated voltage applied through a 1,000 ± 100 ohm resistor for a period of 48 +5, -0 hours. Capacitors shall be returned to room ambient temperature and shall then be visually examined for mechanical damage and leakage of electrolyte. Detection of leakage of electrolyte shall be determined by the use of thymol blue or other suitable chemical indication solution.

3.2.3 DC leakage (DCL) (max) (at 25°C): See table I.

3.2.4 Capacitance (Cap.) (nom): (See table I). Capacitance shall be measured in accordance with Method 305 or MIL-STD-202, (see table I).

3.2.5 Capacitance tolerance ±20 percent.

3.2.6 Dissipation factor (see table I): The dissipation factor shall be determined by a polarized bridge. Measurement accuracy shall be within ±2 percent.

3.3 Environmental tests: In addition to conforming to electrical requirements each device shall be capable of withstanding the following environmental tests as specified.

3.3.1 Shock (specified pulse). Capacitors shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply:

a. Mounting method: Normal mounting means.

b. Test condition: I (100 G).

c. Measurement and electrical loading during test: DC rated voltage (see table I) shall be applied to the capacitor during test. Observation shall be made to determine intermittent contacts or arcing or open or short circuiting. Detecting equipment shall be sufficiently sensitive to detect any interruption of 0.5 ms or greater duration.

d. Inspection after test: Capacitors shall be visually examined for arcing, breakdown, mechanical damage, and leakage of electrolyte.

3.3.2 Vibration high frequency. Capacitors shall be tested in accordance with method 204 of MIL-STD-202. The following details and exceptions shall apply:

a. Mounting of specimens: External mounting means.

b. Test condition: D (20 G), with the following exception: For capacitors with radial pin terminals, the motion shall be applied for a total of 8 hours (4 hours in each of two mutually perpendicular directions, one parallel and the other perpendicular to the capacitor body).

c. Measurements: During the last 30 minutes of vibration in each direction, an electrical measurement shall be made on the capacitors to determine intermittent contacts or open or short-circuiting. Detecting equipment shall be sufficiently sensitive to detect any interruption of 0.5 ms or greater duration.

d. Measurements after cycling: DC leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively. Capacitors shall meet the following requirements:

DC leakage	Shall not exceed 125 percent of the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±5 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed 115 percent of the initial requirement (see 3.2.6).

e. Examination after test: Capacitors shall be visually examined for mechanical damage and leakage of electrolyte. Detection of leakage of electrolyte shall be determined by the use of thymol blue or other suitable chemical indication solution.

3.3.3 Thermal shock. Capacitors shall be tested in accordance with method 107 of MIL-STD-202. The following details and exceptions shall apply:

Visual inspection	There shall be no evidence of mechanical damage, obliteration of marking, or leakage of electrolyte.

a. Conditioning prior to first cycle: Fifteen minutes at room ambient conditions (see 3.1.7).

b. Test condition: A (except step 3 temperature shall be +125°C, +4°C, -0°C): steps 1 and 3 shall be 30 minutes; and steps 2 and 4 shall be 10 to 15 minutes.

c. Number of cycles: 25 cycles).

d. Measurements before cycling: Not applicable.

Measurements after cycling: DC leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively. Capacitors shall meet the following requirements:

DC leakage	Shall not exceed 125 percent of the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±5 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed 115 percent of the initial requirement (see 3.2.6).

e. In addition, capacitors shall be externally examined for leakage of electrolyte. Detection of leakage of electrolyte shall be determined by the use of thymol blue or other suitable chemical indication solution.

Visual inspection	There shall be no evidence of mechanical damage, obliteration of marking, or leakage of electrolyte.

3.3.4 Salt atmosphere. Capacitors shall be tested in accordance with method 101 of MIL-STD-202. The following details and exception shall apply:

a. Test condition: B (48 hours).

b. Measurements after exposure: Not applicable.

c. Examination after test: After the test, capacitors shall be washed, and then air-dried for 24 hours. The capacitors shall then be examined for evidence of harmful corrosion, loss of plating, and legibility of marking.

3.4 Solderability (capacitors with radial pin terminals and terminal tabs only). Capacitors shall be tested in accordance with method 208 of MIL-STD-202. The following details shall apply:

a. Depth of immersion: Terminals shall be immersed up to .062 inch (1.57 mm) of the welded joint or up to .156 inch (3.96 mm) of the body, whichever applies.

