

Energy and Power – Resistor Power Rating

10/9/20

The power rating is the maximum amount of power that a resistor can dissipate without being damaged by excessive heat buildup. Or in other words, a resistor gives off heat when there is current through it, the limit to the amount of heat that a resistor can give off is specified by its power rating.

The power rating is not related to the ohmic value (resistance) but rather is determined mainly by the physical composition, size, and shape of the resistor. The larger the surface area of a resistor, the more power it can dissipate. Carbon-composition resistors are available in standard power ratings **1/8W**, **1/4W**, **1/2W**, **1W** and **2W**. Carbon-film and metal-film resistors have ratings up to **10W** and wire-wound resistors have ratings up to **225W** or greater.

Selecting the Proper Power Rating for an Application

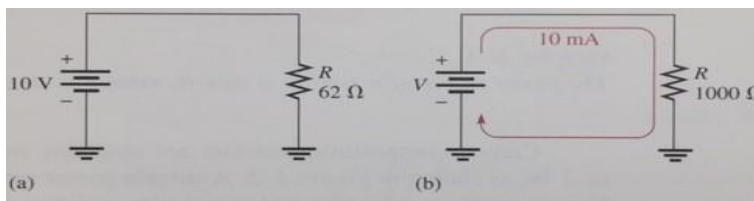
When a resistor is used in a circuit, its power rating must be greater than the maximum power that it will have to handle. For example, if a resistor is to dissipate 0.75W in a circuit application, its rating should be at least the next higher standard value which is 1W. Ideally, a rating that is approximately twice the actual power should be used when possible.

Resistor Failures

When the power in a resistor is greater than its rating, the resistor will become excessively hot. As a result, either the resistor will burn open or its resistance value will be greatly altered.

Do Now:

1. Choose an adequate power rating for each of the carbon-composition resistors in the circuits A and B below:



2. Determine whether the resistor in circuits A, B and C below will have possible damage by overheating:

