

INCH-POUND

MIL-R-39017E
AMENDMENT 4
7 March 1996
SUPERSEDING
AMENDMENT 3
3 October 1994

MILITARY SPECIFICATION
RESISTORS, FIXED, FILM (INSULATED)
ESTABLISHED RELIABILITY,
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-R-39017E, dated 19 March 1991,
and is approved for use by all Departments and Agencies of the
Department of Defense.

PAGE 2

1.2.1.3, TABLE II, title, add: "1". Also, at bottom of table add the following footnote:

"1/ The resistance tolerance available is characteristic dependent (see 3.1)."

PAGES 4 AND 5

TABLE V, delete all "0.1" percent columns in their entirety.

PAGE 5

TABLE V, second "1.0" percent column, line 4: Add "40.20".

PAGE 6

• 2.1.1, SPECIFICATION, MILITARY "MIL-F-14256 - Flux Soldering, Liquid (Rosin Base), delete in its entirety.

• 2.1.2, after EIA documents, add the following:

"(Application for copies should be addressed to the Electronic Industries Association, 2500 Wilson Boulevard,
Arlington, VA 22201-3834.)"

2.1.2, after application note, add the following:

"AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B545 - Standard Specification for Electrodeposited Coatings of Tin.

ASTM D1193 - Reagent Water.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street,
Philadelphia, PA 19103-1187.)"

AMSC N/A

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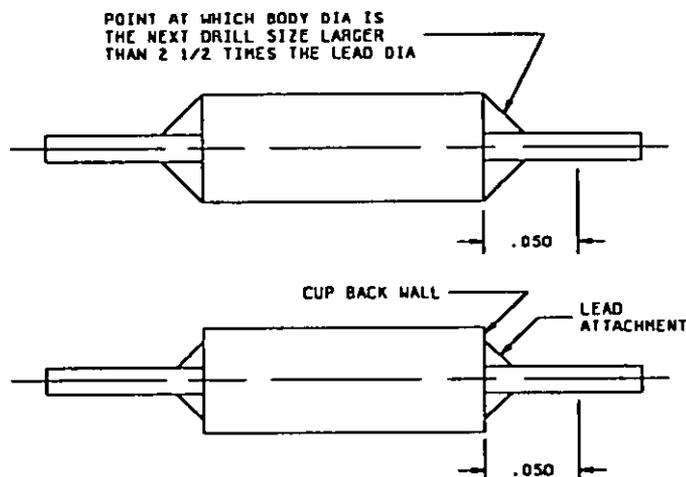
FSC 5905

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

After 3.5.3, add the following new paragraph:

"3.5.3.1 Tin plated finishes. Use of tin plating is prohibited as a final finish and as an undercoat (see 6.15). Use of tin-lead (Sn-Pb) finishes are acceptable provided that minimum lead content is 3 percent."

FIGURE 1, delete and substitute the following:



NOTE: Exposed copper or base metal due to lead attachment within .050 (1.27 mm) of the resistor body shall not be considered a reliability problem .

FIGURE 1. Solderability requirements. "

*3.5.4, delete in its entirety, and substitute:

"3.5.4, Flux. The manufacturer shall verify by certification that only noncorrosive solder flux shall be used unless it can be shown that corrosive elements have been removed satisfactory after soldering. The flux shall be of such a quality as to enable the resistor to meet the requirements of this specification. If cored solders are used, the proportion of flux to solder by volume shall be between 1 percent and 3 percent."

3.6, line 4: Delete "(see 6.5)" and substitute "(see 6.6)".

3.11, line 4, add the following: "or ± 0.035 percent per degree Celsius (350 ppm/ $^{\circ}$ C) as applicable".

3.27.1, line 2: Delete "(see 6.1)" and substitute "(see 6.2)".

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PAGE 13

4.1.1, line 2: Delete "inspection" and substitute "inspections".

PAGE 14

4.1.2, add the following sentence:

"In addition, the manufacturer shall demonstrate resistance temperature characteristic (RTC) control in process."

4.4.2, fourth sentence: Delete "Ten or 20" and substitute "Twelve".

After 4.4.2, add the following paragraph:

"As an option, the manufacturer may develop a control procedure for minimum stabilization times required for RTC testing. This procedure shall detail specific time elements required to reach thermal and electrical stability for specific part designs. Documentation of this procedure and supporting data shall be submitted to the qualifying activity for approval. Upon approval by the qualifying activity, the manufacturer may use this procedure for minimum stabilization times for RTC testing."

PAGE 15

TABLE VIII, Group II, under "Number of sample units" and "Number of defectives allowed": Delete in their entirety and substitute "12 sample units" and "0", respectively.

PAGE 17

4.6.1, add the following new sentence:

"Group B inspection for preparation of delivery is not required when the qualifying activity has allowed group B testing to be performed annually (see table X)."

PAGE 19

4.6.1.2.3.2, line 4: Delete "found removed" and substitute "found shall be removed".

4.6.1.2.4, line 3: Delete "selected, if" and substitute "selected. If".

4.6.1.2.5.2b., last sentence, delete in its entirety and substitute:

"If the lot fails this solderability test the lot may be reworked a second time and retested. If the lot fails the second rework, the lot shall be considered rejected and shall not be furnished against the requirements of this specification."

