

6. We express the magnitude of the current density vector in SI units by converting the diameter values in mils to inches (by dividing by 1000) and then converting to meters (by multiplying by 0.0254) and finally using

$$J = \frac{i}{A} = \frac{i}{\pi R^2} = \frac{4i}{\pi D^2} \quad .$$

For example, the gauge 14 wire with $D = 64 \text{ mil} = 0.0016 \text{ m}$ is found to have a (maximum safe) current density of $J = 7.2 \times 10^6 \text{ A/m}^2$. In fact, this is the wire with the largest value of J allowed by the given data. The values of J in SI units are plotted below as a function of their diameters in mils.

