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SUPERSEDING
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MILITARY SPECIFICATION

RESISTORS, FIXED, COMPOSITION (INSULATED)

GENERAL SPECIFICATION FOR

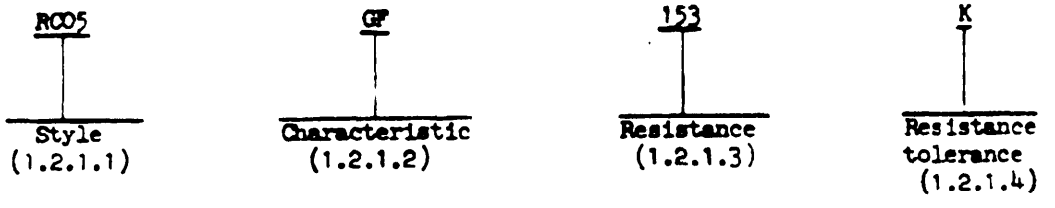
This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the general requirements for insulated, fixed resistors having a composition resistance element consisting of a mixture of carbon, insulating material, and suitable binders, either molded together or applied as a thin layer of conducting material on an insulated form. These resistors are capable of full-load operation at an ambient temperature of 70°C (see table I).

1.2 Classification.

1.2.1 Type designation. The type designation shall be in the following form, and as specified (see 3.1 and 6.1):



1.2.1.1 Style. The style is identified by the two-letter symbol "RC" followed by a two-digit number; the letters identify insulated, composition, fixed resistors, and the number identifies the size and power rating of the resistors.

1.2.1.2 Characteristic. The characteristic is identified by a two-letter symbol; the first letter identifies the maximum ambient-temperature characteristic in accordance with table I, and the second letter identifies the resistance-temperature characteristic in accordance with table II.

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TABLE I. Maximum ambient-temperature characteristic.

Symbol	Maximum ambient-temperature for full-load operation
	°C
G - - - -	70

TABLE II. Resistance-temperature characteristic.

Nominal resistance	Maximum allowable change in resistance from resistance at ambient-temperature of 25°C	
	Symbol F	
	At -55°C (ambient)	At 105°C (ambient)
Ohms	Percent (±)	(Percent (±)
1,000 and under - - - - -	6.5	5
1,100 to 10,000, incl - -	10	6
11,000 to 0.1 megohms, incl. - - - - - - - - - -	13	7.5
Megohms		
0.11 to 1.0, incl - - - -	15	10
1.1 to 10, incl. - - - -	20	15
11 and over - - - - - - -	25	15

1.2.1.3 Resistance. The nominal resistance value expressed in ohms is identified by a three-digit number; the first two digits represent significant figures and the last digit specifies the number of zeros to follow. When resistance values less than 10 ohms are required, the letter "R" is substituted for one of the significant digits to represent the decimal point. When the letter "R" is used, succeeding digits of the group represent significant figures as shown in the following example:

2R7 = 2.7 ohms.

Minimum and maximum resistance values shall be as specified (see 3.1). The standard values for every decade shall follow the sequence demonstrated for the "10 to 100" decade in accordance with MS90178 - Standard 24 - Value Series Decade for Electronic Components of 5-, 10-, and 20-Percent Tolerances.

1.2.1.4 Resistance tolerance. The resistance tolerance is identified by a single letter in accordance with table III.

TABLE III. Resistance tolerance.

Symbol	Resistance tolerance
	Percent (±)
G[1/]	2
J	5
K	10

[1/] Applicable to styles RC08, RC12, and RC22 and the 5 percent decade values only.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

PPP-B-566 - Boxes, Folding, Paperboard.
PPP-B-636 - Box, Fiberboard.
PPP-B-676 - Boxes, Setup.
PPP-T-60 - Tape: Pressure-Sensitive Adhesive, Waterproof, For Packaging.
PPP-T-76 - Tape, Pressure-Sensitive Adhesive, Paper, (for Carton Sealing).

MILITARY

MIL-P-116 - Preservation, Methods of.
MIL-C-45662 - Calibration System Requirements.

(See supplement 1 for list of applicable detail specifications.)

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
MIL-STD-221 - Color Code for Resistors.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Detail specifications for individual resistor types. Detail requirements or exceptions applicable to individual types of resistors shall be as specified in the detail specifications. In the event of any conflict between requirements of this specification and the detail specifications, the latter shall govern (see 6.1).

3.2 Qualification. Resistors furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.2).

3.3 Material. The material shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the resistors 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.

3.4 Design and construction. Resistors shall be of the design, construction, and physical dimensions specified (see 3.1). Each resistor shall consist of a composition resistance element protected against exposure of humidity and temperature conditions by an enclosure or a coating of moisture-resistant, insulating material.

3.4.1 Terminals. All terminals shall be suitably treated to facilitate soldering.

3.5 Power rating. Resistors shall have a power rating as specified (see 3.1), based on continuous full-load operation at an ambient temperature of 70°C. This power rating is dependent on the ability of resistors to meet the applicable life requirements specified in 3.16. For resistors operated at ambient temperature in excess of 70°C, the load shall be derated in accordance with the specified curve (see 3.1).

3.6 Voltage rating. Resistors shall have a rated direct-current (dc) continuous working voltage or an approximate sine-wave root-mean-square (rms) alternating current (ac) continuous working voltage at commercial-line-frequency and waveform corresponding to the power rating, as determined from the following formula:

$$E = \sqrt{PR}$$

Where:

E = Rated dc or rms ac continuous working voltage at commercial-line frequency and waveform.
P = Power rating (see 3.1).
R = Nominal resistance (see 3.1).

In no case shall the rated dc or rms ac continuous working voltage be greater than the applicable maximum value (see 3.1 and table IV).

TABLE IV. Maximum continuous working voltage.

Power rating	Maximum continuous working voltage (dc or rms)
Watts	Volts
1/10 and 1/8	150
1/4	250
1/2	350
1	500
2	500

3.7 DC resistance. When resistors are tested as specified in 4.6.2, the dc resistance shall be within the specified tolerance of the nominal resistance (see 1.2.1.4).

3.8 Resistance-temperature characteristic. When resistors are tested as specified in 4.6.3, the change in resistance at any temperature, referred to an ambient temperature of 25°C, shall not exceed the limits specified for the applicable temperature and resistance values specified in table II. The change in resistance at the intermediate temperatures shall not exceed a value proportional to the maximum values specified in table II.

