

MIL-R-10509G

MIL-R-10509 is the military specification for the RN type resistor. An RN60D would fall under column "D" of this chart.

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TABLE I. Characteristics.

Characteristic B was deleted in Revision H

|   | B  | C  | D  | E  | F   | G 1/  |
|---|--|--|--|--|---|---|
| Maximum resistance-temp. char. (see 3.17)<br>Percent/°C<br>PPM/°C   | ±0.05<br>±500  | ±0.005<br>±50  | +0.02, -0.05<br>+200, -500   | ±0.0025<br>±25   | ±0.005<br>±50   | +0.02, -0.05<br>+200, -500  |
| Maximum ambient temperature at rated wattage (see figure 1)   | 70°C   | 125°C  | 70°C   | 125°C  | 125°C   | 70°C  |
| Maximum ambient temperature at zero wattage derating (see figure 1)   | 150°C  | 175°C  | 165°C  | 175°C  | 175°C   | 165°C   |
| Power rating in watts and maximum dc or rms voltage.<br>Style:<br>RN50<br>RN55<br>RN60<br>RN65<br>RN70<br>RN75<br>RN80  | 2/<br>2/<br>2/<br>2/<br>2/<br>1 W,<br>500 V<br>2 W,<br>750 V | 1/20 W,<br>200 V<br>1/10 W,<br>200 V<br>1/8 W,<br>250 V<br>1/4 W,<br>300 V<br>1/2 W,<br>350 V<br>1 W,<br>500 V<br>2/<br>2/ | 2/<br>1/8 W,<br>200 V<br>1/4 W,<br>300 V<br>1/2 W,<br>350 V<br>3/4 W,<br>500 V<br>2/<br>2/ | 1/20 W,<br>200 V<br>1/10 W,<br>200 V<br>1/8 W,<br>250 V<br>1/4 W,<br>300 V<br>1/2 W,<br>350 V<br>1 W,<br>500 V<br>2/<br>2/ | 2/<br>2/<br>2/<br>1/2 W,<br>350 V<br>3/4 W,<br>500 V<br>2/<br>2/  | 2/<br>1/10 W,<br>200 V<br>1/8 W,<br>250 V<br>1/4 W,<br>300 V<br>1/2 W,<br>350 V<br>1 W,<br>500 V<br>2 W,<br>750 V |
| Maximum percent change in resistance ±:<br>Temperature cycling (see 3.9)<br>Low temperature operation (see 3.10)<br>Short-time overload (see 3.11)<br>Dielectric withstanding voltage (see 3.13)<br>Resistance to soldering heat (see 3.15)<br>Moisture resistance (see 3.16)<br>Life (see 3.18)<br>Shock, medium impact (see 3.20)<br>Vibration, high frequency (see 3.21) | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>1.5<br>1.0<br>0.5<br>0.5  | 0.25<br>0.25<br>0.25<br>0.25<br>0.1<br>0.5<br>0.5<br>0.25<br>0.25  | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>1.5<br>1.0<br>0.5<br>0.5                                | 0.25<br>0.25<br>0.25<br>0.25<br>0.1<br>0.5<br>0.5<br>0.25<br>0.25  | 0.25<br>0.25<br>0.25<br>0.25<br>0.1<br>0.5<br>0.5<br>0.25<br>0.25 | 0.25<br>0.25<br>0.25<br>0.25<br>0.1<br>0.5<br>0.5<br>0.25<br>0.25   |
| Resistance tolerances ± percent (see table IV)  | 1.0  | 1.0, 0.5,<br>0.25, 0.1   | 1.0  | 1.0, 0.5,<br>0.25, 0.1   | 1.0, 0.5,<br>0.25, 0.1  | 1.0   |

1/ Hermetically sealed only (see 3.8).  
2/ Not available.

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

$$E = \sqrt{PR}$$

Where:

- E = Rated dc or rms ac continuous working voltage.
- P = Power rating (see 3.1).
- R = Nominal resistance.

