

13. The resistance of the wire is given by $R = \rho L/A$, where ρ is the resistivity of the material, L is the length of the wire, and A is its cross-sectional area. In this case,

$$A = \pi r^2 = \pi(0.50 \times 10^{-3} \text{ m})^2 = 7.85 \times 10^{-7} \text{ m}^2 .$$

Thus,

$$\rho = \frac{RA}{L} = \frac{(50 \times 10^{-3} \Omega)(7.85 \times 10^{-7} \text{ m}^2)}{2.0 \text{ m}} = 2.0 \times 10^{-8} \Omega \cdot \text{m} .$$