ESD/ EOS Protocols

OVERVIEW

Roscan Electronics Ltd. recognises that:

- Virtually all materials can be triboelectrically charged.
- The level of charge is affected by material type, speed of contact and separation, humidity, as well as several other factors.
- Electrostatic fields are associated with charged objects.
- Electrostatic discharge can damage devices so they fail immediately, or ESD may result in latent damage that may escape immediate attention, but cause the device to fail prematurely once in service.
- Electrostatic discharge can occur throughout the manufacturing, test, shipping, handling, or operational processes.
- Component damage can occur as the result of a discharge to the device, from the device, or from charge transfers resulting from electrostatic fields. Devices do vary significantly in their sensitivity to ESD.

The ESD Coordinator for Roscan Electronics Ltd. is Nathan Martyn.

Before handling or processing any sensitive components, tools and equipment are carefully tested to ensure that they do not generate damaging energy.

We reduce as many static generating processes or materials, such as the contact and separation of dissimilar materials and common plastics, as possible from the work environment. We keep other processes and materials at the same electrostatic potential as electrostatic discharge does not occur between materials kept at the same potential or at zero potential. We provide ground paths, such as wrist straps, flooring and work surfaces, to reduce charge generation and accumulation.

Safe dissipation or neutralisation of electrostatic charges that do occur.

This is achieved largely by proper grounding and the use of conductive or dissipative materials. For example, workers who "carry" a charge into the work environment can rid themselves of that charge when they attach a wrist strap or when they step on an ESD floor mat. The charge goes to ground rather than being discharged into a sensitive part. To prevent damaging a charged device, the rate of discharge can be controlled with static dissipative materials.

Preventing discharges that do occur from reaching susceptible parts and assemblies.

The aim is to achieve ESDS items, personnel and any other conductors to be at the same electrical potential. As noted above one way is to provide our parts and assemblies with proper grounding or shunting that will "dissipate" any discharge away from the product. A second method is to package and transport susceptible devices in proper packaging and materials handling products. These materials may effectively shield the product from charge, as well as reduce the generation of charge caused by any movement of product within the container.

Identification, Measurement & Testing

Equipment and materials are tested to identify the presence of electrostatic fields.

Roscan Electronics Ltd. endeavours to identify those items (components, assemblies, and finished products) that are sensitive to ESD and the level of their sensitivity. Alongside this, we have also identified the areas in which we handle sensitive parts and the areas in which we need to bond or electrically connect all conductive and dissipative materials, including personnel, to a known ground.

EOS/ESD Prevention and Containment Measures

Workstation Basics

ESD safe workstations must be kept free from static generating materials. These include, but are not limited to, Styrofoam, plastic solder removers, sheet protectors, plastic or paper notebook folders and employees' personal items.

Tools and equipment must be regularly tested (see below).

Wrist Straps/Foot Grounders

Wrist straps are our primary means of controlling static charge on personnel. When properly connected to ground, a wrist strap keeps the person wearing it near ground potential. Because the person and other grounded objects in the work area are at or near the same potential, there can be no hazardous discharge between them. Static charges are safely dissipated from the person to ground and do not accumulate. Foot grounders are used when operators work at machines.

Wrist straps have two major components, the cuff that goes around the person's wrist and the ground cord that connects the cuff to the common point ground.

Wrist straps are tested daily using a wrist strap tester. The resistance to ground including the must be < 35 x 10E6 ohms. Results of these tests are recorded in the “Wrist Band & Cord Log.”

Floor Mats

ESD protective floor mats are used, providing a ground path for the dissipation of electrostatic charge, thus reducing the charge accumulation on personnel and other objects to safe levels. In addition to dissipating charge, these also reduce triboelectric charging. The resistance to ground including the person, footwear and floor must be the same as specified for wrist straps (< 35 x 10E6 ohms) or the voltage accumulation on a person must be less than 100 volts.

