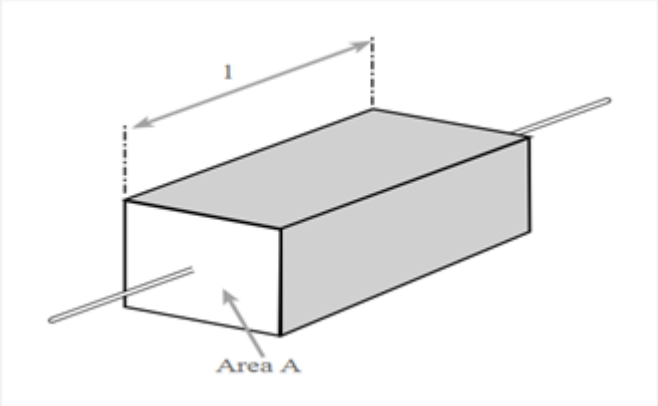
RESISTIVITY

The resistivity of a substance is the resistance of a cube of that substance having edges of unit length, with the understanding that the current flows normal to opposite faces and is distributed uniformly over them.

The electrical resistivity is the electrical resistance per unit length and per unit of cross-sectional area at a specified temperature.

The SI unit of electrical resistivity is the ohm·metre (Ω·m). It is commonly represented by the Greek letter ρ, rho.

Although the SI resistivity unit, the ohms metre is generally used, sometimes figures will be seen described in terms of ohms centimetres, Ω·cm.



Resistivity formula / equation

The resistivity of a material is defined in terms of the magnitude of the electric field across it that gives a certain current density. It is possible to devise an electrical resistivity formula.

ρ=EJ

Where:
ρ is the resistivity of the material in ohm metres, Ω·m

E is the magnitude of the electric field in volts per metre, V·m^-1

J is the magnitude of the current density in amperes per square metre, A·m^-2

Many resistors and conductors have a uniform cross section with a uniform flow of electric current. It is therefore possible to create the more specific, but more widely used electrical resistivity formula or equation:

ρ=RAlρ=RAl

Where:
R is the electrical resistance of a uniform specimen of the material measured in ohms

l is the length of the piece of material measured in metres, m

A is the cross-sectional area of the specimen measured in square metres, m^2