3.5 Terminal strength. Capacitors shall be tested in accordance with 3.5.1 through 3.5.3, as applicable.

3.5.1 Pull test (radial pin and stud terminals). Capacitors shall be tested in accordance with method 211 of MIL-STD-202. The following details and exception shall apply:

a. Test condition: A.

b. Applied force: 10 pounds, +2, -0 ounces.

c. Duration of applied force: 30 +5, -0 seconds.

3.5.2 Bend test (radial pin terminals and capacitors with terminal tabs only). Capacitors when be tested in accordance with method 211 of MIL-STD-202. The following details and exception shall apply:

a. Test condition: B.

b. Number of bends: Two, 90 degrees each for terminal tabs; or two 45 degrees each for radial pin terminals. Capacitors with radial pin terminals shall be secured in position as shown on figure 3.

3.5 3 Torque test (stud terminals only). Capacitors shall be tested in accordance with method 211 of MIL-STD-202. The following details shall apply:

a. Test condition: E.

b. Torque to be applied: 11 pound-inches.

After the tests, the terminals, terminal weld, and seals shall be examined for loosening or permanent damage.

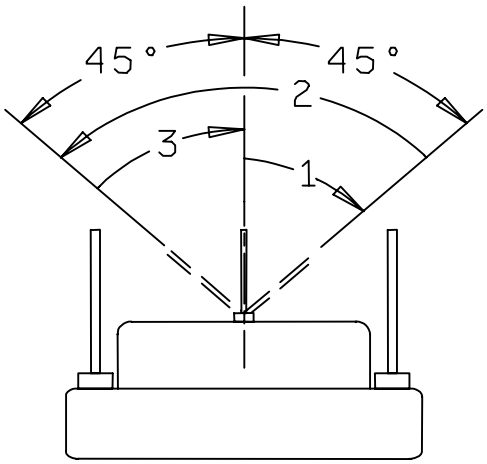

FIGURE 3 Wire-lead bend test.

3.6 Surge voltage (see table IV) Capacitors shall be subjected to 1,000 cycles of the applicable dc surge voltage specified in table II. The ambient temperature during cycling shall be +85°C +6°C -0°C. Each cycle shall consist of a 30-second surge voltage application followed by a 5.5 minute discharge period. Voltage application shall be made through a resistance of 10 +0, -2 ohms including the source in series with the capacitor and the voltage source. Each surge voltage cycle shall be performed in such a manner that the capacitor is discharged through a 10 +0, -2, ohm resistor at the end of the 30-second application. The test shall be terminated on the discharge portion of the cycle. During the test, an electrical measurement shall be made to detect intermittent contacts and opened or shorted. After the test, capacitors shall be visually examined for mechanical damage and leakage of electrolyte.

TABLE II. DC surge voltages, derated surge voltages, and rated voltages.

DC surge voltage at 85°C	Derated surge voltage at 125°C	DC rated voltage at 85°C
143.8	94.9	125
115.0	75.9	100
86.3	56.9	75
57.5	37.8	50
34.5	22.8	30
23.0	15.2	20
17.3	11.4	15
11.5	7.6	10
9.2	6.1	8
6.9	4.6	6

3.7 Moisture resistance. Capacitors shall be tested in accordance with method 106 of MIL-STD-202.The following details and exception shall apply:

a. Mounting: Except during examination and measurements, capacitors shall be securely fastened by normal mounting means.

b. Initial measurements: Not applicable.

c. Polarization and loading voltage: 6 volts dc or rated voltage, whichever is less.

d. step 7b: Vibration is not required during step 7b.

e. Final measurements: After the final cycle and within 2 to 6 hours after removal of capacitors from the humidity chamber, the dc leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively.

DC leakage	Shall not exceed 125 percent of the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±8 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed 115 percent of the initial requirement (see 3.2.6).

f. Examination after test: Capacitors shall be visually examined for evidence of harmful corrosion, mechanical damage, obliteration of marking, and leakage of electrolyte.

Visual inspection	There shall be no evidence of mechanical damage, obliteration of marking, or leakage of electrolyte.