Grounding

All machines and racking are grounded. Grounding is the primary means of controlling static charge on equipment and many production aids. Much electrical equipment is required by the National Electrical Code to be connected to the equipment ground (the green wire) in order to carry fault currents. This ground connection also will function for ESD purposes. All electrical tools and equipment used to process ESD sensitive hardware require the 3 prong grounded type AC plug. Hand tools that are not electrically powered, i.e., pliers, wire cutters, and tweezers, are grounded through the ESD work surface and the (grounded) person using the conductive tools. Holding fixtures are made of conductive or static dissipative materials when possible to requirements set by the ESDA.
Each series of work benches has a common ground point.

Packing and Handling

Static shielding packaging, anti-static (low charging) packaging materials and static dissipative material are utilised by Roscan Electronics Ltd.

Anti-static bags and, bubble wrap, metallised bags and other anti-static packaging are used to store and transport ESDS devices so as to have low charging materials in contact with ESD sensitive items. The material provides protection from direct electrostatic discharge as well as shielding components/assemblies from electrostatic fields.

The primary use of these items is to protect the product when it leaves the facility to be shipped to a customer. However, if goods are sent to Roscan Electronics Ltd. in static materials e.g. white bubble wrap, these items are removed and re-packed/stored by Roscan Electronics Ltd. in anti-static/safe packaging and the static inducing items are removed from the building.

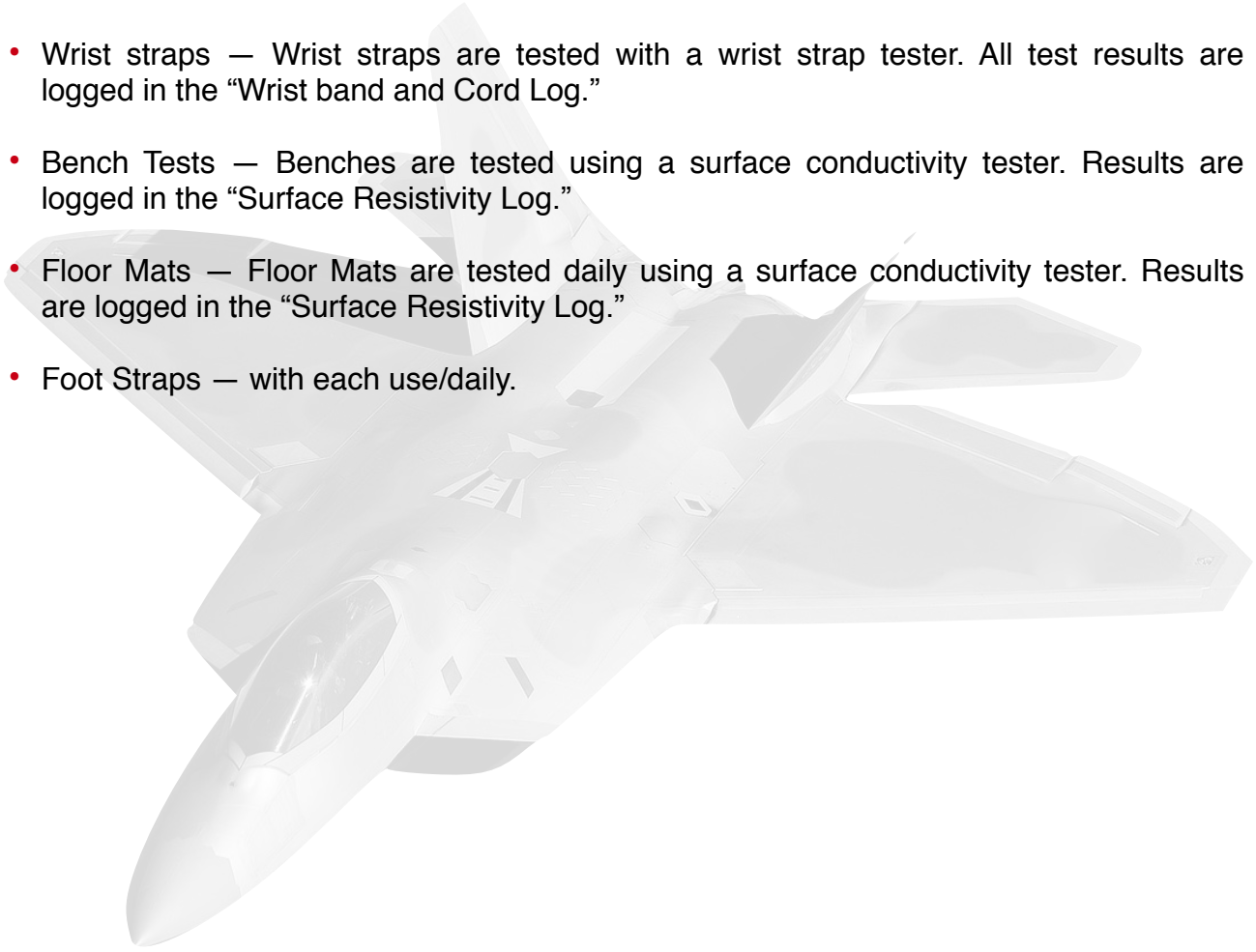
Such packaging used by Roscan Electronics Ltd. provides: low charging, discharge protection, and electric field suppression. The inside of these packaging materials have a low charging layer, but also have an outer layer with a surface resistance generally in the dissipative range.

