

ESD Overview: Six Ways to Control Static

ESD (electrostatic discharge) is a growing problem in this electronic age. A simple touch from a person in a non-static controlled environment can damage an electronic component with charges up to 35,000 volts of static electricity. To combat this, static control solutions are needed.

What steps can be taken to help reduce the problem of static generation? There are a number of them. An overview of six ways of controlling ESD are covered in this issue: Floor Finish, Wrist Straps, Foot Grounders, Wrist Strap Monitors, Ionization, and Shielding Bags.

ESD Floor Finish

Taking care of static generated on the floor is a key place to start any ESD control program. Static starts to build on people as they walk and push carts and chairs around. As more and more companies are relying on their employees to be mobile due to the changing work requirements and space issues, static control needs to start from the floor up. By fighting static at the source, dissipative floor finish increases the effectiveness of other static control devices, such as the wrist strap.

Good ESD floor finishes provide the ability to ground mobile personnel and remove the static charges generated by walking across the floor. ESD floor finishes are easy to apply and are easily implemented into an existing floor finish program. Ninety percent of the cost of maintaining a floor is labor. Changing your current floor finish to a good ESD floor finish (at about the cost of \$0.02 more per sq. ft. in material cost) will provide an ESD safe and grounded floor.

Wrist Straps

Wrist straps have long been proven to be the first and most effective means of grounding an individual. Due to the direct connection to ground, it is virtually impossible to accumulate and retain a static charge while wearing a properly grounded wrist strap. Since their conception in the mid 1970's, many styles have been designed and offered in the marketplace.

Although their function remains the same, wrist straps have evolved from the basic adjustable cloth band dipped or painted with a carbon loaded substance, to straps with a stainless steel construction that offer the best skin contact possible. The decision of which strap to specify when purchasing should meet the needs of the requirement at hand. Options such as color, size, cover designs, connector types, and band material create a wide variety of alternatives from which to choose. All of these issues should be addressed in order to ensure user comfort and compliance and to maximize the return on your ESD investment program.

Foot Grounders

Foot grounders are used where wrist straps are not practical, particularly for tasks which require mobility, work areas that require standing, walking, or where coil cords might be inconvenient. To be effective, however, foot grounders must be used in conjunction with properly grounded conductive or dissipative flooring. They must also be worn on both feet so as to provide constant contact with the grounded floor. This ensures that there is always electrical continuity to ground for draining off any built-up static charges on the body.

To ensure complete, effective grounding, mobile personnel should wear heel grounders at all times. They should also check them on a regular schedule to verify that the foot grounder is being worn correctly and making contact with the worker.

Foot grounders are less costly when implementing and maintaining an ESD program compared to static dissipative shoes, which are an expensive item. Also, shoes usually cannot be used by someone else when an employee leaves. Foot Grounders are designed to fit nearly every shoe, are just as easy to use as ESD shoes, allow workers to go to work instantly when foot grounder contact strips are tucked inside of the shoe, simplify inventory, have custom resistance values, and are available worldwide through local distributors.

Wrist Strap Monitors

Soon after wrist straps were proven to be the first and best line of defense against ESD, it became obvious that they needed to be tested periodically.

The initial solution to this was on-demand or "touch" testers that are still in wide use today. The problem with a touch tester is that it requires an action by the wearer of the wrist strap to make the test. For companies that are working on highly sensitive or valuable assemblies it may not be enough to know that the wrist strap has failed after the fact.

AC Capacitance, Dual-Wire Resistance, and Three Wire Resistance Constant Monitors all were developed to overcome problems associated with wrist strap testers. However, none have been as successful as Wave Distortion Monitors.

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FLOOR FINISH

STATFREE® DISSIPATIVE FLOOR FINISH



- 81010 Floor Finish, 1 Gallon Bottle
- 81020 Floor Finish, 5 Gallon Pail
- 81030 Floor Finish, 55 Gallon Drum

FEATURES

- Zinc-free
- Non-tribocharging
- 18% solids
- Shines without buffing
- UL classified for slip resistance

BENEFITS

- For companies wanting to reduce discharge of zinc in waste water
- Prevents charge generation
- Easy to apply, improving productivity
- Buffing is optional
- Ensures walker safety and mitigates user's liability exposure



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WRIST STRAPS

SPEIDEL® TWIST-O-FLEX® METAL EXPANSION WRIST STRAPS

- 09041 Band only
- 09042 Band Only Extra Large
- 09085 Band with 6' Coil Cord
- 91070 Band with 6' Coil Cord and Angle Banana

FEATURES

- Speidel's Twist-O-Flex design
- Durable metal band
- Patented adjustment band

BENEFITS

- Comfortable, will not pinch or pull hair
- Long wearing, easy to clean
- One size fits all, only one item number to purchase and stock, no "extra" links to lose

Drawings 09041, 09480, and 91095

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FOOT GROUNDERS

D-RING FASTENING HEEL GROUNDERS

- 07590 1 megohm resistor
- 07593 2 megohm resistor

FEATURES

- Elastic D-ring assembly
- Exceptionally tear resistant dual layer rubber with inner scrim
- Two-ply abrasion, wear resistant rubber

BENEFITS

- Allows for flex during walking; less particulation and sloughing
- Provides long life - saving money
- Provides rapid and complete static dissipation; durable, for long life