3.9 Voltage coefficient (applicable only to resistors of 1,000 ohms and over). When resistors are tested as specified in 4.6.4, voltage-coefficient measurements which result in a total resistance change of 2 percent or less shall be considered satisfactory. However, if the change is greater than 2 percent, the voltage coefficient shall not exceed 0.05 percent per volt, for resistors rated at 1/10 and 1/8 watt, 0.035 percent per volt for resistors rated at 1/4 and 1/2 watt, and 0.02 percent per volt for resistors rated above 1/2 watt.

3.10 Dielectric withstanding voltage. When resistors are tested as specified in 4.6.5, there shall be no evidence of mechanical damage, arcing, or breakdown.

3.11 Insulation resistance. When resistors are tested as specified in 4.6.6, the insulation resistance shall be not less than 10,000 megohms.

3.12 Low-temperature operation. When resistors are tested as specified in 4.6.7, there shall be no evidence of mechanical damage and the change in resistance between the initial and final measurements at 25° ±5°C shall not exceed ±3 percent or as specified (see 3.1).

3.13 Temperature cycling. When resistors are tested as specified in 4.6.8, there shall be no evidence of mechanical damage and the change in resistance shall not exceed ±4 percent or as specified (see 3.1).

c. Test condition D:

3.14 Moisture resistance. When resistors are tested as specified in 4.6.9, there shall be no evidence of mechanical damage or products of corrosion except for normal discoloration, and the change in resistance shall not exceed the values specified (see 3.1). When computing the average change in resistance, the sign (plus or minus) of the individual change shall be disregarded. The insulation resistance shall be 100 megohms, minimum.

3.15 Short-time overload. When resistors are tested as specified in 4.6.10, there shall be no evidence of arcing, burning, or charring, and the change in resistance shall not exceed ±2.5 percent or as specified (see 3.1).

3.16 Life. When resistors are tested as specified in 4.6.11, there shall be no evidence of mechanical damage; the change in resistance between the initial measurement and each of the succeeding measurements shall not exceed the average value specified for each group of 10 resistors tested, nor the maximum value specified for any individual resistor (see 3.1). When computing the average change in resistance, the sign (plus or minus) of the individual changes shall be disregarded.

3.17 Terminal strength.

3.17.1 Pull test. When resistors are tested as specified in 4.6.12.1, resistors shall withstand the specified load (see 3.1) without mechanical damage.

3.17.2 Twist (when applicable). When resistors are tested as specified in 4.6.12.2, there shall be no evidence of breakage or other mechanical damage and the change in resistance shall not exceed ±(1.0 percent +.05 ohm).

3.18 Resistance to soldering heat. When resistors are tested as specified in 4.6.13, there shall be no evidence of mechanical damage and the change in resistance shall not exceed the value specified (see 3.1).

3.19 Seal (when applicable). When resistors are tested as specified in 4.6.14, there shall be no continuous visible stream of bubbles.

3.20 Shock, medium impact. When resistors are tested as specified in 4.6.15, there shall be no evidence of mechanical or electrical damage. There shall be no electrical discontinuity during the test.

3.21 Vibration, high frequency. When resistors are tested as specified in 4.6.16, there shall be no evidence of mechanical or electrical damage and the change in resistance from the initial measurement of 3.20 shall not exceed ±(2 percent +.05 ohm). There shall be no electrical discontinuity during the test.

3.22 Solderability. When resistors are tested as specified in 4.6.17, the dipped surface of the leads shall be at least 95-percent covered with a new solder coating. The remaining 5 percent of the lead surface may show only small pinholes or voids. These shall not be concentrated in one area. Bare base metal and areas where the solder dip failed to cover the original coating are indications of poor solderability, and shall be cause for failure. In case of dispute, the percent of coverage with pinholes or voids shall be determined by actual measurement of these areas, as compared to the total area.

3.23 Marking. Resistors shall be legibly and permanently color coded in accordance with MIL-STD-221.

3.24 Soldering. When soldering is employed, only noncorrosive flux shall be used, unless it can be shown that corrosive elements have been satisfactorily removed after soldering. Electrical connections shall be electrically continuous after soldering. In no case shall the solder used start to flow at a temperature of less than 200°C.

3.25 Workmanship. Resistors shall be processed in such a manner as to be uniform in quality, and shall meet the requirements of 3.3 to 3.4.1, inclusive, 3.23, and 3.24, as applicable, and shall be free from other defects that will affect life, serviceability, or appearance. The bodies of the resistors shall be free from cracks, holes, chips, or malformation. The wire leads shall be unbroken, and not crushed or nicked.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commerical laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test equipment and inspection facilities. Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of inspection equipment shall comply with the requirements of MIL-C-45662.

4.2 Classification of inspection. The examination and testing of resistors shall be classified as follows:

(a) Qualification inspection (see 4.4).
(b) Quality conformance inspection (see 4.5).
    1. Inspection of product for delivery (see 4.5.1).
    2. Inspection of preparation for delivery (see 4.5.2).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be made in accordance with the general requirements of MIL-STD-202.

4.3.1 Precautions. Adequate precautions shall be taken during inspection to prevent condensation of moisture on resistors, except during the low-temperature-operation, temperature-cycling and moisture-resistance tests.

4.3.2 Mounting of resistors. Unless otherwise specified herein, suitable clips shall be used wherever resistors are mounted for test purposes.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.2).

4.4.1 Sample. The number of sample units comprising a sample of resistors to be submitted for qualification inspection shall be as specified in the appendix to this specification. The sample shall be taken from a production run and shall be produced with equipment and procedures normally used in production.

4.4.2 Test routine. Sample units shall be subjected to the qualification inspection specified in table V, in the order shown. All sample units, except units to be subjected to group VII, shall be subjected to the inspection of group I. Fifty sample units shall then be divided equally into five groups for groups II to VI, inclusive. Ten or 20 sample units, at the option of the supplier (see 20.1) shall be submitted for group VII. All sample units shall then be conditioned for 96 ±4 hours except style RC05, for style RC05 the conditioning shall be 25 ±4 hours in a dry oven at a temperature of 100° ±5°C. After conditioning, sample units shall be subjected to the inspection for their particular group. Sample units shall be stored in desiccators using a suitable desiccant, such as activated alumina or silica gel, from the time of removal from the oven until the beginning of subsequent tests.

4.4.3 Defectives. Defectives in excess of those allowed in table V shall be cause for refusal to grant qualification.

4.4.4 Retention of qualification. To retain qualification, the supplier shall forward at 6-month intervals, to the qualifying activity, a summary of the results of groups A and B tests, indicating as a minimum the number of lots which passed and the number which failed, and a summary of the results of group C tests, including the number and type of any part failures. The summary shall include those tests performed during that 6-month period. If the summary of the tests results indicates nonconformance with specification requirements, action shall be taken to remove the failing product from the qualified products list. Failure to submit the summary shall result in loss of qualification for that product. In addition to the periodic submission of inspection data, the supplier shall immediately notify the qualifying activity at any time during the 6-month period that the inspection data indicates failure of the qualified product to meet the requirements of the specification.

