



## What is ESD?

**Electrostatic discharge (ESD)** is the transfer of an electrostatic charge between two objects. An electrostatic charge can be defined as electrical energy that is gathered at one place such as human body. For example, an act of rubbing a hand, walking on a carpet etc. generates a charge. This static charge stays in the body until it comes in contact with a material where it can be transferred. An act of that transfer is commonly known as Electrostatic discharge or ESD. A touch on a door knob at home or an office that results in a tiny electric shock in a dry weather is a good example of an Electrostatic discharge or an ESD event. That shock is due to transfer of static charge from your body to the door knob or an Electrostatic discharge. ESD is one of the most common causes of electronic equipment damage or malfunction.

Static electricity is different from the regular electricity in home or offices commonly known as electric current of 110/220 volts. Static charge on the other hand can generate up to 35,000 volts by walking on a carpet and can cause permanent damage to static sensitive devices. Electric current is always on the move, carrying energy from one place to another. It travels through metal wires from a place where it is produced to the end use such as appliance, machines, lights etc.

The best way to remove the static charge is to drain the charge through an ESD mat to the ground. 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. They are Antistatic, ESD and Conductive. Surface resistivity is expressed in ohms ( $\Omega$ ). 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. Therefore, the conductive material offers the fastest way to drain the Electrostatic charge. However, ESD material is the most commonly used in general purpose electronic assembly and manufacturing.

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

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, and the third is to improve the ESD condition of the product that causes 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 workstation should be connected to this common ground. Items that can help ground or prevent ESD are [ESD Table Top Mats](#), [ESD Floor Mats](#), and various other [Grounding Products](#).

