

Determination of the Surface Resistance and Surface Resistivity of Electrical Insulating Materials

Definition: The surface resistance R_0 is the quotient of a direct voltage applied to two electrodes on a surface of a specimen and the current between these electrodes at a given time of electrification (usually 1 min).

$$R_0 = \frac{U}{I} \left[\frac{V}{A} = W \right]$$

The surface resistivity σ of an insulating material is the surface resistance R_0 (measured) of a material reduced to a square area (L and a are length and width of the gap between the electrodes).

$$s = \frac{R_0 \cdot L}{a} [W]$$

It is very difficult to measure the surface resistance because of volume currents which can not be excluded easily. To cope with these problems different electrode geometries leading to different results have been invented.

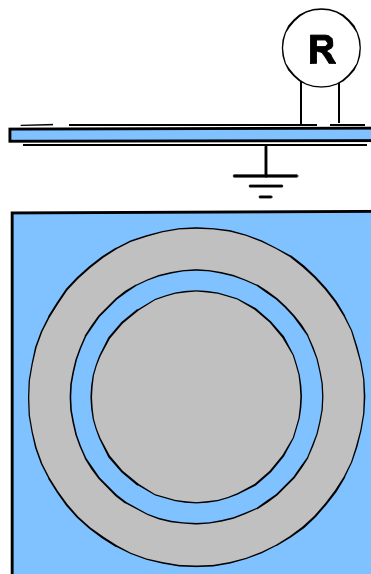


Fig. 1: IEC 60'093

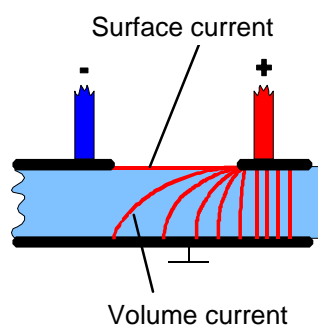


Fig. 2: Volume and surface currents

As long as surface resistance is smaller than the volume resistance, this method produces reliable surface resistance results.