TABLE V. Qualification inspection.

Examination or test	Requirement paragraph	Method paragraph	Number of defectives allowed[1]	
Group I				
Visual and mechanical examination[2/3]	3.1, 3.3, 3.4, 3.4.1 and 3.22 to 3.25 incl.	4.6.1	1	4
DC resistance[3]	3.7	4.6.2		
Group II				
Resistance temperature characteristic[3]	3.8	4.6.3	2	
Voltage coefficient (applicable only to resistors of 1,000 ohms and over)[3]	3.9	4.6.4		
Dielectric withstanding voltage[3]	3.10	4.6.5		
Insulation resistance[3]	3.11	4.6.6		
Group III				
Low-temperature operation	3.12	4.6.7	2	
Temperature cycling	3.13	4.6.8		
Moisture resistance[4]	3.14	4.6.9		
Short-time overload	3.15	4.6.10		
Group IV				
Life[4]	3.16	4.6.11	2	
Group V				
Terminal strength	3.17	4.6.12	1	
Resistance to soldering heat	3.18	4.6.13		
Seal (when applicable)	3.19	4.6.14		
Group VI				
Shock, medium impact	3.20	4.6.15	2	
Vibration, high frequency	3.21	4.6.16		
Group VII				
Solderability[5]	3.22	4.6.17	1	

1/ Failure of an individual resistor in one or more tests in group I to VI, inclusive, will be charged as a single failure. Failure for each resistance value shall be permitted as specified in each group, but not more than four failures shall be permitted in groups I thru VI combined.

2/ Marking shall be considered defective only if the marking is illegible.

3/ Nondestructive examination and tests.

4/ When a group of resistors fails to meet the specified average percent change in resistance requirement, three failures shall be charged; however, a failure shall be charged for each resistor of the group which exceeds the specified maximum percent change in resistance requirement, and these resistors shall not be considered in computing the average.

5/ Ten or 20 sample units, at the option of the supplier, shall be submitted to this test; if 10 sample units are submitted, both terminal leads of each resistor shall be subjected to the test; if 20 sample units are submitted, only one terminal of each resistor shall be subjected to the test. Failure of two terminal leads on the same resistor subjected to the solderability test shall be considered as two separate defectives.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A, B, and C.

4.5.1.1 Inspection lot. An inspection lot, as far as practicable, shall consist of all the resistors of the same style.

4.5.1.2 Group A inspection. Group A inspection shall consist of the examinations and tests specified in table VI, and shall be made on the same set of sample units in the order shown.

4.5.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105. The acceptable quality levels (AQL) shall be as specified in table VI. Major and minor defects shall be as defined in table VII. Resistance values in the samples shall be representative, and where possible, in proportion to the resistors in the inspection lot.

TABLE VI. Group A inspection.

Examination or test	Requirement paragraph	Method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination:				
Material	3.3	4.6.1	1.0	4.0
Design and construction	3.4	---		
Terminals	3.4.1	---		
Marking	3.23	---		
Workmanship	3.24 and 3.25	---		
DC resistance	3.7	4.6.2		

4.5.1.2.2 Rejected lots. If an inspection lot is rejected, the supplier may withdraw the lot, rework it to correct the defects, or screen out the defective units, as applicable, and reinspect. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots. Rejected lots shall be inspected using tightened inspection.

TABLE VII. Classification of defects.

Requirement	Defect classification
Construction	
Resistor body - cracks, holes, or chips, except end chipping, shall be not more than 1/3 of the distance to axial-wire leads - - - - - - - - - - - - - - - -	Major
Wire leads broken, crushed, or nicked, which would cause probable failure in use - - - - - - - - - - - - - - - - -	Major
Malformation of body due to improper molding - - - - - - - - - - - - - - -	Major
End chipping not exceeding 1/3 distance to axial-wire lead - - - - - - - - -	Minor
Crushed or nicked wire at ends which would not cause failure in use - - -	Minor
Marking	
Wrong, mixed, or missing color- - - - -	Major
Illegible or smeared color- - - - - - -	Minor
Resistance	
Greater than 100 percent but not exceeding 125 percent of tolerance - - - -	Minor
Greater than 125 percent of tolerance	Major

4.5.1.3 Group B inspection (applicable only to styles RC08, RC12, and RC22). Group B inspection shall consist of the tests specified in table VIII, in the order shown. They shall be performed on sample units which have been subjected to and have passed the group A inspection, unless the Government considers it more practical to select a separate sample from the lot for group B inspection.

4.5.1.3.1 Sampling plan. Five sample units from each inspection lot shall be subjected to the tests of table VIII, with no defectives allowed.

TABLE VIII. Group B inspection (applicable only to styles RC08, RC12, and RC22).

Test	Requirement paragraph	Method paragraph
Dielectric withstanding voltage - - - - - - - -	3.10	4.6.5
Insulation resistance - -	3.11	4.6.6
Resistance to soldering heat - - - - - - - - -	3.18	4.6.13
Seal - - - - - - - - - -	3.19	4.6.14

4.5.1.3.2 Disposition of sample units. Sample units which have passed all the group B inspection may be delivered on the contract or order, at the option of the supplier.

4.5.1.4 Group C inspection. Group C inspection shall consist of the tests specified in table IX, in the order shown, and shall be made on sample units selected from resistors specifically designated for this specification, for the periods specified in table IX. Before being subjected to any of the tests listed, all sample units shall be conditioned for 96 ±4 hours except for style RC05, for RC05 the time shall be 25 ±4 hours in a dry oven at a temperature of 100° ±5°C.

4.5.1.4.1 Sampling plan.

4.5.1.4.1.1 Monthly. Twenty sample units of each style and of any resistance value shall be inspected monthly in accordance with table IX. A separate sample shall be selected for each subgroup listed.

4.5.1.4.1.2 Semiannually. Sample units selected for semiannual inspection shall be of the same style. Ten sample units of the lowest resistance value, 10 of the critical or the value closest to the critical value (see table XV), and 10 of the highest resistance value, which were produced during the previous 6-month period shall be subjected to the tests of subgroup 1 in accordance with table IX. Ten sample units of the lowest resistance value and 10 of the critical or the value closest to the critical value shall be subjected to the test of subgroup 2. Ten sample units of the lowest, 10 of the critical or the value closest to the critical value, and 10 of the highest resistance value shall be subjected to the tests of subgroup 3. Ten sample units of any value between the critical and the highest values shall be subjected to the tests of subgroup 4. Ten or 20 sample units, at the option of the supplier, of any one resistance value shall be subjected to the test of subgroup 5. If 10 sample units are submitted, both terminal leads of each resistor shall be subjected to the test; if 20 sample units are submitted, only one terminal of each resistor shall be subjected to the test. A separate sample shall be selected for each subgroup listed.

