

21. The resistance of conductor A is given by

$$R_A = \frac{\rho L}{\pi r_A^2} ,$$

where r_A is the radius of the conductor. If r_o is the outside diameter of conductor B and r_i is its inside diameter, then its cross-sectional area is $\pi(r_o^2 - r_i^2)$, and its resistance is

$$R_B = \frac{\rho L}{\pi (r_o^2 - r_i^2)} .$$

The ratio is

$$\frac{R_A}{R_B} = \frac{r_o^2 - r_i^2}{r_A^2} = \frac{(1.0 \text{ mm})^2 - (0.50 \text{ mm})^2}{(0.50 \text{ mm})^2} = 3.0 .$$