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ELECTROSTATIC **DISCHARGE**

In most industrial manufacturing production processes, control of static electricity is crucial for the safety of people and property. It also helps to improve the quality of the products and the efficiency of the factory. Electrostatic discharges (ESD) must be controlled to avoid damaging components, products, etc.

Electrostatic discharge

Electrostatic discharge corresponds to a discharge of static electricity to earth. It involves the transfer of electrostatic charges between 2 bodies with different electrostatic potentials; this transfer may occur due to direct contact or it may be induced by an electrostatic field.

In a factory or office, simply by walking, the separation of the shoe from the floor generates static electricity on the person involved. When the person then touches an object or piece of equipment whose electrical potential is lower, his or her static electricity will flow to the equipment.

Electrostatic-sensitive devices

Sectors such as electronics, aviation, the automotive industry, micromechanics and even printing works are all environments which are particularly sensitive to ESD.

Main electrostatic-sensitive devices: discrete component, integrated circuit, electronic assembly, etc.

Insulation

IEC 61340-2-3

IEC 61340-4-1

IEC 61340-5-1

Measure up

Solutions

An area protected against electrostatic discharges, where **electrostatic-sensitive devices** can be handled with a minimal risk of damage, is called an "**ESD controlled area**".

Various systems can be implemented to overcome electrostatic disturbances. These systems will channel the energy flow produced when there is a discharge. The purpose of this equipment (bracelet connected to earth, antistatic mat, floor covering, etc.) is to make sure that the different parts are at the same potential by connecting together the person, the equipment, the work surface, etc.

A basic **ESD controlled area** usually comprises:

- Either a desk mat and an earthing bracelet both connected to the earth
- Or a floor covering used with heel earthing devices, all connected to the earth

There is one constraint, however: the electrostatic discharge must not be drained too quickly, as this would generate a disturbance which should be avoided, particularly when electronic applications are involved.

The IEC 61340-2-3 standard

This corresponds to the test method for determining the resistance and resistivity of the materials in the solid surfaces used to prevent the accumulation of electrostatic discharges.

It stipulates a method for measuring the capability of the floors and walls to drain the energy in the event of an electrostatic discharge. The surfaces must not be conductors (sudden voltage surges may occur) or totally insulated (all the ESD energy would then be dissipated in the electronic sub-assemblies).

Measurements

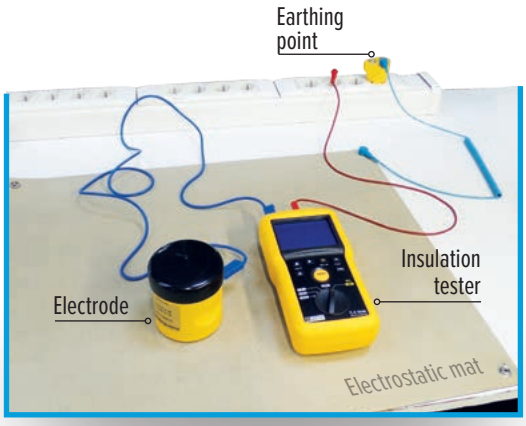
All these devices should be checked regularly.

Checking the bracelets and antistatic heels

Measure the resistance between the operator's hand and the earthing point, or between the heel and the earthing point: the system is satisfactory if the resistance value of the earth connection is less than 35 MΩ, as per EN 60340-5-1

Checking the mats or floors

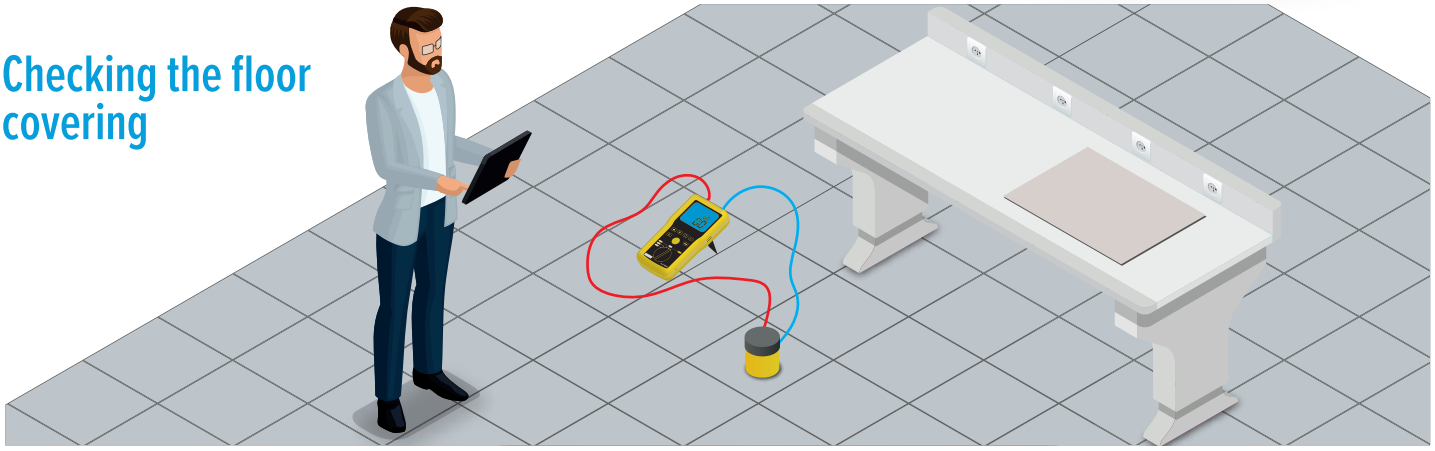
This can be done using an insulation tester with a test voltage of 100 V ±10%
Earth looping and surface resistivity measurements
The value measured must not exceed 1 GΩ to ensure that the whole system is functional



The **C.A 6536 insulation and continuity tester** is ideal for these measurements due to:

- Its test voltage: 10 V to 100 V in 1 V increments
- Its appropriate electrodes compliant with the IEC 61340-2-3 standard

Checking the floor covering



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