PAGE 21

4.6.1.3.1.1, line 3: Delete "If one or more defects are found, a new sample" and substitute "A new sample".

4.6.1.3.1.2, line 3: Delete "If one or more defects are found, a new sample" and substitute "A new sample".

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TABLE X, delete and substitute:

TABLE X. Group B inspection. 1/

Test	Requirement paragraph	Method paragraph	Number of samples
<u>Subgroup 1</u>			
Resistance-temperature characteristic	3.11	4.7.5] 13
Short-time overload	3.14	4.7.8	
<u>Subgroup 2</u>			
Resistance to solvents	3.17	4.7.11	8

1/ If the manufacturer can demonstrate that these tests have been performed five consecutive times with zero failures, the frequency of these tests, 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."

PAGE 22

4.6.2.1.3, line 4: Delete "processes," and substitute "processes, etc.". Line 5: Delete "essentially the" and substitute "essentially the same conditions with essentially the". Line 14: Delete "the failure" and substitute "the failure and corrective action".

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TABLE XI, delete and substitute:

"TABLE XI. Group C inspection.

Inspection	Requirement paragraph	Method paragraph	Number of sample units for inspection	Number of defectives allowed
<u>Monthly</u>				
<u>Subgroup 1</u>				
Life	3.24	4.7.18	See 4.6.2.1.1	
<u>Subgroup 2</u>				
Thermal shock	3.10	4.7.4] 10]] 1]
Resistance to soldering heat	3.20	4.7.14		
Moisture resistance	3.21	4.7.15		
<u>Quarterly</u>				
<u>Subgroup 1 1/</u>				
Shock (specified pulse)	3.22	4.7.16] 10]] 1]
Vibration, high frequency ^t	3.23	4.7.17		
<u>Subgroup 2 1/</u>				
Dielectric withstanding voltage	3.18	4.7.12] 10]] 1]
Insulation resistance	3.19	4.7.13		
Low-temperature storage	3.12	4.7.6		
Terminal strength	3.15	4.7.9		
<u>Semiannual 2/</u>				
High temperature exposure	3.25	4.7.19	102	1

1/ If the manufacturer can demonstrate that these tests have been performed five consecutive times with zero failures, these tests, with the approval of the qualifying activity, can be deleted. The manufacturer, however, shall perform these tests every three years after the deletion as part of long term design verification. If the design, material, construction or processing of the part is 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.

2/ If the manufacturer can demonstrate that this test has been performed five consecutive times with zero failures, the frequency of 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."

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PAGE 24

4.7.3a., delete in its entirety and substitute:

" a. Measuring apparatus: Different types of measuring test equipment (multimeters, bridges, or equivalent) are permitted to be used on the initial and final readings of this test, provided the equipment is the same style, model, or if it can be shown that the performance of the equipment is equivalent or better."

4.7.3c., line 1: Delete "group 1" and substitute "group I".

PAGE 29

4.7.14d., delete in its entirety.

4.7.14e., line 1: Delete "Measurements" and substitute "Measurements".

PAGE 32

* 4.7.18f(1), delete and substitute:

"(1) Qualification inspection: DC resistance shall be measured at the end of the 30 minutes off period after 250 +72, -24; 500 +72 -24; 1,000 +72, -24; 2,000 +96, -24; hours have elapsed.

(2) Extended life testing: DC resistance shall be measured at the end of the 30 minutes off period after 250 +72 -24; 500 +72 -24; 1,000 +72 -24; 2,000 +96 -24; 4,000 +96 -24; 6,000 +96 -24; 8,000 +96 -24; 1,000 +120 - 0. Measurements shall be made as near as possible to the specified time but may be adjusted so that measurement need not be made during other than normal weekdays."

PAGE 34

4.7.21.2.5, line 9: Delete "4.7.21.2.7.1" and substitute "4.7.21.2.5.1".

PAGE 35

4.7.21.4c., first sentence, delete in its entirety and substitute: "As soon as thermal equilibrium is established, place the dip-type cell in the extract solution, making certain that the electrodes are completely immersed."

After 6.4, add the following new paragraph:

"6.4.1 Resistance tolerance by characteristic. The resistance tolerance available for resistance-temperature characteristics 100 ppm and 350 ppm is 1, 2 percent and 2, 5, and 10 percent, respectively (see 3.1)."

PAGE 37

6.9.2, title: Delete "(not for Navy use)".

6.9.3, title: Delete "(not for Navy use)".

Following 6.14, add the following new paragraph:

"6.15 Tin plated finishes. Tin plating is prohibited (see 3.5.3.1) since it may result in tin whisker growth. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information on this matter, refer to ASTM B545 (Standard Specification for Electrodeposited Coating of Tin)."

PAGE 38

30.1, third sentence: Delete "10 or 20" and "X" and substitute "12" and "VIII", respectively.

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The margins of this amendment are marked with an asterisk to indicate where changes from the previous amendment were made. This was done for 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 - ER
Navy - EC
Air Force - 85
NASA - NA

Review activities:

Army - AR, AT, AV, ME, MI
Navy - AS, CG, MC, OS
Air Force - 17, 19, 99
DLA - ES

Preparing activity:

Army - ER

Agent:

DLA - ES

(Project 5905-1421)