4.5.1.4.2 Defectives. One defective shall be allowed in any group of 10 resistors of the same resistance value within a subgroup. (In subgroup 5 of semiannual inspection, the group shall consist of 10 or 20 resistors, as applicable.) If this number is exceeded, an additional group of 10 resistors of the same resistance value may be tested and a total of three defectives shall be allowed for the 20 resistors. In the semiannual inspection, only one resubmission shall be allowed in any of subgroups 1, 2, and 3; i.e., only one resistance value shall be retested per subgroup. If more than one resistance value fails in any of these groups, it shall be considered that the resistors have failed to pass group C inspection.

4.5.1.4.3 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or order.

TABLE IX. Group C inspection.

Test	Number of sample units to be inspected		Requirement paragraph	Method paragraph
Monthly				
Subgroup 1				
Voltage coefficient (applicable only to resistors of 1,000 ohms and over)	10		3.9	4.6.4
Dielectric withstanding voltage (atmospheric pressure)	10		3.10	4.6.5.1
Insulation resistance	10		3.11	4.6.6
Subgroup 2				
Terminal strength	10		3.17	4.6.12
Resistance to soldering heat	10		3.18	4.6.13
Seal (when applicable)	10		3.19	4.6.14
Semiannually				
Subgroup 1				
Low-temperature operation	30	10 high 10 critical 10 low	3.12	4.6.7
Temperature cycling	30	10 high 10 critical 10 low	3.13	4.6.8
Moisture resistance[1]	30	10 high 10 critical 10 low	3.14	4.6.9
Short-time overload	30	10 high 10 critical 10 low	3.15	4.6.10
Subgroup 2				
Life[1]	20	10 critical 10 low	3.16	4.6.11
Subgroup 3				
Dielectric withstanding voltage (barometric pressure)	30	10 high 10 critical 10 low	3.10	4.6.5.2
Resistance-temperature characteristic	30	10 high 10 critical 10 low	3.8	4.6.3
Subgroup 4				
Shock, medium impact	10		3.20	4.6.15
Vibration, high frequency	10		3.21	4.6.16
Subgroup 5				
Solderability[2]	10 or 20		3.22	4.6.17

[1] When a group of resistors fail to meet the specified average percent change in resistance requirement, three failures shall be charged; however, a failure shall be charged for each resistor of the group which exceeds the specified maximum percent change in resistance requirement, and these resistors shall not be considered in computing the average.

[2] See 4.5.1.4.1.2.

4.5.1.4.4 Noncompliance. If a sample fails to pass group C inspection, the supplier shall take corrective action on the material or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective

action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original failed, at the option of the Government). Groups A and B inspection may be reinstituted; however, final acceptance shall be withheld until the group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and the corrective action taken shall be furnished to the contracting officer, and to the qualifying activity.

4.5.2 Inspection of preparation for delivery. Sample packages and packs shall be selected and inspected in accordance with the schedule of acceptance tests and visual inspection aids of MIL-P-116, to verify conformance with the requirements in section 5 of this specification.

4.6 Methods of examination and test.

4.6.1 Visual and mechanical examination. Resistors shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements. General workmanship defects shall be classified in accordance with table VII (see 3.1, 3.3 to 3.4.1, inclusive, and 3.22 to 3.25, inclusive).

4.6.2 DC resistance (see 3.7). Resistors shall be tested in accordance with method 303 of MIL-STD-202. The following details and exceptions shall apply:

(a) Measuring apparatus - The same measuring instrument shall be used for any one test, but not necessarily for all tests.
(b) Combined limit of error of measuring apparatus - Shall not exceed 0.5 percent.
(c) Test voltage - Table X gives the recommended test voltage to be impressed across the resistor in making resistance measurements. Other test voltages may be used; however, in no event shall the test voltage exceed the voltage shown in table X. In the event of conflict in results, attributable to the test voltage used, the nominal voltage specified in table X shall be used to resolve the conflict.
(d) Temperature - The dc resistance test specified in group I of table V shall be performed at 25° ±2°C. For all other tests, unless otherwise specified herein, the temperature at which subsequent and final resistance measurements are made shall be within ±2°C of the temperature at which the first resistance measurement was made.

TABLE X. DC resistance test voltages.

Nominal resistance	Test potential
Ohms	Volts
1 to 9.1 incl.	0.50 ±0.1
10 to 91 incl.	0.75 ±0.25
100 to 910 incl.	2.75 ±0.25
1,000 to 9,100 incl.	9.0 ±1.0
10,000 to 91,000 incl.	27.0 ±3.0
0.1 megohm or higher	90.0 ±10.0

4.6.3 Resistance-temperature characteristic (see 3.8). The resistors shall be maintained at each of the ambient temperatures listed in table XI. Resistance measurements shall be made at each temperature, 30 to 45 minutes after resistors have attained that temperature. The temperature adjustment shall be accurate within 1°C. The percent change in resistance, referred to a reference temperature of 25°C, shall be computed by the following formula:

$$\text{Percent change in resistance} = \frac{(R-r)\ 100}{r}$$

Where:
R = Resistance at test temperature.
r = Resistance at reference temperature.

Resistance values at temperatures (b) and (c) of table XI shall be referred to the resistance value at temperature (a), and resistance values at temperatures (e), (f), and (g) shall be referred to the resistance value at temperature (d).

TABLE XI. Ambient temperature for resistance-temperature-characteristic test.

Temperature	Sequence
	°C
(a)	25
(b)	-15
(c)	-55
(d)	25
(e)	65
(f)	105
(g) 1/	150

1/ For styles RC12 and RC22 only.

4.6.4 Voltage coefficient (applicable only to resistors of 1,000 ohms and over (see 3.9)). Resistance shall be measured at the rated continuous working voltage specified in 3.6 and one-tenth the rated continuous working voltage. The voltage coefficient shall then be computed as follows:

$$\text{Voltage coefficient} = \frac{100\ (R-r)}{r} \times \frac{1}{0.9E}$$

Where:
R = Resistance at rated continuous working voltage.
r = Resistance at 0.1 rated continuous working voltage.
E = Rated continuous working voltage.