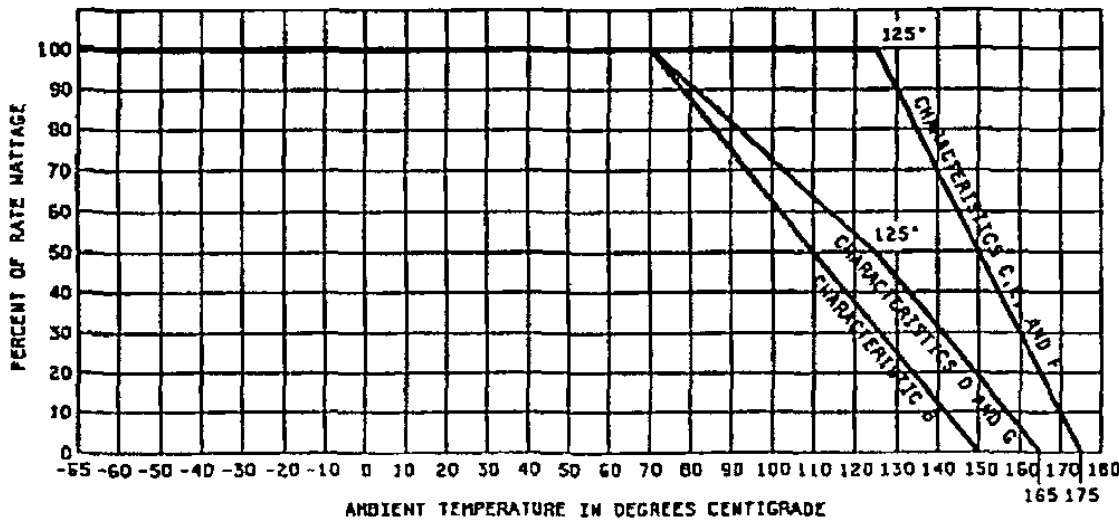
In no case shall the rated dc or rms continuous working voltage be greater than the applicable maximum value (see 3.1 and table 1).

**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 Seal (applicable only to hermetically sealed resistors).** When resistors are tested as specified in 4.6.3, there shall be no continuous visible stream of bubbles. For the purpose of this specification, a hermetically sealed resistor is one which shall be capable of passing the seal test specified in 4.6.3, or one which shall have a leakage rate of not more than  $1.76 \times 10^{-8}$  cubic centimeter per second, when determined by any other method having sensitivity equal to or better than the stated limit. Materials used for this enclosure shall be ceramic, metal, or glass, or combination thereof.

**3.9 Thermal shock.** When resistors are tested as specified in 4.6.4, there shall be no evidence of mechanical damage. The change in resistance shall not exceed  $\pm(0.5\% + 0.05 \text{ ohm})$  for characteristics B and D, and  $\pm(0.25\% + 0.05 \text{ ohm})$  for characteristics C, E, F, and G.

**3.10 Low-temperature operation.** When resistors are tested as specified in 4.6.5, there shall be no evidence of mechanical damage. The change in resistance between the initial and the final measurements at  $25^\circ\text{C} \pm 5^\circ\text{C}$ , shall not exceed  $\pm(0.5\% + 0.05 \text{ ohm})$  for characteristics B and D, and  $\pm(0.25\% + 0.05 \text{ ohm})$  for characteristics C, E, F, and G.



NOTE: These curves indicate the percentage of nominal wattage to be applied at temperatures higher than 70°C and 125°C. However, at no time shall the applied voltage exceed the maximum for each style (see table 1).

FIGURE 1. Derating curves for high ambient temperatures.

**3.11 Short-time overload.** When resistors are tested as specified in 4.6.6, there shall be no evidence of arcing, burning, or charring. The change in resistance shall not exceed  $\pm(0.5\% + 0.05 \text{ ohm})$  for characteristics B and D, and  $\pm(0.25\% + 0.05 \text{ ohm})$  for characteristics C, E, F, and G.