

# Environment, Health, Safety and Sustainability

Facts about Electrostatic Discharge (ESD) and its effects on people and Xerox<sup>®</sup> copiers and printers.



## What is Electrostatic Discharge (ESD)?

Electrostatic Discharge (ESD) is the transfer of electrical charge between any two objects. A common example of this is the static shock that a person experiences after walking across a carpet and then touching a metallic object such as a file cabinet. The “shock” is felt at the point of contact and is typically accompanied by a small spark and a slight snapping sound.

The process of creating an ESD event begins with the generation of static electricity. As one material (in this case the soles of a person’s shoes) comes into contact with another material (the carpeted floor) which are then separated, an imbalance of electrical charge is created. The interaction between the soles of the shoes and the carpeted floor causes a build-up of electrons on the surface of the person. This static electricity continues to increase until a maximum level is reached or the person contacts another surface at a different electrical potential (in this case, a metal file cabinet). The static electricity is then transferred from the person in an electrostatic discharge event.

## Is ESD harmful to me or my Xerox® copier or printer?

People experience an ESD event as a momentary nuisance. The static shock is felt, but no physical harm is done to the person. However, during everyday activities, it is possible that ESD can be discharged into a piece of electronic equipment (instead of a file cabinet). The person is not in any danger, but the current and voltage from the ESD event can cause electronic upset or permanent damage to the equipment.

In general, this situation is not a problem if the discharge is to the metallic shell (enclosure) of the equipment. When this happens, the ESD current is safely channeled from the chassis of the equipment into the system ground to which it is normally attached.

However, there is a possibility that the ESD current can be coupled directly into the communications (data, signal, and control lines) bus of the equipment. In this event, the integrated circuits (IC’s) and application specific integrated circuits (ASIC’s) are subjected to the current and voltage of the ESD event and can be damaged.

Xerox® products have been designed and tested for immunity to ESD, so the likelihood of damage from an ESD event is relatively small.

## Why do I experience static shocks when my colleagues do not?

There are many reasons why this might be the case. First, some people are more sensitive to static shocks than others. For most people, the threshold for feeling static shocks is in the range of 2,000-4,000 volts.

Second, you may be storing more static electricity than others. This depends on body size, and the thickness of your shoe soles.

Third, you may be generating more charge than others. This could be due to the material of your shoe soles, or the way that you walk. If you experience an electrostatic discharge event when sitting, it may be due to the material of your clothes, and the amount of static they generate against your chair.



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## Does weather affect static electricity?

Static charge build-up is enhanced when the air is dry. So, static problems and effects are most often noticed in dry air conditions.

The air outside can be very dry when the weather is cold. Indoors, central heating or air conditioning can create very dry conditions which promotes static electricity. Heating warms the air and reduces its humidity.

Static shocks are most often noticed in cold dry weather, especially when in a centrally heated environment. Usually static shocks disappear when the weather gets more humid. Static shocks can also occur in air conditioned building during hot weather.

## How can I stop static shocks?

Totally eliminating static shocks is very difficult. But, there are a number of ways to reduce the occurrence and severity of the shocks.

- Install a humidifier in your work environment to raise the air humidity to 40-50 percent relative humidity (RH).
- Wear leather soled shoes rather than those with rubber soles.
- Install vinyl tile on floors instead of carpeting. If carpeting must be used make sure it is "antistatic".
- Wear clothing made of natural materials like cotton rather than synthetic materials such as polyester and nylon.
- Use chairs made of conductive material (rather than polyester material) that also have a grounding mechanism.