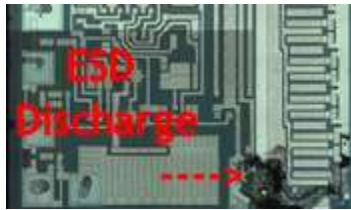


## Installation and Maintenance of ESD Table Top Mats

Release Date: 1/5/2024



**Introduction:** Static electricity is normally caused by contact and separation. It is ongoing, relentless and causes billions of dollars in lost production and damage yearly. The purpose of an ESD table top mat is to slow and control an electrostatic discharge. When used properly, an ESD table top mat and ESD wrist strap are the first line of defense for eliminating static and the headaches it can potentially cause your ESD sensitive build. The Purpose of an ESD worksurface is to aid in the

prevention of damages to ESD sensitive components and assemblies from said electrostatic discharges. An ESD worksurface provides protection in the following two ways:

1. Provides an antistatic worksurface that will dissipate static and limit static generation.
2. Remove the electrostatic voltage from a conductive object placed on the worksurface.

A dissipative worksurface having a surface resistance of at least 1.0E06 (1 million ohms), and less than 1.0E09 (1 billion ohms) is recommended by worksurface standard ANSI/ESD S4.1. Dissipative materials minimize the generation of static charges, and will dissipate a charge slow enough so that a spark will not occur. Dissipative materials are usually the preferred choice for bench top worksurfaces. Conductive materials are the quickest to remove a charge, but they can also cause damage by discharging too rapidly. Conductive materials are usually used as floor mats, which as defined by ANSI/ESD S7.1 are less than 1.0E06 ohms.

**1. General Grounding Guidelines:** ANSI/ESD S20.20 requires that all conductors in an ESD protected area (EPA), including personnel, must be grounded. The ESD ground must be tied directly to and at the same potential as the building or "green wire" equipment ground.

Per ANSI/ESD S20.20, the ESD control program can in no way replace or supersede any requirements for personnel safety. Ground fault circuit interrupters (GFCI) and other safety protection should be considered wherever personnel might come into contact with electrical sources.

All electrical outlets shall be verified for proper wiring configuration, resistance or impedance and GFCI function when the mats are installed and periodically thereafter.

**2. Common Point Ground:** A common point ground is defined by the grounding standard S6.1, grounding section 4.1.1 "Every element to be grounded at an ESD protected station shall be connected to the same common point ground. The first step in ensuring that everything in an EPA is at the same electrical potential is to ground all conductive components of the work area (worksurfaces, people, equipment, etc.) to the same electrical ground point. This point is called the common point ground."

The next step in completing the ground circuit is to connect the common point to a reliable ground source." Grounding your common point to the

equipment ground (third wire, green) is the preferred method.

**NOTE:** Grounding your common point to the center screw of an AC face plate cover is also acceptable as long as the resistance between the center screw and that of the equipment ground is less than an ohm.

**NOTE:** Do NOT ground your common point to a ground rod or structural steel in the building. Contact United for details on why this is no longer acceptable.

**Examples of common point grounds:**

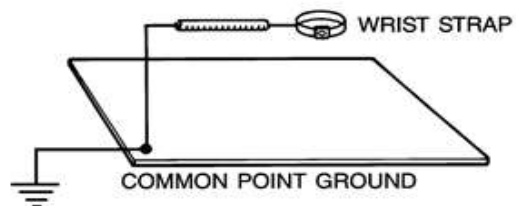


Figure 1

**NOTE:** Wrist straps should NEVER be grounded through a worksurface as the added resistance of the worksurface material will prevent the wrist strap from operating properly.

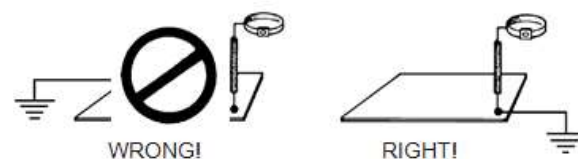


Figure 2

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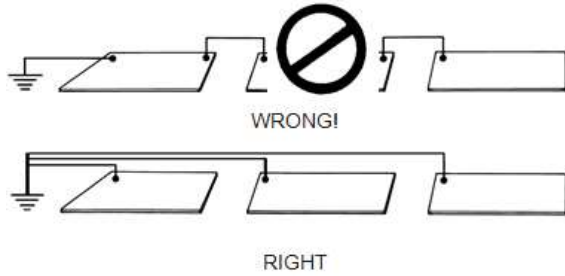


Figure 3

**NOTE:** Never daisy chain the mat ground cords.

## Grounding Methods

- United SCP recommends using a common point ground cord when grounding the mats. Our common point ground cords provide dual banana jack inputs that are perfect for grounding wrist straps and other accessories.
- A common point ground should be installed at each workstation and connected to a verified “green wire” equipment ground or the center screw of a pre verified AC face plate cover. Only ONE groundable point should exist on a worksurface ESD table top mat.

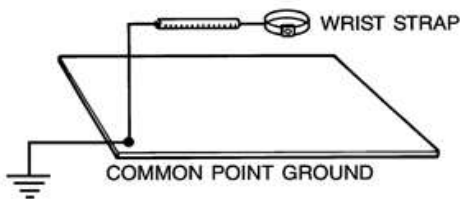


Figure 4

**NOTE:** Wrist straps should NEVER be grounded through the mat as the added electrical resistance will prevent the wrist strap from properly operating.