3.8 Low temperature (storage). Capacitors shall be tested in accordance with Procedure I of method 502 of MIL-STD-810. The following details and exceptions shall apply:

a. Pretest data required: DC leakage, capacitance, and dissipation factor measurements obtained from 3.2.3, 3.2.4, and 3.2.6 respectively.

b. Storage temperature and exposure time: -62°C +0°C, -3°C for 72 hours, followed by a 1-hour exposure at +125°C +4°C, -0°C within 24 hours after low temperature storage.

c. Steps not required: Steps 3, 4, and 5.

d. Measurements after exposure: Capacitors shall be returned to the inspection conditions specified in 3.1.7; and within 24 hours after exposure, dc leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively.

DC leakage	Shall not exceed the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±5 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed the initial requirement (see 3.2.6).

e. Examination after test: Capacitors shall be externally examined for leakage of the electrolyte. Detection of leakage of electrolyte shall be determined by the use of thymol blue or other suitable chemical indicator solution.

Visual inspection	There shall be no evidence of mechanical damage, obliteration of marking, or leakage of electrolyte.

3.9 Impedance. Capacitors shall be conditioned at -55°C, +0°C, -3°C for a period of not less than 30 minutes or until stable measurements can be obtained. The impedance shall then be measured directly or determined from measurements obtained on a bridge. Measurements shall be made at 125 ±5 Hz. Measurement accuracy shall be within ±5 percent.

3.10 Stability at low and high temperatures: The measurements specified in table III shall be made in the order shown. Capacitors shall be brought to thermal stability before the measurements are made. Thermal stability will have been reached when no further change in capacitance is observed between two successive measurements taken at 15-minute intervals.

Step 1 (+25°C):

DC leakage	Shall not exceed initial requirement (see table I).
Capacitance	Shall be within the applicable tolerance specified (see table I).
Dissipation factor	Shall not exceed initial requirement (see table I).

Step 2 (-55°C):

Impedance	Shall not exceed the applicable value specified (see table I).
Capacitance	Shall change not more than the percent specified (see table I) from the step 1 measured value.

Step 3 (+25°C):

DC leakage	Shall not exceed initial requirement (see table I).
Capacitance	Shall change not more than ±5 percent from step 1 measured value.
Dissipation factor	Shall not exceed initial requirement (see table I).

Step 4 (+85°C):

DC leakage	Shall not exceed the applicable value specified (see table I).
Capacitance	Shall change not more than the percent specified (see table I) from the step 1 measured value.
Dissipation factor	Shall not exceed the applicable value specified (see table I).

Step 5 (+125°C):

DC leakage	Shall not exceed the applicable value specified (see table I).
Capacitance	Shall change not more than the percent specified (see table I) from the step 1 measured value.
Dissipation factor	Shall not exceed the applicable value specified (see table I).

Step 6 (+25°C):

DC leakage	Shall not exceed the initial requirement (see table I).
Capacitance	Shall change not more than ±5 percent from the step 1 measured value.
Dissipation factor	Shall not exceed the initial requirement.

TABLE III. Temperatures and measurements for stability tests at low and high temperatures.

Step	Temperature	Measurement	Test paragraph
1	+25°C	DC leakage Capacitance Dissipation factor	3.2.3 3.2.4 3.2.6
2	-55°C +0°C, -3°C	Impedance Capacitance	3.9 3.2.4
3	+25°C	DC leakage Capacitance Dissipation factor	3.2.3 3.2.4 3.2.6
4	+85°C +3°C, -0°C	DC leakage Capacitance Dissipation factor	3.2.3 3.2.4 3.2.6
5	+125°C +4°C, -0°C	DC leakage 1/ Capacitance Dissipation factor	3.2.3 3.2.4 3.2.6
6	+25°C	DC leakage Capacitance Dissipation factor	3.2.3 3.2.4 3.2.6

1/ During this measurement, de-rated voltage (see table I) shall be applied.

3.11 Reverse voltage. Capacitors shall be subjected to a dc potential of 3 volts, applied in the reverse polarity direction, for 125 ±10 hours. The ambient temperature during the test shall be +125°C, +4°C, -0. °C. Capacitors shall be maintained at the +125°C temperature and de-rated voltage shall be applied in the forward polarity direction for an additional period of 125 ±10 hours. Capacitors shall then be returned to room ambient temperature and dc leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6, respectively.

DC leakage	Shall not exceed 125 percent of the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±10 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed the initial requirement (see 3.2.6).

