EIA RS-196-A

EIA STANDARD

Fixed Film Resistors —

Precision and Semiprecision

RS-196-A

(Revision of RS-196)

September 1970

Engineering Department

ELECTRONIC INDUSTRIES ASSOCIATION

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FIXED FILM RESISTORS – PRECISION AND SEMIPRECISION

(From EIA Standard RS-196 and Standards Proposal No. 1044, formulated under the cognizance of EIA Working Group P-1.2. on Precision Film Resistors.)

1. SCOPE

This standard describes requirements for a stable fixed film type resistor distinguished, in general, by its accuracy of initial tolerance and stability under the standard tests outlined herein. This standard is intended as a guide for commercial users of fixed film resistors.

2. CLASSES, STYLES & CHARACTERISTICS

2.1 Classes:

Two classes of resistors are available in this standard. Two classes shall be identified as follows and in Table I.

CLASS I – Tolerance: 1.0%, 2.0%, 5.0%.
Temperature Coefficient: ±500PPM and less.

CLASS II – Tolerance: 0.1%, 0.25%, 0.50%, 1.0%.
Temperature Coefficient: ±100PPM and less.

2.2 Type Designation:

The type designation shall be as follows:

2.2.1 Style:

The style shall be identified by a single letter and a two digit number. The single letter R is to signify resistor. Odd numbers(05,07, etc.) identify Class I resistors. Even numbers(04,06, etc.) identify Class II resistors.

2.2.2 **Temperature Coefficient:**

The temperature coefficient shall be identified by a single letter as follows:

TEMPERATURE COEFFIENT

SYMBOL	T,C.
E	±25PPM
C	±50PPM
K	±100PPM
D	±200PPM
A	±500PPM

2.2.3 **Resistance:**

The resistance value shall be identified by a three digit number and a letter designating the multiplier. The letter "R" denotes the decimal point for ohms. The letter "K" denotes the decimal point for kilo, thousands of ohms. The letter "M" denotes the decimal point for Mega, millions of ohms.

DESIGNATION OF RESISTANCE VALUES

DESIGNATION	VALUE
10R0	10Ω
100R	100Ω
1K00	1,000Ω
10K0	10,000Ω
100K	100,000Ω
1M00	1,000,000Ω

2.2.4 **Tolerance:**

The reference tolerance shall be identified by a single letter as follows:

RESISTANCE TOLERANCE

SYMBOL	TOLERANCE
B	0.1%
C	0.25%
D	0.50%
F	1%
G	2%
J	5%

2.2.5 **Size & Characteristic:**

The class, style, wattage, dimensions, rated ambient temperature, resistance value, and maximum continuous working voltage shall be in accordance with Table I.

2.2.6 **Standard Values:**

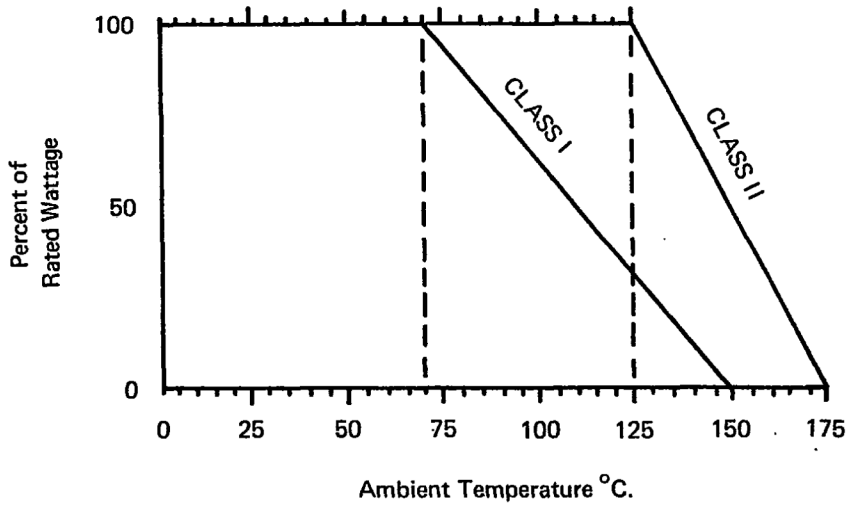
The standard values for every decade shall follow the sequence demonstrated for the "10 to 100" decade in Table II.