4.6.5 Dielectric withstanding voltage (see 3.10).

4.6.5.1 Atmospheric pressure. Resistors shall be tested in accordance with method 301 of MIL-STD-202. The following details and exceptions shall apply:

(a) Special preparations - Resistors shall be clamped in the trough of a 90° metallic V-block of such size that the body of the resistor does not extend beyond the extremities of the block. The resistor leads shall be so positioned that the distance between the resistor leads and any point of the V-block is not less than the radius of the resistor minus the radius of the lead wire.
(b) Magnitude of test voltage - Twice the maximum rms continuous working voltage specified in table IV for all styles except style RC08. Voltage for style RC08 shall be as specified (see 3.1).
(c) Nature of potential - An ac supply at commercial-line frequency (not more than 100 hertz (Hz)) and waveform.
(d) Duration of application of test voltage - 5 seconds.
(e) Rate of application of test voltage - 100 volts per second.
(f) Points of application of test voltage - Between the resistor terminals connected together and the V-block.
(g) Examinations after test - Resistors shall be examined for evidence of mechanical damage, arcing, and breakdown.

4.6.5.2 Barometric pressure. Resistors shall be tested in accordance with method 105 of MIL-STD-202. The following details and exceptions shall apply:

(a) Method of mounting - As specified in 4.6.5.1 (a).
(b) Test condition - B.
(c) Test voltages during subjection to reduced pressure - As specified in table XII.

(d) Nature of potential - As specified in 4.6.5.1 (c).
(e) Duration of application of test voltage - 5 seconds.
(f) Rate of application - 100 volts per second.
(g) Points of application of test voltage - As specified in 4.6.5.1 (f).
(h) Examinations after test - As specified in 4.6.5.1 (g).

TABLE XII. Voltages to be applied at barometric pressure.

Resistor wattage	Voltage to be applied
	Volts
1/10 and 1/8	200
1/4	325
1/2	450
1	625
2	625

4.6.6 Insulation resistance (see 3.11). Resistors shall be tested in accordance with method 302 of MIL-STD-202. The following details and exceptions shall apply:

(a) Special preparations - As specified in 4.6.9 (a).
(b) Test condition - A - for all styles except styles RC20, RC32, and RC42; B - for styles RC20, RC32, and RC42.
(c) Points of measurement - Between the resistor terminals connected together and the mounting strap.

4.6.7 Low-temperature operation (see 3.12).

4.6.7.1 Mounting. Resistors shall be mounted by their terminals so that there is at least 1 inch of free air space around each resistor and the mounting is in such a position with respect to the air that it offers substantially no obstruction to the flow of air across and around the resistors.

4.6.7.2 Procedure. DC resistance shall be measured as specified in 4.6.2. Within 1 hour after this measurement, the resistors shall be placed in a cold chamber at room temperature. The temperature shall be gradually decreased to $-65\ ^{+0}_{-5}$°C, within the period of not less than 1-1/2 hours. For quality conformance inspection only, and at the option of the supplier, the resistors may be placed in the cold chamber when the chamber is already at the extreme low temperature. After 1 hour of stabilization at this temperature, the full rated continuous working voltage (see 3.6), shall be applied for 45 minutes. The resistors may be loaded individually or in parallel. Fifteen $^{+5}_{-0}$ minutes after the removal of voltage, the temperature in the chamber shall be gradually increased to room temperature within a period of not more than 8 hours. The resistors shall be

removed from the chamber and maintained at a temperature of 25° ±5°C for a period of approximately 24 hours; the dc resistance shall then be measured as specified in 4.6.2. Resistors shall then be examined for evidence of mechanical damage.

4.6.8 Temperature cycling (see 3.13). Resistors shall be tested in accordance with method 102 of MIL-STD-202. The following details and exceptions shall apply:

(a) Special mounting - As specified in 4.6.7.1.
(b) Measurement of air temperature - The air temperature shall be measured by a suitable means and as near to the center of the group as possible. If a thermometer is used, it shall be mounted parallel to the axis of the resistors.
(c) Test condition - D.
(d) Measurements before and after cycling - DC resistance shall be measured as specified in 4.6.2, prior to the first cycle and within 24 hours after completion of the fifth cycle.
(e) Examination after test - Resistors shall be examined for evidence of mechanical damage.

4.6.9 Moisture resistance (see 3.14). Resistors shall be tested in accordance with method 106 of MIL-STD-202. The following details and exceptions shall apply:

(a) Mounting - Resistors shall be soldered by their leads to stand-off insulators[1/] on a suitable panel so that there will be at least 1 inch of free air space around each resistor. The spacing of the mounts shall be such that the length of each resistor lead is 3/8 ±1/16 inch when measured from the edge of the supporting terminal to the resistor body. In addition, all sample units shall be covered with a flat, noncorrosive, metal strap whose width is equal to the length of the resistors and of sufficient thickness to be rigid. A 0.075-inch thick layer of resilient, moisture-resistant material, having a resistivity of less than 1,000 ohm-centimeters, shall be bonded to the surface of the strap next to the resistors. Sufficient contact pressure shall be maintained between this material and the resistor in order that all color code bands shall be completely imbedded in the material. This shall be done by applying a compressive force between the strap and a cylindrical, nonconducting rod held beneath the resistors (see figure 1). The mounting straps may be used to cover one or more resistors at a time and may be applied after the last cycle.

[1/] Standoff insulators of polytetrafluoroethylene are preferred for use with resistors of high resistance values.

(b) Initial measurements - Not less than 1-1/2 hours after resistors have been removed from the drying oven, the dc resistance shall be measured as specified in 4.6.2.

(c) Loading voltage - During the first 2 hours of steps 1 and 4, a test potential equivalent to 100-percent rated wattage, but not exceeding the maximum rated voltage shall be applied to 50 percent of the resistors. The remaining 50 percent of the resistors shall be tested without any application of voltage.

(d) Final measurements - Upon completion of step 6 of the final cycle, the resistors shall be conditioned at a temperature of 25° ±2°C and at a relative humidity of 90 to 95 percent for a period of 1-1/2 to 3-1/2 hours. Upon removal from the chamber, resistors shall be permitted to dry for a maximum of 4 hours at 25° ±5°C at no less than 50 percent relative humidity. The sample units shall not be subjected to forced circulating air during this test. DC resistance and insulation resistance shall be measured, as specified in 4.6.2 and 4.6.6, respectively.

4.6.10 Short-time overload. Resistors shall be conditioned at 50 $^{+3^\circ}_{-0^\circ}$C for 1 hour ±5 minutes. DC resistance shall then be measured as specified in 4.6.2. Following this measurement, a potential of 2.5 times the rated continuous working voltage (see 3.6) shall be applied for 5 ±.5 seconds to the resistor terminals.