3.12 Life at 85°C.

3.12.1 240 hour inspection. Capacitors shall meet the following requirements.

a. Mounting: Normal mounting means.

b. Test temperature and tolerance: +85°C, +3°C, -0°C.

c. Operating conditions: DC rated voltage (see table I) shall be applied gradually (not to exceed 5 minutes either by a slow buildup of the voltage or through a resistor which shall be shorted out within 5 minutes). Voltage shall be applied continuously except for measurement periods. The impedance of the voltage source, as seen from the terminals of each capacitor, shall not exceed 10 ohms. Storage batteries (or an electronic power supply) capable of supplying at least 100 milliamperes when a capacitor is shorted out shall be used.

d. Test condition: B (240 +48, -0 hours).

e. Measurements during exposure (at +85°C): DC leakage shall be measured as specified in 3.2.3 during the first hour of exposure and then at 240 +48, -0 hours.

f. Measurements after exposure: Capacitors shall be returned to the inspection conditions specified in 3.1.7 and the dc leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively. Capacitors shall then be visually inspected for evidence of mechanical damage, obliteration of marking, and leakage of electrolyte.

DC leakage	Shall not exceed 125 percent of the initial requirement (see 3.2.3).
Capacitance	Shall not change more than ±5 percent from the initial measured value (see 3.2.4).
Dissipation factor	Shall not exceed 115 percent of the initial requirement (see 3.2.6).
Visual inspection	There shall be no evidence of mechanical damage, obliteration of marking, or leakage of electrolyte.

3.13 Fungus. Unless certification is substituted, capacitors shall be tested in accordance with method 508 of MIL-STD-810. Pretest and posttest measurements are not required.

NOTE: Fungus certification: The manufacturer shall certify that all external materials are fungus resistant or shall perform the test specified in 3.13. When capacitors are tested as specified in 3.13, examination shall disclose no evidence of fungus growth on the external surface of the capacitor.

3.14 Resistance to solvents. Capacitors shall be tested in accordance with method 215 of MIL-STD-202.

3.15 Resistance to soldering heat (capacitors with terminal tabs only). Capacitors shall be tested in accordance with method 210 of MIL-STD-202.

a. Depth of immersion: Within .250 in (6.35 mm) of the seal or case.

b. Test condition: B (260°C ±5°C; 10 ±1 seconds).

c. Cooling time prior to final measurements: 10 ±1 minutes.

d. Measurements after test: DC leakage, capacitance, and dissipation factor shall be measured as specified in 3.2.3, 3.2.4, and 3.2.6 respectively.

DC leakage	Shall not exceed the initial requirement (see table I).
Capacitance	Shall change not more than ±5 percent from the initial measured value.
Dissipation factor	Shall not exceed the initial requirement (see table I).

3.16 Visual and mechanical inspection. Capacitors shall be examined to verify that the materials, design, construction, physical dimensions, marking and workmanship are in accordance with the applicable requirements (see 3.3.1, 3.1.5, 3.17, and 3.21).

3.17 Marking: Marking shall be in accordance with MIL-STD-1285, except the capacitor shall be marked with the PIN as specified herein (see 1.2), the manufacturers name or Commercial and Government Entity cage code, date lot code and polarity.

3.18 Manufacturer eligibility. To be eligible for listing as a suggested source of supply, a manufacturer shall be listed on the MIL-PRF-39006 Qualified Products List for at least one part, or perform the group A and group C inspections specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.

3.19 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a approved source of supply.

3.20 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.21 Workmanship. The capacitor shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of all tests specified in groups A and B of this drawing

4.2.2 Certification. The procuring activity, at its discretion, may accept a certificate of compliance for group B requirements in lieu of performing group B testing.

4.3 Group A inspection Group A inspection shall be performed as shown in table IV.

Table IV. Group A inspection.

Examination or test	Requirement paragraph	Sampling Procedure
Subgroup 1		
Burn-in	3.2.2	100 percent inspection
DC leakage	3.2.3	
Capacitance	3.2.4	
Dissipation factor	3.2.6	
Subgroup 2		
Visual and mechanical Examination (external)	3.16	5 samples 0 failures
Materials	3.1.5	
Physical dimensions	3.1.1	
Marking 1/	3.15	
Workmanship	3.18	

1/ Marking defects shall be based on visual inspection only. Any subsequent electrical defects shall not be used as a basis for determining marking defects.

Table V. Group B inspection.