3. DEFINITIONS

3.1 **Wattage:**

Power rating is based on continuous full load operation at rated ambient temperature of either 70°C or 125°C as specified for the particular types. For operation at higher ambient temperatures, resistors shall be derated in accordance with 3.1.1.

3.1.1 **DERATING CURVE FOR HIGH AMBIENT TEMPERATURE:**



In no case shall the maximum continuous working voltage be exceeded.

3.2 **Voltage:**

The rated dc continuous working voltage, or the approximate sine-wave r.m.s. continuous working voltage at commercial line frequency, corresponds to the power rating as determined from the following formula.

$$E = \sqrt{PR}$$

Where E = Rated Voltage
P = Power Rating
R = Nominal Resistance

TABLE I

CLASS	STYLE	WATT-AGE	BODY LENGTH	BODY DIAMETER	LEAD DIAMETER	RATED AMBIENT TEMP.	RESISTANCE VALUE MINIMUM	RESISTANCE VALUE MAXIMUM	MAX. CONTINUOUS WORKING VOLTAGE
I	R05	1/8	.150 ± .020	.065 ± .007	.014/.018	70°C	4.7Ω	150K	200
	R07	1/4	.250 ± .025	.095 ± .015	.019/.027	70°C	10Ω	301K	250
	R09	1/2	.375 ± .038	.130 ± .018	.026/.036	70°C	4.3Ω	1Meg	350
	R11	1	.562 ± .056	.190 ± .019	.038/.042	70°C	10Ω	2Meg	500
	R15	2	.688 ± .040	.260 ± .040	.040/.050	70°C	10Ω	1.5Meg	500
II	R04	1/20	.150 ± .020	.065 ± .007	.014/.018	125°C	10Ω	150K	200
	R06	1/10	.250 ± .025	.095 ± .015	.023/.027	125°C	10Ω	301K	200
	R08	1/8	.375 ± .038	.130 ± .018	.023/.027	125°C	10Ω	1Meg	250
	R12	1/4	.625 ± .063	.203 ± .020	.023/.027	125°C	10Ω	2Meg	300
	R14	1/2	.781 ± .078	.273 ± .028	.030/.034	125°C	24.9Ω	2Meg	350
	R16	1	1.062 ± .110	.385 ± .039	.030/.034	125°C	49.9Ω	2Meg	500

NOTE:
1. Lead length for the R04 shall be 1.00" ± .062". All others shall be 1.50" ± .125".
2. Lead material shall be suitably treated to facilitate soldering.
3. The leads shall be solderable to within. .125 inch of the resistor body.
4. The end of the body shall be that point at which the diameter equals the nearest drill size larger than 150 percent or 300 percent of the nominal lead diameter.

