

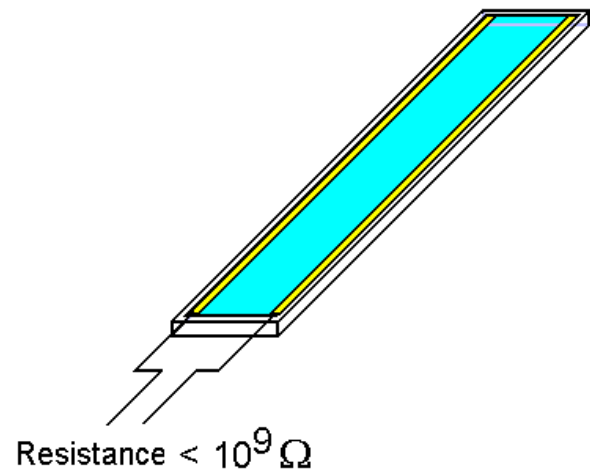


Application Note: Indium Tin Oxide for transparent Anti-static applications

Anti-static requirement

BS EN 50014:1993 section 7.3.2 'Electrical Apparatus for potentially explosive atmospheres' defines a suitable anti-static coating. This specifies that a test sample 100mm long and 10mm wide must have a resistance of less than 10^9 Ohms (1 Giga.Ohm). This 100mm x 10mm sample shape is 0.1 of a square. Diamond Coating's standard anti-static ITO coating has a sheet resistance of 500 Ohms/square. In this case the test sample resistance will be $0.1 \times 500 = 50$ Ohms. This is better than the statutory requirement of a resistance less than 10^9 Ohms by a factor of 20 million.

Figure : Anti-static resistance requirement



Sheet resistance and surface resistivity

For anti-static applications it is common to use surface resistivity (often just termed resistivity). Surface resistivity is defined in standards such as IEC60093 or ASTM D257-93 (1998). IEC 60093 allows various measurement geometries for measuring the surface resistivity. One geometry detailed in the standard is a concentric ring electrode arrangement. The resistance is measured between two concentric rings and then a correction made for the geometry of the measurement (ref IEC 60093). This correction brings surface resistivity (measured in ohms) almost exactly back to sheet resistance





(measured in ohms/square). The agreement is certainly better than the $\pm 10\%$ referred to in IEC 60093 as a typical reproducibility (ref IEC 60093).

So sheet resistance (Ohms/square) and surface resistivity (ohms) are just two conventions for specifying the same thing. There is no correction when swapping between these two conventions, for example a sheet resistance of 1000 ohms/square is equivalent to a surface resistivity of 1000 ohms.