(NOTE: Test potential should be established by use of a dummy load in order to avoid excessive stress on the test specimens.)

In no case shall the voltage exceed the applicable value listed in table XIII. Thirty minutes after removal of the test potential, the dc resistance shall again be measured as specified in 4.6.2 (see 3.15).

TABLE XIII. Maximum overload voltage.

Power rating	Maximum overload voltage (dc or peak ac)
Watts	Volts
1/10 and 1/8	200
1/4	400
1/2	700
1	1,000
2	1,000

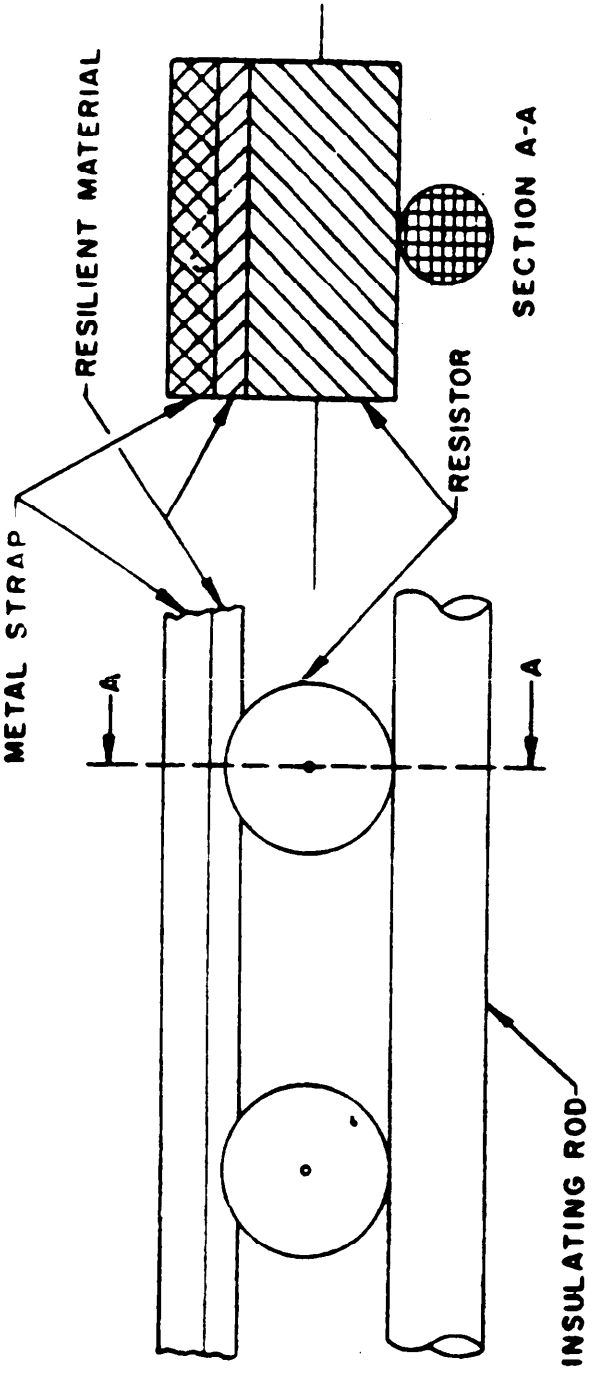


FIGURE 1. Resistor-contacting assembly for insulation-resistance measurements.

4.6.11 Life (see 3.16). Resistors shall be tested in accordance with method 108 of MIL-STD-202. The following details and exceptions shall apply:

(a) Method of mounting - Resistors shall be mounted and soldered to lightweight terminals (see figure 2). The effective length of each lead shall be 1 ±3/16 inch. Resistors shall be so arranged that the temperature of any one resistor shall not appreciably influence the temperature of any other resistor. There shall be no circulation of air directly over the resistors other than that caused by the heat of the resistors.

(b) Test temperature and tolerance - 70° ±5°C.

(c) Initial measurements - Measurements may be made inside or outside the chamber.

1. Inside chamber - When measurements are to be made inside the chamber, the initial dc resistance shall be measured after mounting at the applicable test temperature, after temperature stabilization, and within 8 hours of exposure of the resistors to the test temperature. The initial measurement shall be used as the reference temperature for all subsequent measurements under the same conditions.

2. Outside chamber - When measurements are to be made outside the chamber, the initial dc resistance shall be measured after mounting at room temperature. This initial measurement shall be used as the reference resistance for all subsequent measurements under the same conditions.

(d) Operating condition - One hundred percent rated dc continuous working voltage (see 3.6), or filtered or nonfiltered full wave rectified ac voltage shall be applied intermittently, 1-1/2 hours "on" and 1/2 hour "off" for 1,000 hours. "On time" shall be three-quarters of the total elapsed time. During the "on" cycle, the voltage shall be regulated and controlled to maintain ±5 percent of the rated continuous working voltage. In case of conflict, a referee potential of nominal one-percent shall be used. (NOTE: If rectified ac is employed, a voltmeter capable of measuring true rms shall be used to prevent overloading of the test specimen.)

(e) Test condition - D.

(f) Measurements during test. DC resistance shall be measured at the end of the 1/2-hour-off periods, after 50 ±8, 100 ±12, 250 $^{+48}_{-0}$, 500 $^{+48}_{-0}$, and 1,000 $^{+48}_{-0}$ hours have elapsed.

(g) Examination after test - Resistors shall be examined for evidence of mechanical damage.

4.6.12 Terminal strength (see 3.17.1).

4.6.12.1 Pull test. Resistors shall be tested in accordance with method 211 of MIL-STD-202. The following details shall apply:

(a) Test condition - A.
(b) Measurement before test - DC resistance shall be measured as specified in 4.6.2.
(c) The resistors shall be clamped by one terminal lead.
(d) The applied load shall be as specified (see 3.1).
(e) Examination after test - Resistors shall be examined for evidence of mechanical damage.