Examination or test	Requirement paragraph	Sampling Procedure
Subgroup 1		
Thermal shock 1/	3.3.3	5 samples
Life at 85°C (240-hour)	3.11	0 failures
Subgroup 2		
Stability at low and high temperatures	3.9	5 samples 0 failures
Subgroup 3		
Surge voltage	3.6	12 samples 0 failures

1/ Twenty-five cycles. No failures allowed.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature, which may be helpful, but is not mandatory.)

6.1 Intended use. Capacitors covered by this specification are military unique due to the fact that these devices must be able to operate satisfactorily in military systems under the following demanding conditions: -55°C to +125°C operating temperature range.

6.2 Ordering data. The contract or purchase order should specify the following:

a. Complete PIN (see 1.2).

b. Requirements for delivery and one copy of the quality conformance inspection data or certificate of compliance that parts have passed quality conformance inspection with each shipment of parts by the manufacturer.

c. Requirements for packaging and packing.

6.3 Users of record. Coordination of this document for future revisions are coordinated only with the approved sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or e-mailed to capacitorfilter@dla.mil also by telephone (614) 692-0563 or DSN 850-0563.

6.4 Life degradation. The life of these capacitors is primarily dependent upon voltage and temperature. When increased life is desired, capacitors may be further de-rated from the conditions specified in the specification. Under no condition should these capacitors be subjected to voltages above the de-rated voltage at the maximum rated temperature.

6.5 Tin-plated finishes. Tin plating is prohibited (see 3.1.5.1) 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 B 545 (Standard Specification for Electrodeposited Coating of Tin).

6.6 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or e-mailed to capacitorfilter@dla.mil also by telephone (614) 692-0563 or DSN 850-0563.

6.7 Cross reference table. Table VI is a cross reference table between DSCC drawing 05017 and MIL-PRF-83500 capacitor part numbers.

Table VI. Cross reference between DSCC drawing 05017 and MIL PRF-83500 part numbers.

DSCC drawing PIN 05017-	MIL-PRF-83500/1 PIN
0001	M83500/01-0001
1001	M83500/01-1001
0002	M83500/01-0002
1002	M83500/01-1002
0003	M83500/01-0003
1003	M83500/01-1003
0005	M83500/01-0005
1005	M83500/01-1005
0007	M83500/01-0007
1007	M83500/01-1007
0009	M83500/01-0009
1009	M83500/01-1009
0011	M83500/01-0011
1011	M83500/01-1011
0013	M83500/01-0013
1013	M83500/01-1013
0015	M83500/01-0015
1015	M83500/01-1015
0017	M83500/01-0017
1017	M83500/01-1017
0019	M83500/01-0019
1019	M83500/01-1019
0021	M83500/01-0021
1021	M83500/01-1021
0023	M83500/01-0023
1023	M83500/01-1023
0025	M83500/01-0025
1025	M83500/01-1025
0027	M83500/01-0027
1027	M83500/01-1027
0029	M83500/01-0029
1029	M83500/01-1029
0031	M83500/01-0031
1031	M83500/01-1031
0033	M83500/01-0033
1033	M83500/01-1033

Table VII. Similar vendor types.

1/ DSCC drawing PIN 05017-	Vendor "A" similar vendor type
0001	402/1/50158/020
1001	402/1/50157/020
0002	402/1/50158/019
1002	402/1/50157/019
0003	402/1/50158/018
1003	402/1/50157/018
0005	402/1/50158/017
1005	402/1/50157/017
0007	402/1/50158/016
1007	402/1/50157/016
0009	402/1/50158/015
1009	402/1/50157/015
0011	402/1/50158/014
1011	402/1/50157/014
0013	402/1/50158/013
1013	402/1/50157/013
0015	402/1/50158/012
1015	402/1/50157/012
0017	402/1/50158/011
1017	402/1/50157/011
0019	402/1/50158/010
1019	402/1/50157/010
0021	402/1/50158/009
1021	402/1/50157/009
0023	402/1/50158/008
1023	402/1/50157/008
0025	402/1/50158/007
1025	402/1/50157/007
0027	402/1/50158/006
1027	402/1/50157/006
0029	402/1/50158/005
1029	402/1/50157/005
0031	402/1/50158/004
1031	402/1/50157/004
0033	402/1/50158/003
1033	402/1/50157/003

1/ Parts must be purchased to DSCC PIN to assure all performance and tests are met.

Vendor	Vendor CAGE Number	Vendor name and address
A	U2391	Arcotronics Limited Wood Burcote Trading Estate, Burcote Road Towcester Northants England, NN12 6LX