TABLE II

STANDARD RESISTANCE VALUES FOR THE 10 TO 100 DECADE RESISTANCE TOLERANCE

C, D .25, .5	F 1.0	G 2	J 5	C, D .25, .5	F 1.0	G 2	J 5	C, D .25, .5	F 1.0	G 2	J 5
10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0	26.1	26.1	26.1	26.1
10.1	—	—	—	16.2	16.2	16.2	16.2	26.4	—	—	—
10.2	10.2	—	—	16.4	—	—	—	26.7	26.7	—	—
10.4	—	—	—	16.5	16.5	—	—	27.0	27.0	27.0	27.0
10.5	10.5	10.5	—	16.7	—	—	—	27.1	—	—	—
10.6	—	—	—	16.9	16.9	16.9	—	27.4	27.4	27.4	—
10.7	10.7	—	—	17.2	—	—	—	27.7	—	—	—
10.9	—	—	—	17.4	17.4	—	—	28.0	28.0	—	—
11.0	11.0	11.0	11.0	17.6	—	—	—	28.4	—	—	—
11.1	—	—	—	17.8	17.8	17.8	17.8	28.7	28.7	28.7	28.7
11.3	11.3	—	—	18.0	18.0	18.0	18.0	29.1	—	—	
11.4	—	—	—	18.2	18.2	—	—	29.4	29.4	—	—
11.5	11.5	11.5	—	18.4	—	—	—	29.8	—	—	—
11.7	—	—	—	18.7	18.7	18.7	—	30.0	30.0	30.0	30.0
11.8	11.8	—	—	18.9	—	—	—	30.1	30.1	30.1	—
12.0	12.0	12.0	12.0	19.1	19.1	—	—	30.5	—	—	—
12.1	12.1	12.1	12.1	19.3	—	—	—	30.9	30.9	—	—
12.3	—	—	—	19.6	19.6	19.6	19.6	31.2	—	—	—
12.4	12.4	—	—	19.8	—	—	—	31.6	31.6	31.6	31.6
12.6	—	—	—	20.0	20.0	20.0	20.0	32.0	—	—	—
12.7	12.7	12.7	—	20.3	—	—	—	32.4	32.4	—	—
12.9	—	—	—	20.5	20.5	20.5	—	32.8	—	—	—
13.0	13.0	13.0	13.0	20.8	—	—	—	33.0	33.0	33.0	33.0
13.2	—	—	—	21.0	21.0	—	—	33.2	33.2	33.2	—
13.3	13.3	13.3	13.3	21.3	—	—	—	33.6	—	—	—
13.5	—	—	—	21.5	21.5	21.5	21.5	34.0	34.0	—	—
13.7	13.7	—	—	21.8	—	—	—	34.4	—	—	—
13.8	—	—	—	22.0	22.0	22.0	22.0	34.8	34.8	34.8	34.8
14.0	14.0	14.0	—	22.1	22.1	—	—	35.2	—	—	—
14.2	—	—	—	22.3	—	—	—	35.7	35.7	—	—
14.3	14.3	—	—	22.6	22.6	22.6	—	36.0	36.0	36.0	36.0
14.5	—	—	—	22.9	—	—	—	36.1	—	—	—
14.7	14.7	14.7	14.7	23.2	23.2	—	—	36.5	36.5	36.5	—
14.9	—	—	—	23.4	—	—	—	37.0	—	—	—
15.0	15.0	15.0	15.0	23.7	23.7	23.7	23.7	37.4	37.4	—	—
15.2	—	—	—	24.0	24.0	24.0	24.0	37.9	—	—	—
15.4	15.4	15.4	—	24.3	24.3	—	—	38.3	38.3	38.3	38.3
15.6	—	—	—	24.6	—	—	—	38.8	—	—	—
15.8	15.8	—	—	24.9	24.9	24.9	—	39.0	39.0	39.0	39.0
				25.2	—	—	—	39.2	39.2	—	—
				25.5	25.5	—	—	39.7	—	—	—
				25.8	—	—	—	40.2	40.2	40.2	—

TABLE II (Continued)

STANDARD RESISTANCE VALUES FOR THE 10 TO 100 DECADE RESISTANCE TOLERANCE

C, D .25, .5	F 1.0	G 2	J 5	C, D .25, .5	F 1.0	G 2	J 5	C, D .25, .5	F 1.0	G 2	J 5
40.7	–	–	–	56.2	56.2	56.2	56.2	78.7	78.7	78.7	–
41.2	41.2	–	–	56.9	–	–	–	79.6	–	–	–
41.7	–	–	–	57.6	57.6	–	–	80.6	80.6	–	–
42.2	42.2	42.2	42.2	58.3	–	–	–	81.6	–	–	–
42.7	–	–	–	59.0	59.0	59.0	–	82.0	82.0	82.0	82.0
43.0	43.0	43.0	43.0	59.7	–	–	–	82.5	82.5	82.5	82.5
43.2	43.2	–	–	60.4	60.4	–	–	83.5	–	–	–
43.7	–	–	–	61.2	–	–	–	84.5	84.5	–	–
44.2	44.2	44.2	–	61.9	61.9	61.9	61.9	85.6	–	–	–
44.8	–	–	–	62.0	62.0	62.0	62.0	86.6	86.6	86.6	–
45.3	45.3	–	–	62.6	–	–	–	87.6	–	–	–
45.9	–	–	–	63.4	63.4	–	–	88.7	88.7	–	–
46.4	46.4	46.4	46.4	64.2	–	–	–	89.8	–	–	–
47.0	47.0	47.0	47.0	64.9	64.9	64.9	–	90.9	90.9	90.9	90.9
47.5	47.5	–	–	65.7	–	–	–	91.0	91.0	91.0	91.0
48.1	–	–	–	66.5	66.5	–	–	92.0	–	–	–
48.7	48.7	48.7	–	67.3	–	–	–	93.1	93.1	–	–
49.3	–	–	–	68.0	68.0	68.0	68.0	94.2	–	–	–
49.9	49.9	–	–	68.1	68.1	68.1	68.1	95.3	95.3	95.3	–
50.5	–	–	–	69.0	–	–	–	96.5	–	–	–
51.0	51.0	51.0	51.0	69.8	69.8	–	–	97.6	97.6	–	–
51.1	51.1	51.1	51.1	70.6	–	–	–	98.8	–	–	–
51.7	–	–	–	71.5	71.5	71.5	–				
52.3	52.3	–	–	72.3	–	–	–				
53.0	–	–	–	73.2	73.2	–	–				
53.6	53.6	53.6	–	74.1	–	–	–				
54.2	–	–	–	75.0	75.0	75.0	75.0				
54.9	54.9	–	–	75.9	–	–	–				
55.6	–	–	–	76.8	76.8	–	–				
56.0	56.0	56.0	56.0	77.7	–	–	–				