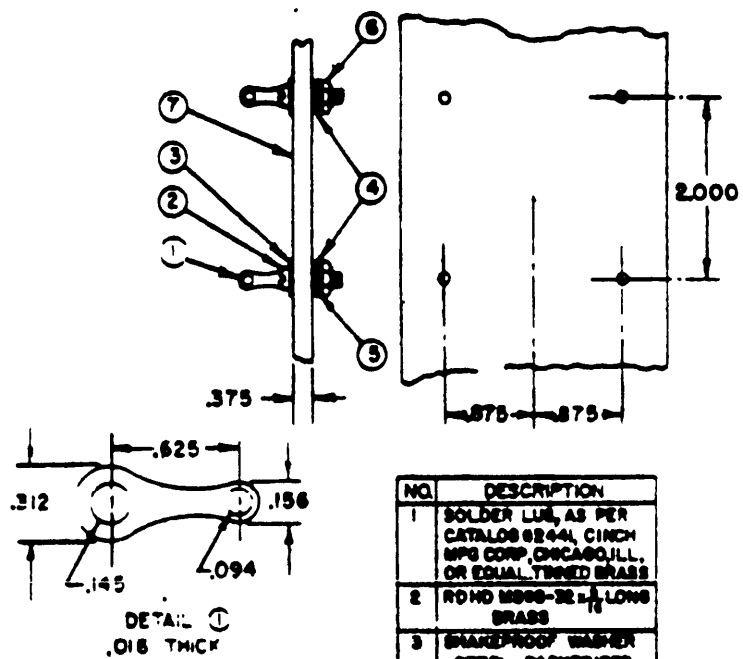
4.6.12.2 Twist test (when applicable) (see 3.17.2). Resistors shall be tested in accordance with method 211 of MIL-STD-202. The following details shall apply:

(a) Test condition - D.
(b) Test to be performed following tests specified in 4.6.12.1.
(c) Following the test, dc resistance shall be measured as specified in 4.6.2, and resistors shall be examined for evidence of breakage and other mechanical damage.

4.6.13 Resistance to soldering heat (see 3.18). Resistors shall be tested in accordance with method 210 of MIL-STD-202. The following details shall apply:

(a) Measurement before test - DC resistance shall be measured as specified in 4.6.2.
(b) Special preparation of specimen - Sample units shall not have been soldered during any of the previous test.
(c) Depth of the immersion in the molten solder - To a point within 1/8 inch to 3/16 inch from the resistor body at the temperature specified (see 3.1) for a duration of 3 $^{+1/2}_{-0}$ seconds.
(d) Measurement after test - Within 24 ±4 hours after completion of test, the dc resistance shall be measured as specified in 4.6.2. Resistors shall be examined for evidence of mechanical damage.

Inches	MM
.094	2.39
.145	3.68
.156	3.96
.312	7.92
.375	9.53
.625	15.88
.875	22.23
2.000	50.80



NO.	DESCRIPTION
1	SOLDER LUG, AS PER CATALOG 62441, CINCH MFG CORP, CHICAGO, ILL., OR EQUAL, TINNED BRASS
2	ROHD M866-32 x 1/4 LONG BRASS
3	SHAKEPROOF WASHER STEEL, PARKERIZED
4	FLATWASHER, BRASS FOR 6-32 MS
5	LOCKWASHER, BRASS FOR 6-32 MS
6	HEXAGONAL NUT, BRASS 6-32 STD
7	RACK, PHENOLIC

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only and are based upon 1 inch = 25.4 mm.
3. Tolerance is .xxx ± .005 (13 mm).

FIGURE 2. Suggested mounting-lug arrangement for life test.

4.6.14 Seal (when applicable) (see 3.19). Resistors shall be tested in accordance with method 112 of MIL-STD-202. The following details shall apply:

(a) Test condition - A.
(b) After test - Resistors shall be cleaned in alcohol, or other suitable degreaser, and shall be allowed to dry thoroughly.

4.6.15 Shock, medium impact (see 3.20). Resistors shall be tested in accordance with method 205 of MIL-STD-202. The following details and exceptions shall apply:

(a) Special mounting means - Resistors shall be mounted on appropriate jig fixtures and supported by their leads at a distance 1/4 inch from the resistor body. These fixtures shall be constructed in a manner to insure that the points of the resistor-mounting supports shall have the same motion as the shock table. Resistors shall be mounted in relation to the test equipment in such a manner that the stress applied is in the direction which would be considered most detrimental. Test leads used during this test shall be no larger than AWG size 22 stranded wire, so that the influence of the test lead on the resistor shall be held to a minimum strength. The test-lead shall be no longer than necessary.
(b) Measurement before shock - DC resistance shall be measured as specified in 4.6.2.
(c) Test condition - C.
(d) Number and direction of applied shocks - The resistors shall be subjected to a total of 10 shocks in each of two mutually perpendicular planes, one perpendicular and the other parallel to the longitudinal axis of the resistor.
(e) Measurement during shock - Each resistor shall be monitored to determine electrical discontinuity by a method which shall at least be sensitive enough to monitor or register, automatically, any electrical discontinuity of 0.1 millisecond or greater duration.
(f) Examination after test - Resistors shall be examined for evidence of mechanical and electrical damage.

4.6.16 Vibration, high frequency (see 3.21). Resistors shall be tested in accordance with method 204 of MIL-STD-202. The following details and exceptions shall apply:

(a) Mounting of specimens - Resistors shall be mounted on appropriate jig fixtures and supported by their leads at a distance 1/4 inch from the resistor body. These fixtures shall be constructed in a manner to insure that the points of the resistor-mounting supports shall have the same motion as the vibration table. The arrangement of the mounting shall be such that the body of the resistor is not restrained in any manner, but is allowed to respond to the vibration forces applied. Test leads used during this test shall be no larger than AWG size 22 stranded wire, so that the influence of the test lead on the resistor shall be held to a minimum. The test lead length shall be no greater than is absolutely necessary. A shielded cable, which may be necessary because of the field surrounding the vibration table, shall be clamped to the resistor-mounting jig. In all cases, the resistors shall be mounted in relation to the test equipment in such a manner that the stress applied is in the direction which would be considered most detrimental.

(b) Test condition - D.

(c) Direction of motion - In each of two mutually perpendicular directions, one perpendicular and the other parallel to the longitudinal axis of the resistor. Six hours in each direction for a total of 12 hours.

(d) Measurement during test. Each resistor shall be monitored to determine electrical discontinuity by a method which shall at least be sensitive enough to monitor or register, automatically, any electrical discontinuity of 0.1 millisecond or greater duration.

(e) Measurement after vibration - DC resistance shall be measured as specified in 4.6.2.

(f) Examination after test - Resistors shall be examined for evidence of mechanical and electrical damage.

4.6.17 Solderability (see 3.22). Resistors shall be tested in accordance with method 208 of MIL-STD-202. The following detail shall apply:

Either one or two of the leads shall be tested, as applicable (see table V).

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C, as specified (see 6.1).

5.1.1 Level A.

5.1.1.1 Cleaning. Resistors shall be cleaned in accordance with MIL-P-116, process C-1.

lead beyond the extremities of the block. The

5.1.1.2 Drying. Resistors shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. None required.

5.1.1.4 Unit packaging. Unless otherwise specified, ten each resistors shall be packaged in accordance with MIL-P-116, method IA8, insuring compliance with the general requirements paragraph under methods of preservation (unit protection) and the physical protection requirements paragraph therein.

