



Electrostatic Discharge (ESD)

Introduction

Electrostatic discharge (ESD), is "the transfer of an electrostatic charge between bodies at different electrostatic potentials (voltages), caused by direct contact or induced by an electrostatic field." Although its definition may sound obscure, we have all experienced ESD.

Simply walking across a carpeted floor and touching a metal doorknob, we often feel a small shock on our finger. This shock results when two materials are rubbed together or separated rapidly. One material tends to attract electrons away from the other material. This leaves differently charged voltage levels on each material. When a charge or uncharged region is brought into close proximity with an oppositely charged region, electrostatic discharge may occur because of the attraction of unlike charges. If this electrostatic discharge occurs near electronic components, the components are often damaged or destroyed.

Controlling ESD

ESD damage to electronic component and assemblies has been a major problem of the electronics industry in recent years. This is because most ESD damage is caused unknowingly by individuals inspecting, sorting, or installing ESD sensitive devices. Devices, that aren't destroyed during handling, are often damaged or impaired. This damage is know as "latent" damage and often is not detectable by routine quality tests, and could appear after the device is installed in its host equipment.

The possibility of ESD damage to our products is a concern at Comair Rotron. Customers demand reliable, high quality products from our electronic air moving and cooling devices. It is evident that excessive ESD damage to our products could impair our quality reputation in the fan industry. To avoid this possible dilemma, Comair Rotron has implemented an aggressive ESD management program.

Comair Rotron maintains "Class 1" recognition for its ESD control. This is the ESD control class that covers electronic components with the sensitivity range of 200 to 1999 volts. This class will guarantee ESD protection for all the electronic components that we are currently using. To insure this level of protection the following devices have been installed and incorporated in our manufacturing process.

1. Three-Layer Runners have been installed on every table and bench top where product is processed while still vulnerable to ESD. Grounding cords have been attached at each separate table or bench and connected to earth ground. The conductive center layer provides a lower resistance path to ground for quick dissipation of static charges.
2. Grounded Wrist Straps are used by all personnel handling, inspecting, or populating PC boards. Wrist straps provide an electrical path between en ground and the sensitive device handler, thereby eliminating or substantially reducing ESD voltages generated by the handler.
3. Wrist Strap Testers have been placed in receiving, the PC board assembly area, and in the production line area. These testers are used to measure re the effectiveness of wrist straps and their path to ground. Operators are require to test their wrist straps before handling any ESD sensitive components.
4. Static Shielding Conductive Tote Boxes and Static Shielding Bags are used for the storage and transportation of any ESD sensitive electronic component and loaded PC boards. The tote boxes and the shielding bags protect their contents from any external static fields that may cause ESD damage. These items are used until partial closure of the fan is done. Partial closure occurs when the printed circuit board is placed inside the venturi and is considered shielded and not vulnerable to ESD damage.
5. Conductive Floor Tile has been installed in the PC Board assembly room. The tile is made to conduct static charges from personnel to ground and to prevent static build-up while being walked upon.
6. Grounded Foot Straps are used by all personnel that are not stationary within the containment areas and handle sensitive components. These grounded foot straps provide an excellent path to ground of any unwanted static energies. Each operator is required to test the effectiveness of the grounded foot straps on a daily basis.

To insure compliance of the ESD control policy, training programs have been established to educate operators of the importance of ESD protection. All personnel, including receiving, production line workers, and engineers involved in the manufacturing and processing of ESD sensitive devices have been fully trained in ESD control methods and use of ESD materials in protected areas.

In addition to the training of personnel, all ESD protected areas are clearly identified by prominently displayed signs. Access to these areas are limited to only approved materials and those personnel who are ESD trained. Visitors are escorted by ESD trained personnel and receive proper instruction before entering the protected area.

Comair Rotron's ESD control policy has effectively eliminate all ESD damage that can occur to our fans during the manufacturing process. This strict ESD control policy has enhanced an already formidable quality program, reflecting our continual commitment to insure the highest quality and reliability in all of our fans and blowers.

References

1. Owen J. McAteer, "Electrostatic Discharge Control", McGraw Hill, 1990