The resistance values for tolerance "B" may be any value, but it is preferred that the value be chosen from the table and not to exceed 3 significant figures.

3.2.1 In no case shall the rated voltage be greater than the applicable maximum continuous working voltage specified. in Table I.

4. MARKING

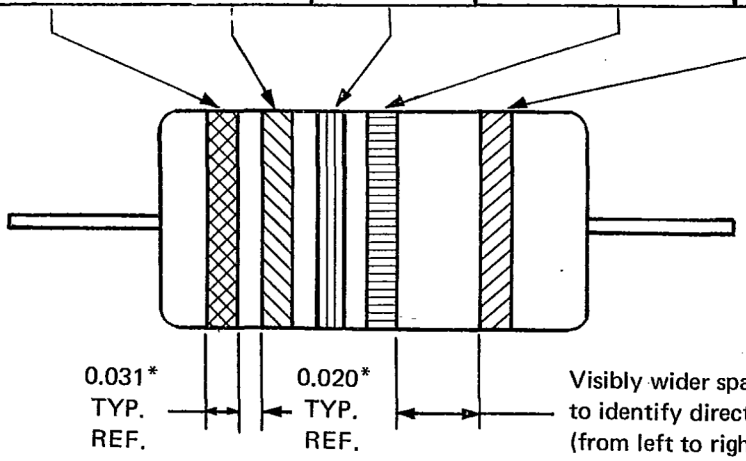
4.1 Resistors shall be marked with either of the following methods.

4.1.1 Resistors shall be marked as a minimum with the manufacturer's name, trademark, or code symbol, tolerance symbol, style, temperature characteristic symbol, and the four digit resistance designation as follows:

LINE	INFORMATION	EXAMPLE
1	Style & Temp. Char.	R04C
2	Four Digit Resistance	10K0
3	MFR & Tolerance	XXXF

4.1.2 Resistors shall be marked with the color code as follows:

COLOR	1st DIGIT	2nd DIGIT	3rd DIGIT	MULTIPLIER	TOLERANCE ±%
BLACK	0	0	0	1	
BROWN	1	1	1	10	1
RED	2	2	2	100	2
ORANGE	3	3	3	1,000	
YELLOW	4	4	4	10,000	
GREEN	5	5	5	100,000	0.5
BLUE	6	6	6	1,000,000	0.25
VIOLET	7	7	7	10,000,000	0.10
GRAY	8	8	8		0.05
WHITE	9	9	9		
GOLD				0.1	5
SILVER				0.01	10



NOTE: *All band widths and spacing are for reference only and may be scaled up or down. All colors shall be in accordance with EIA Standard RS-359, Standard Colors for Color Identification and Coding.

5. STANDARD TESTS

5.1 **Standard Test Conditions:**

5.1.1 Temperature, Pressure and Humidity:

Unless otherwise specified herein, all measurements and tests shall be made at or referred to a temperature of 25° ±2°C at ambient barometric pressure and humidity.