Testing

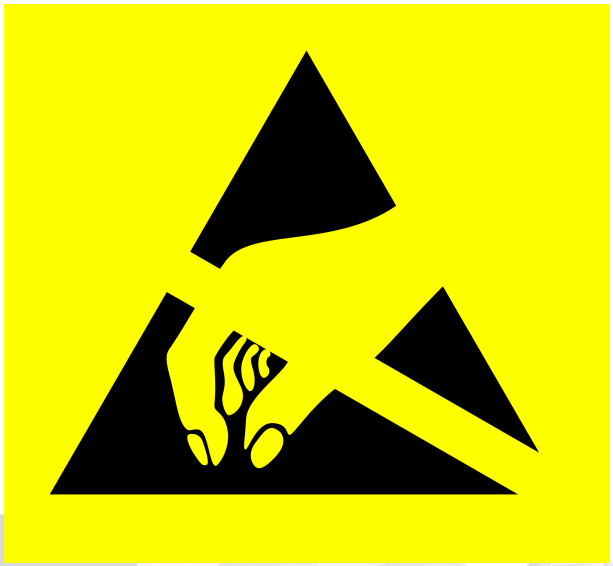
Equipment and tools are tested to ensure that they do not generate energy that may damage components. The general accepted standard states that voltages and spikes are deemed acceptable if they occur at less than 0.5v. However components are increasingly sensitive and require that soldering irons, solder extractors, test instruments and other equipment should not generate spikes greater than 0.3v.

The following tests are carefully carried out daily:-

- Wrist straps — Wrist straps are tested with a wrist strap tester. All test results are logged in the “Wrist band and Cord Log.”
- Bench Tests — Benches are tested using a surface conductivity tester. Results are logged in the “Surface Resistivity Log.”
- Floor Mats — Floor Mats are tested daily using a surface conductivity tester. Results are logged in the “Surface Resistivity Log.”
- Foot Straps — with each use/daily.



Identification



ESD Susceptibility Symbol

Where required, Roscan Electronics Ltd. uses the 'The ESD Susceptibility Symbol' (above). Where necessary, this is applied directly to integrated circuits, boards, and assemblies that are static sensitive. It indicates that handling or use of this item may result in damage from ESD if proper precautions are not taken. The sensitivity level of the item may be added to the label.

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ESD Protective Symbol

The ESD Protective Symbol (above) indicates ESD protective material. It is applied to mats, chairs, wrist straps, garments, packaging, and other items that provide ESD protection, used by Roscan Electronics Ltd..

Training in ESD Awareness & Prevention

All Operators at Roscan Electronics Ltd. are trained to IPC-A-610 standards for acceptability of Electronic Assemblies. Training covered by IPC-A-610, includes training in ESD awareness and prevention.

Auditing

Internal and external audits for ISO 9001:2000 are carried out each year. These audits include our ESD Controls.

Upon completion of the auditing process, details of the audits are fully documented.

Corrective actions are implemented if any deficiencies are discovered. Trends are tracked and analysed to help establish corrective action, which may include retraining of personnel, revision of requirement documents or processes, or even modification of our facility.

Nathan Martyn
MANAGING DIRECTOR