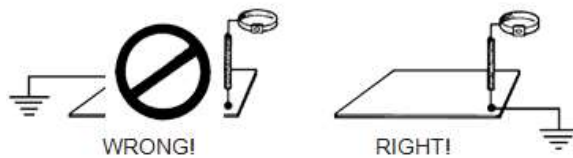


Figure 5

## Groundable Point Installation

**NOTE:** Before installing a groundable point on your mat you must first determine whether you will need a

snap socket or stud, the type of snap hardware and the location.

**UnitedSCP supplies three types of snaps available in both studs and sockets:**

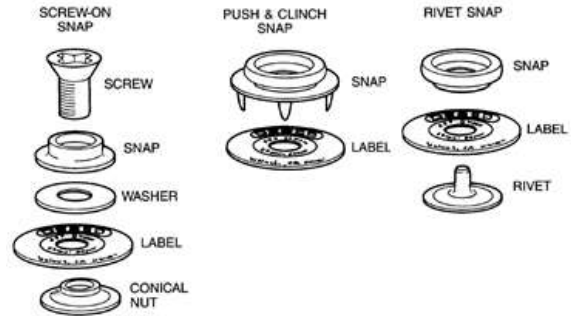


Figure 6

1. The first type is a screw on field installable snap kit. These kits are ONLY recommended for 2 layer ESD Mats. A 2 layer mat has a static dissipative top surface and static conductive back surface that is normally a black color.

**NOTE:** Do NOT use this type of snap kit on a 3 layer ESD Mat. If you are unsure of the type of matting (single, dual layer or 3 layer) contact UnitedSCP for clarification.

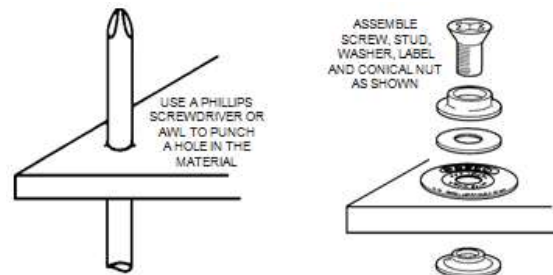


Figure 7, screw on snap

**To install this grounding snap:** Determine the position (only one per mat). And the type of fastener (socket or stud). Observe safety precautions so as not to cut your hand and punch a small hole through the mat with a Phillips head screw driver or awl.

Insert the bottom fastener (conical nut). Place screw through the appropriate stud (and washer and label if desired) and tighten in place. The stud should not rotate and the assembly shall be firm.

2. The second type of fasteners is a push and cinch snap. This type of snap is ideal for soft mats and all three layer matting material. These are available as both sockets and studs.

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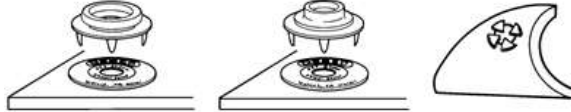


Figure 8, push and cinch fastener

**To install this grounding snap:** Place the snap on top of the mat and lightly tap to mark the mat with the location of the prongs. Use a nail or awl to punch starter holes for the prongs. Center the prongs and apply pressure to the snap until the prongs come through the back of the mat, then cinch over the prongs to secure.

- The third type of grounding fastener is the rivet style. This type of fastener is generally not recommended for 3 layer matting and is installed using a riveting tool or an anvil and setting tool (available from UnitedSCP).



Figure 9, anvil and riveting tool

**To install this grounding snap:** Use an awl to pierce the mat where the snap will be installed. Push the snap base up through the mat and place the socket or stud over this base. Place the anvil base beneath the base of the fastener. Place the driver over the snap base and lightly and repeatedly tap the top of the snap base while rotating the driver. The head of the snap base should not tear. Rather, it should exhibit a nice mushroom radius of rolled steel that should hold the socket or stud firmly in place.

### ESD Table Top Mats – General Information:

For best results allow the mats to acclimate to the temperature of the installation area for at least 8

hours prior to cutting to size or installing grounding hardware. Lay the mats out flat – this will give the material time to flatten out from being rolled during shipping.

After installing the ground fastener on the mat lay it in position and snap the ground cord to it. Bring the other end of the ground cord to the common ground point and attach the ring terminal to the center screw of a properly test AC face plate cover or in a location defined by your ESD Coordinator.



Figure 10, attachment of ring terminal to ground

**ESD Table Top Mats – Cleaning:** For optimum performance periodic cleaning of ESD matting is a must. United SCP recommends ElectraMat for all ESD workstation mats.

Note: ElectraMat contains no harsh solvents or silicone. Cleaners with silicone leave an insulative residue and solvents such as 2-Butoxyethanol, Ethanolamine or alcohol used in mat cleaners can dry out the material - both can prevent conductive or dissipative mats from functioning properly.

**Tech support:** 719 676 3928, option 8 or  
techsupport@ultrastatinc.com.

Approved for release: SRC 1/5/2024  
Revision History: Initial release

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