5.1.2 Precautions:

Adequate precautions shall be taken during inspection to prevent condensation of moisture on resistors, except during the moisture resistance and temperature cycling tests. Precautions shall also be taken to prevent damage by heat when soldering resistor leads to terminals.

5.2 **Test Procedure:**

5.2.1 Visual and Mechanical Inspection:

Resistors shall be inspected to certify that the design, construction, physical dimensions, marking and workmanship are in accordance with the applicable requirements.

5.2.2 DC Resistance:

The method employed for the measurements of resistance shall be such that the combined inherent errors of the measuring instruments shall not exceed 0.10 of the tolerance of part being measured. Measurements of resistance shall be made by using a dc potential applied for as short a time as practicable, and in no case for more than five seconds, in order that the temperature of the resistance element shall not rise appreciably during measurement. The voltage specified shall be applied across the terminals of the resistor under test.

(a) Measuring Apparatus:

The same measuring instrument shall be used for any one test, but not necessarily for all tests.

DC RESISTANCE TEST VOLTAGES

RESISTANCE, NORMAL(OHMS)	MAXIMUM TEST VOLTAGES(WATTS) 1/2,1,2,	1/20,1/10,1/8,1/4
10 to 98.8 incl.	1 Volt	1 Volt
100 to 988 incl.	3 Volts	3 Volts
1,000 to 9,880 incl.	10 Volts	3 Volts
10,000 to 98,800 incl.	30 Volts	10 Volts
100,000 or higher	100 Volts	30 Volts

(b) Test Voltage:

Voltage used during measurements of resistance shall not exceed the test voltage specified. The test voltage chosen, whether it be the maximum or a lower voltage which would still provide the sensitivity required, shall be applied across the terminals of the resistor. This same voltage shall be used whenever a subsequent resistance measurement is made.

(c) Temperature:

The dc resistance test specified in 5.2.2 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 in each test shall be within ±2°C of the temperature at which the initial resistance measurement was made.

5.2.3 Thermal Shock:

5.2.3.1 *Procedure*

Resistors shall be tested in accordance with method 11 of RS-186. The following details and exceptions shall apply.

(a) Mounting:

Resistors shall be mounted by means other than soldering.

(b) Measurement Before Test:

DC resistance shall be measured as specified in 5.2.2.

(c) Test Condition:

Test Condition A shall be used, except that the extreme high temperature shall be 105° $^{+3°C}_{-0°}$.

(d) Measurement After Test:

Within 3 hours after completion of the final cycle and as soon as the resistors stabilize at room temperature, dc resistance shall again be measured as specified in 5.2.2.

(e) Examination After Test:

Resistors shall be examined for evidence of mechanical damage.

5.2.3.2 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±1% for Class I styles and ± .25% for Class II styles.

5.2.4 Temperature Coefficient of Resistance:

5.2.4.1 *Procedure:*

Following a resistance measurement at 25°C.* the resistors shall be maintained for 15 to 30 minutes within 1°C at each of the following ambient temperatures: −55°, +25°* and 105°C., consecutively. At the end of each time period, the resistance shall be measured again at the temperature maintained during the period. The temperature coefficient of resistance, referred to a reference temperature of 25°C., shall then be computed as follows:

$$TC = \frac{\triangle R \times 100}{R \times \triangle t}$$

Where TC = Temperature Coefficient in percent per degree C.
R = Resistance at reference temperature.
$\triangle R$ = Change in resistance at test temperature from resistance at reference temperature.
$\triangle t$ = Difference between test and reference temperature in degree C.

*This is considered reference temperature for the following temperature.

5.2.4.2 *Requirement:*

As a result of the test the Temperature Coefficient shall be within the specified requirement in 2.2.2.

5.2.5 Short-Time Overload:

5.2.5.1 *Test Conditions:*

5.2.5.1.1 Free Space:

In free space, resistors shall be mounted horizontally, with no object closer than 3 inches to the protective coating except the mounting base, which shall not be closer than 2 inches below the resistors.

5.2.5.1.2 Still Air:

In still air, resistors shall be mounted with no circulation of air other than that created by the heat of the resistors being operated.

