SciCron Technologies

FAQ Information

What is the Difference Between Anti-Static, Dissipative, Conductive, and Insulative?

Static Electricity

As the name implies, static electricity is electricity at rest. The electrical charge is the transference of electrons that occurs when there is sliding, rubbing, or separating of a material, which is a generator of electrostatic voltages. For example: plastics, fiber glass, rubber, textiles, etc. Under the right conditions, this induced charge can reach 30,000 to 40,000 volts.

When this happens to an insulating material, like plastic, the charge tends to remain in the localized area of contact. This electrostatic voltage may then discharge via an arc or spark when the plastic material comes in contact with a body at a sufficiently different potential, such as a person or microcircuit.

If Electrostatic Discharge (ESD) occurs to a person, the results may range anywhere from a mild to a painful shock. Extreme cases of ESD, or Arc Flash, can even result in loss of life. These types of sparks are especially dangerous in environments that may contain flammable liquids, solids or gasses, such as a hospital operating room or explosive device assembly.

Some micro-electronic parts can be destroyed or damaged by ESD as low as 20 volts. Since people are prime causes of ESD, they often cause damage to sensitive electronic parts, especially during manufacturing and assembly. The consequences of discharge through an electrical component sensitive to ESD can range from erroneous readings to permanent damage resulting in excessive equipment downtime and costly repair or total part replacement.

Electrostatic Discharge (ESD)

The sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown. A buildup of static electricity can be caused by tribocharging or by electrostatic induction.

Anti-Static

Preventing the buildup of static electricity. Reducing static electric charges, as on textiles, waxes, polishes, etc., by retaining enough moisture to provide electrical conduction.

Dissipative

Static dissipative plastics allow electrical charges to dissipate generally within milliseconds. The charges flow to ground more slowly and in a somewhat more controlled manner than with conductive materials. Dissipative materials have a surface resistivity equal to or greater than 1 x 105 Ω/sq but less than 1 x 1012 Ω/sq or a volume resistivity equal to or greater than 1 x 104 Ω-cm but less than 1 x 1011 Ω-cm.2

Conductive

With a low electrical resistance, electrons flow easily across the surface or through the bulk of these materials. Charges go to ground or to another conductive object that the material contacts or comes close to. Conductive materials have a surface resistivity less than 1 x 10^5 Ω/sq or a volume resistivity less than 1 x 10^4 Ω-cm.

Insulative

Insulative materials prevent or limit the flow of electrons across their surface or through their volume. Insulative materials have a high electrical resistance and are difficult to ground. Static charges remain in place on these materials for a very long time. Insulative materials are defined as those having a surface resistivity of at least 1 x 10^{12} Ω/sq or a volume resistivity of at least 1 x 10^{11} Ω-cm.

Go to: https://www.sctech.com/AP-02-Conductivity-Spectrum for SciCron's Optimum Range