

What is ESD?

Electrostatic discharge (ESD) is the transfer of an electrostatic charge between two objects. This is a very rapid event that happens when two objects of different potentials come into direct contact with each other. ESD is one of the most common causes of electronic equipment damage or malfunction. Walking or working on a grounded ESD mat drains the electrical charge before it damages any ESD sensitive devices. There are three types of static control mats that are classified by their surface resistivity range. Surface resistivity is expressed in ohms (Ω). It measures how much a surface resists draining a static charge. The lower the surface resistivity the faster and more effective the mats will dissipate the Electrostatic charge.

Charging results in one object gaining electrons on its surface area to become negatively charged. The other object loses electrons from its surface area and becomes positively charged. The small electric shock you may receive from certain objects happens when you become triboelectrically charged.

Triboelectrical charge is the term used for an electron transfer resulting from two objects coming into contact with each other and then separating. This may happen by simply walking across a room. Different materials you come into contact with may cause you to become either positively or negatively charged. Thus causing a form of a static shock as some of us experience.

Failures caused by **ESD** can happen in a number of different ways. The failure can exhibit one or more of the following signs: a short or burnout, resistor/metal fusing together a junction leakage and a resistor-metal interface rupture. There are three major categories of ESD prevention or control. One is the prevention of a static-charge build up. The next is the safe dispersal of any charge that has built up, while the third is to improve the ESD robustness of the product causing the Static Charge.

Preventing a charge works on the theory of eliminating materials that have a higher tendency towards the buildup of **ESD** in the workplace. All equipment should be free of moving parts that can cause such build up, such as rubber rollers and plastic stoppers. The use of ionizers to neutralize newly generated charges also prevents charges from building up.

Grounding is one of the most important factors towards eliminating ESD. For example, in the workplace, there should be only one common ground. There should be suitable provisions made for the electrical path of charges to the ground. Any charge that has built up will be dissipated by a good grounding system. Everything in the production line, equipment, and worktables should be connected to this common ground. Items that can help ground or prevent ESD are [ESD Table Top Mats](#), [ESD Floor Mats](#), [Constant Monitors](#) and various other [Grounding Products](#).

Having a single **common point ground** will ensure that everything on the workplace floor remains at the same potential. If the workplace has **conductive flooring**, then it should be connected at regular intervals to this common ground. Conductive shoes, along with properly grounded [ESD Wrist Straps](#) and [foot grounders](#), will also bring any charge to the common ground.

Antistatic, Conductive and Static Dissipative Resistivity:

Antistatic Material	$10^9\Omega$ to $10^{11}\Omega$
Static Dissipative Material	$10^6\Omega$ to $10^9\Omega$
Conductive Material	$10^2\Omega$ to $10^5\Omega$