5.2.5.2 *Procedure:*

DC resistance shall be measured as specified in 5.2.2. Following this measurement, a potential of 2.5 times the rated continuous working voltage but not to exceed twice the maximum voltage shall be applied for 5 seconds to the resistor terminals. One hour ± thirty minutes after removal of the test potential, the dc resistance shall again be measured as specified in 5.2.2.

5.2.5.3 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±.5% for Class I styles and ±.25% for Class II styles.

5.2.6 **Dielectric Strength Test**

5.2.6.1 *Procedure:*

Resistors shall be tested in accordance with method 4 of RS-186. 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) Measurement before Test:

DC resistance shall be measured as specified in 5.2.2.

(c) Test Condition:

Sea level pressure shall be used.

(d) Magnitude of Test Voltage:

The following test voltages shall be used.

R04 & R05	–	250 Volts RMS
R06 & R07	–	450 Volts RMS
R08 & R09	–	700 Volts RMS
All others	–	900 Volts RMS

(e) Nature of Potential:

An alternating current(ac) supply at commercial-line frequency(not more than 100 Hz) and waveform shall be used.

(f) Points of Application of Test Voltage:

The points of application shall be between the resistor terminals connected together and the V-block.

(g) Measurement after Test:

DC resistance shall be measured as specified in 5.2.2.

(h) Examinations after Test:

Resistors shall be examined for evidence of mechanical damage, arcing, and breakdown.

5.2.6.2 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±.5% for Class I styles and ±.25% for Class II styles.

5.2.7 **Insulation Resistance Test**

5.2.7.1 *Procedure:*

Resistors shall be tested in accordance with method 13 of RS-186. The following details and exceptions shall apply.

(a) Special Preparations:

As specified in 5.2.6(a).

(b) Test Potential:

100 volts shall be used for R04 and 500 volts shall be used for all others.

(c) Points of Measurements:

Between the resistor terminals connected together and the mounting strap.

5.2.7.2 *Requirement:*

As a result of the test, the insulation resistance of the units tested shall be not less than 1,000 megohms for Class I styles and not less than 10,000 megohms for Class II styles.

5.2.8 **Moisture Resistance**

5.2.8.1 *Procedure:*

Resistors shall be tested in accorance with method 2 of RS-186. The following details and exceptions shall apply.

(a) Mounting:

Resistors shall be soldered by their leads to rigid mounts or terminals lugs. The spacing of the mounts or terminal lugs shall be such that the length of each resistor lead is approximately 3/8 inch when measured from the edge of the supporting terminal to the resistor body.

(b) Measurement before test:

At the end of the initial drying period dc resistance shall be measured as specified in 5.2.2.

(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) Subcycle:

Step 7a:

At least 1 hour but not more than 4 hours after the beginning of step 7, the resistors shall be either removed from the humidity chamber, or the temperature of the chamber shall be reduced. Resistors shall then be conditioned at $-10° \pm 2°C.$, with humidity not controlled, or three hours. When a separate cold chamber is not used, care should be taken to assure that the specimens are held at $-10° \pm 2°C.$, for the full 3 hour period.

Step 7b:

Within 15 minutes after completion of step 7a and with humidity not controlled, resistors shall be vibrated for 15 minutes, at room ambient temperature, using a simple harmonic motion having an amplitude of 0.03 inch(0.06-in. max. total excursion), the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. The entire frequency range, from 10 to 55 Hz and return to 10 Hz, shall be traversed in approximately 1 minute.

(e) Number of Cycles:

Resistors shall be subjected to 10 continuous cycles.

(f) Final Measurements:

Upon completion of step 6 of the final cycle, the resistors shall be removed and held at room conditions for a period of 1 1/2 to 2 1/2 hours, after which the Dielectric

Strength(5.2.6), Insulation Resistance(5.2.7) and DC Resistance(5.2.2) shall be measured.

5.2.8.2 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±1.5% for Class I styles and ±.5% for Class II styles. The dielectric test shall show no evidence of mechanical damage and the insulation resistance shall be 100 megohms minimum.

5.2.9 **Load Life Test**

5.2.9.1 *Procedure:*

Resistors shall be tested in accordance with method 12 of RS-186. The following details and exceptions shall apply.