SPECIFICATIONS:
RTG: 10⁶ - 10⁷ Ohms

Drawing 07590



WRIST STRAP MONITORS

DUAL OPERATOR ESD WORKSTATION CONTINUOUS MONITOR

19208 Continuous - 120 Volt
 19209 Continuous - 220 Volt

FEATURES

Two banana jacks

Mounting bracket and two remote jacks included

BENEFITS

Continuously monitors two operators, carts or visitors

Allows mounting main unit at eye level, not using any worksurface area

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IONIZERS

ION PYTHON AIR NOZZLES

19585 Controller/Ion Python/Foot Switch 120 volt
 19586 Controller/Ion Python/Foot Switch 220 volt
 19587 Controller/Hand Gun w/Hose 120 volt
 19588 Controller/Hand Gun w/Hose 220 volt
 19589 Controller Only 120 volt
 60350 Nozzle/ Hand Gun Attachment
 60351 Nozzle/Hand Gun Attachment, Dissipative
 60340 Foot Switch
 60345 Photoelectric Switch
 60355 Replacement Filter

FEATURES

Ion Python

Foot pedal controls

Flexible hose

Hand Gun

Detachable 7' air hose and nozzle

Adjustable air stream

BENEFITS

Hands-free usage

Allows accurate positioning of ionized air

Facilitates servicing

Provides flexibility in usage

Technical Bulletin TB-2079



SHIELDING BAGS

STATSHIELD® METAL IN (BURIED METAL) BAGS

FEATURES

Most commonly used shielding bag

40% light transmission

BENEFITS

Quantities of scale provide excellent value

Allows for easy identification of bag contents

Drawings 13405 (without zipper) and 13605 (antistatic zipper)



Address Service Requested

Wrist Strap Monitors *Continued from Page 1*

From all the choices available, Desco has chosen the Wave Distortion technology for all its Constant Monitor product offerings. Wave Distortion circuitry monitors current/voltage phase shifts providing the only true constant monitoring. When the wrist strap is properly grounded, a highly visible LED light shows compliance. If there is failure, it is immediately detected sounding an audible alarm. By using any brand standard single-wire wrist strap, the system life-cycle costs are by far the lowest.

Desco's Wave Distortion Constant Monitor solves many of the problems of the other technology monitors, such as:

- It allows the use of any standard, single-wire wrist straps
- Does not require expensive & fragile dual-wire cords or special wrist straps
- most reliable technology to determine if the circuit is complete - no false alarms
- No need to tune monitor to a specific installation or person
- It provides a warning if the lower (safety) resistance limits are shorted
- The tiny amount of current required to generate the waveform has never caused reported skin irritation.

Many customers are eliminating testing and utilizing constant monitoring to better ensure that their products were manufactured in an ESD controlled environment. The Wave Distortion Constant Monitoring detection technology, utilized in all Desco monitors, is superior, and using single wire wrist straps saves money, a great deal of money over the life-cycle of the monitoring system.

The choice of whether or not you need continuous monitoring, and of the specific type of monitor, will depend upon the value and sensitivity of the devices you are using. It is important that you understand the difference and pick the monitor that provides you with the protection you need at the lowest life cycle cost.

Ionization

Ionization is one of the best methods of removing charges from insulators, and as a result it plays an important role in controlling ESD. There are many components of an overall ESD program. Unfortunately, there is no single method that will fulfill all requirements; typically it requires a combination of methods to curb all static problems.

Electronic products by nature will normally consist of conductors and insulators. Insulators at the workstation can be found on the product itself, on tools being used, on tapes for masking, even on circuit boards. A static charge on an insulator cannot be drained by grounding, as it can be with a conductive material. To effectively remove charges from insulators we need to make the surrounding air more conductive; the more conductive the air is, the faster the charge will be neutralized.

Ionizer configurations range from elaborate systems that blanket an entire room to small palm-sized units. Selection of ionization equipment depends on the application, the space available, the performance desired, and what features are important. A single model may be well suited to one application and useless in another. Fortunately, there are many models on the market to choose from, such as room ionization, workstation ionizers, overhead ionization, focused air ionizers, and industrial ionization.

The ionizer is a secondary form of defense and does not eliminate the need for standard ESD control devices, such as wrist straps, heel grounders, and work surface mats. It is only one element in an effective ESD program.

Shielding

As a manufacturer of "High-Tech" electronics, you are most certainly aware of the need to protect them from the hazards of ESD. You are also aware that it takes more than a wrist strap, a table mat, and ground cord to have a complete ESD control program. Not only is it necessary to protect these sensitive components while in production, but also while in storage and in transit.

There are a number of ways to store and transport sensitive components and assemblies safely. The most common, and by far the least costly, is through the use of a bag designed specifically for this purpose. As of the time of this writing, there are 6 types of bags currently available to meet most manufacturers' needs. These are: Metal-In and Metal-Out static shielding bags, Premium Metal-In and Metal-Out static shielding bags, Premium and Standard Moisture Vapor Barrier bags, and the Clear ESD Barrier bag.

There are a number of choices for ESD protective packaging. How sensitive your products are and your customers' requirements, will determine the type necessary to get the job done. You may have applications for all types within your production process. Samples should always be evaluated for their intended purpose.