Resistance and resistivity

Physics 225 – Background wiki

What is resistance?

Resistance is a measure of how much an object resists the flow of current through it when a potential difference is applied. Resistance is measured in **Ohms (Ω)**, which is equal to Volt/Ampere.

The current through a resistor depends on its resistance as described by Ohm's Law:

$$I = V / R \qquad \text{(Equation 1)}$$

In Equation 1:

- I is the current in the resistor
- V is the potential difference (voltage) across the resistor
- R is the resistance of the resistor

For a cylindrical resistor (such as a wire), the resistance R is given by equation 2:

$$R = \frac{\rho L}{A} \qquad \text{(Equation 2)}$$

In Equation 2:

- R is the resistance of the resistor
- ρ is the resistivity of the material the resistor is made of
- L is the length of the resistor
- A is the cross-sectional area of the resistor