(a) Method of Mounting:

Resistors shall be mounted and soldered on lightweight terminals. The effective length of each terminal shall be 1 inch, except for the R04 which shall be 1/2 inch minimum. Resistors shall be so arranged that the temperature of any one resistor will not appreciably influence the temperature of any other resistor. There shall be no undue draft over the resistors.

(b) Test Temperature:

Test shall be conducted at an ambient temperature of 70°C. ±2°C. or 125°C. ±2°C. as specified in Table I. Resistance Measurements may be made either at room or test ambient temperature provided all measurements for the same group are made at the same ambient temperature.

(c) Initial Measurements:

After temperature stabilization and within a period of 8 hours after exposure of resistors to the test temperature, dc resistance shall be measured as specified in 5.2.2.

(d) Operating Conditions:

Rated continuous working voltage shall be applied intermittently, 1 1/2 hours on and 1/2 hour off, for 1,000 hours. Adequate precaution shall be taken to maintain constant voltage on resistors.

(e) Test Duration:

The test shall be conducted for 1000 hours.

(f) Measurements during test:

DC resistance shall be measured at the end of the 1/2 hour off periods, after 50±8, 100±8, 250±8, 500±12, 750±12, and 1,000±12 hours have elapsed.

(g) Examination after Test:

Resistors shall be examined for evidence of mechanical damage.

5.2.9.2 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±2% for Class I styles and ±.2% for Class II styles.

5.2.10 **Terminal Strength**

5.2.10.1 *Procedure:*

Resistors shall be tested in accordance with method 6 of RS-186. The following details and exceptions shall apply.

(a) Measurement before test:

DC resistance shall be measured as specified in 5.2.2.

(b) Type 1 test: Tensile(Pull)

Resistor shall be clamped by one terminal lead and a gradual pull of five pounds applied to the other lead in a direction parallel to the axis of the resistor; however, for the styles R04 and R05 a gradual pull of two pounds shall be applied.

(c) Type V test: Torsion(Twist)

(d) Measurement after tests:

DC resistance shall be measured as specified in 5.2.2.

(e) Examination after test:

Resistors shall be examined for evidence of breakage and other mechanical damage.

5.2.10.2 *Requirement:*

As a result of the test, the units tested shall not show a change in excess of ±.5% for Class I styles and ±.2% for Class II styles.

5.2.11 **Solderability**

5.2.11.1 *Procedure:*

Resistors shall be tested in accordance with RS-178. The following details and exceptions shall apply.

(a) Test Condition:

Test Condition A shall be used.

(b) Terminals:

Both terminal leads of each resistor shall be tested.

6. TEST GROUPINGS AND INTERPRETATIONS OF TEST RESULTS

6.1 Test Groupings

A minimum of ten resistors shall be used for each test group. No test resistors shall be tested in more than one test group. All units shall be inspected per 5.2.1.

Test Group 1:	Thermal Shock Short-Time Overload Dielectric Strength Insulation Resistance
Test Group 2:	Moisture Resistance Terminal Strength
Test Group 3:	Temperature Coefficient of Resistance Load Life
Test Group 4:	Solderability

6.2 Interpretation of Test Results:

the sample scheme or percentage of any shipment which shall be subjected to the tests outlined in this standard is a matter of determination between the vendor and the purchaser. Production sampling plans are not part of this standard.

RELATED EIA STANDARDS

In addition to this Standard the following EIA Standards on resistors are available:

RS-155-A	Fixed Wirewound Resistors	$2.20
RS-172-A	Fixed Composition Resistors	4.40
RS-178-A	Solderability Test Standard	1.00
RS-186-C	Standard Test Methods for Electronic Component Parts	4.90
RS-229-A	Fixed Wirewound, Precision Resistors	3.30
RS-279	Color Code for Film Resistors	1.00
RS-303	Variable Control Resistors (Adjustable Composition Resistance Units)	3.80
RS-333	Wirewound Variable Resistors	2.20
RS-344	Low Power, Insulated Fixed Wirewound Resistors	3.30
RS-345	Resistors, Variable, Wirewound (Lead Screw Actuated)	1.60
RS-360	Resistors, Variable, (Lead Screw Actuated) Non-Wirewound	5.00

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