5.1.1.5 Intermediate packaging. Resistors packaged as described in 5.1.1.4 shall be placed in intermediate containers conforming to PPP-B-566 or PPP-B-676. Intermediate containers shall be uniform in size and shape, shall be of minimum tare and cube, and shall contain multiples of five unit packages, not to exceed 100 packages or ten pounds. No intermediate packaging is required when the total quantity shipped to a single destination is less than 100 units.

5.1.2 Level C. Ten each resistors shall be packaged in a manner that will afford adequate protection against corrosion, deterioration, and physical damage during shipment from supply source to the first receiving activity. This package may conform to the supplier's commercial practice for retail distribution when it meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. The packaged resistors shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirement. In lieu of the closure and waterproofing requirements in the appendix of PPP-B-636, closures and waterproofing shall be accomplished by sealing all seams, corners, and manufacturer's joint with waterproof tape, 2-inch minimum width, conforming to PPP-T-60, class 1, or PPP-T-76. Banding (reinforcement requirements) shall be applied in accordance with the appendix to PPP-B-636, using nonmetallic or tape banding only.

5.2.2 Level B. Unless otherwise specified, the packaged resistors shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirement. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged resistors shall be packed in shipping containers in a manner that will afford adequate protection against damage during direct shipment from the supply source to the first receiving activity. This pack shall conform to the applicable carrier rules and regulations and may be the supplier's commercial practice when it conforms to the requirements of this level.

5.3 Marking (see 6.1). In addition to any special marking required by the contract or order, each unit package, intermediate package, and exterior container shall be marked in accordance with MIL-STD-129.

5.4 General. Exterior containers shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock-numbered items to the greatest extent possible.

5.5 Inspection. Inspection of military packaging shall be in accordance with MIL-P-116 (see 4.5.2).

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Title, number, and date of the applicable detail specification, and the complete type designation (see 1.2.1 and 3.1).
(c) Levels of preservation and packaging, and applicable marking (see section 5).

6.1.1 Indirect shipments. The preservation, packaging, packing, and marking requirements specified in section 5 apply only to direct purchases by or direct shipment to the Government and are not intended to apply to contracts or orders between the supplier and prime contractor.

6.2 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government, tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is Electronics Command; however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E), Engineering Standardization Directorate, Dayton, Ohio 45401.

6.3 High altitude. All tests in this specification, with the exception of the dielectric withstanding voltage at reduced barometric pressure, are performed at ambient atmospheric pressure. This fact should be considered when the use of these resistors for high-altitude conditions is contemplated.

6.4 Replacement data. Characteristic BF and tolerance M have been deleted. Resistors having characteristic BF may be replaced by resistors having characteristic GF. Resistors with resistance tolerance M may be replaced by resistors with resistance tolerance K or J. The deleted characteristic BF and tolerance M were specified in superseded MIL-R-11A, dated 17 February 1953.

6.5 Supersession data. The change in the indentification of the items under this specification is a nontechnical change only, accordingly, resistors presently identified under existing Federal Stock Numbers, by type designations of MIL-R-11D and MIL-R-11E do not require assignment of new FSNs.

6.6 Deletion of styles. Styles RC06, RC09, and RC30 have been deleted from this specification. For replacement purposes use styles RC05, RC07, and RC32, respectively.

6.7 Selection and use information. Equipment designers should refer to MIL-STD-199 "Resistors, Selection and use of" for a selection of standard resistor types and values for new equipment design. Applications and use information concerning these resistors is also provided in MIL-STD-199.

6.8 Interchangeability of styles. Resistors in this specification are mutually interchangeable with resistors of the same style procured under MIL-R-11E.

6.9 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:
Army - EL
Navy - SH
Air Force - 11

Review activities:
Army - EL, MU, MI
Navy - SH, AS, OS
Air Force - 11, 17, 85

User activities:
Army - ME, AT, AV
Navy - MC
Air Force - 14, 19

Preparing activity:
Army - EL

(Project 5905-0460)

Code "C"

TABLE XV. Critical resistance values for qualification inspection[1/]

Style	Critical resistance value[2/]
	Megohm
RC05	0.18
RC07	0.27
RC08	0.24
RC12	0.27
RC20	0.27
RC22	0.27
RC32	0.27
RC42	0.12

1/ Maximum continuous working voltage shall be applied. (See table IV.)

2/ The critical resistance value is the maximum standard resistance value which will dissipate full wattage when the maximum continuous working voltage is applied.

30. EXTENT OF QUALIFICATION

The resistance range included in the qualification of any one style shall be between any two adjacent-resistance values which pass the required qualification inspection. Qualification of G-tolerance resistors shall also qualify J and K-tolerance resistors, qualification of J-tolerance resistors shall also qualify K-tolerance resistors.

APPENDIX

PROCEDURE FOR QUALIFICATION INSPECTION

10. SCOPE

10.1 This appendix details the procedure for submission of samples, with related data, for qualification inspection of resistors covered by this specification. The procedure for extending qualification of the required sample to other resistors covered by this specification is also outlined herein.

20. SUBMISSION

20.1 Sample. A sample consisting of 60 sample units, each of the lowest and highest resistance values in each style for which qualification is sought, shall be submitted. At the option of the supplier, 70 sample units may be supplied to allow 20 sample units to be submitted for group VII of table V. When the lowest and highest resistance values submitted are respectively below and above the critical value specified in table XV, 60 or 70 sample units, as applicable, of each critical value shall also be submitted in each style. One additional sample unit of each resistance value shall be submitted to permit substitution for the allowable defect in group I inspection. All sample units for which qualification is sought shall have resistance tolerance J (±5 percent) or G (±2 percent) as applicable. If approval for 2 percent resistance tolerance is sought, in addition to the 5 percent resistance tolerance already approved, 10 additional sample units of this tolerance (2 percent) shall be submitted and subjected to group I inspection of table V.

20.2 Test data. When examinations and tests are to be performed at a Government laboratory, prior to submission, all sample units shall be subjected to all of the examinations and tests indicated as nondestructive in table V. Each submission shall be accompanied by the test data obtained from these examinations and tests. The performance of the destructive tests by the supplier on a duplicate set of sample units is encouraged, although not required. All test data shall be submitted in duplicate.

20.3 Description of items. The supplier shall submit a detailed description of the resistors being submitted for inspection, including materials used for the resistance element and the protective enclosure or coating.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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