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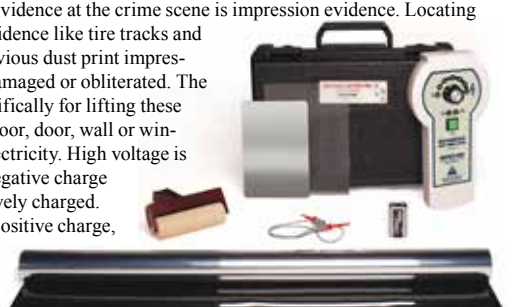
TECHNICAL INFORMATION

Electrostatic Dust Print Lifter

Catalog No. ESP900

Information

One of the most overlooked forms of physical evidence at the crime scene is impression evidence. Locating and recovering obvious kinds of impression evidence like tire tracks and footprints is not the problem. It's the not-so-obvious dust print impressions that are difficult to locate, accidentally damaged or obliterated. The Electrostatic Dust Print Lifter is designed specifically for lifting these dust prints from almost any surface from the floor, door, wall or windowsill to upholstered furniture using static electricity. High voltage is applied to a metallized lifting mat creating a negative charge and causing the ground plane to become positively charged. Any dust present under the mat will take on a positive charge, attracting it to the negatively charged mat. The resulting dust print lifted will be a precise mirrored image of the original print.



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Application	Lifting dust prints from a variety of porous and non-porous surfaces whether horizontal, vertical, or curved.
Hazards/Safety Info	**Warning!** Potential for electrical shock. Unit develops up to 10,000 volts of static electricity even though it operates at a low current. **Caution!** Arching may occur between the pickup mat and surface. If so, reduce the charging voltage. **Caution!** Do not touch charging mat or ground plane while voltage is being applied. **Caution!** Always reduce charging voltage to MIN before turning unit off and discharge any residual voltage between the ground plane and pickup mat with the static discharge cable provided.

ESP900 Contents	1- Electrostatic Voltage Control Unit 1- Ground Plane, nickel-plated steel, 4" x 6" (10.2cm x 15.2cm) 1- Ground Plane Polycarbonate Insulating Sheet, 5" x 7" (12.7cm x 17.8cm) 1- Insulated Roller 1- 9V Alkaline Battery 1- Static Discharge Cable 1- ESP901 Metallized Lifting Mats in protective tube, 5 ea. 1- Technical Information 1- Black Molded Copolymer Case; Dimensions: 12.25" x 9" x 3.875" (31.1cm x 22.9cm x 9.8cm); Weight: 3.1 lbs. (1.4kg)	**Optional Accessory Items/ Reorder Items**	ESP901....2′ x 3′ Lifting Mats, 5 ea. ESP902....2′ x 3′ Lifting Mats, 10 ea. ESP903....2′ x 3′ Lifting Mats, 15 ea. ESP904....1′ x 2′ Lifting Mats, 50 ea. ESP905....25′ roll Lifting Material ESP906....50′ roll Lifting Material ESP908....Lifting Mat Evidence Box (39" x 27" x 1") w/(1) evidence label and (3) EIL02 evidence seals ESP909....(10) Lifting Mat Evidence Boxes (39" x 27" x 1") w/(10) evidence label and (30) EIL02 evidence seals

Control Panel

Indicator Lights

RED: High Voltage Ready

YELLOW: Low Battery

GREENs: Voltage LEDs indicate the strength of the voltage output

Voltage Control

Adjusts voltage level

Power Switch

Push-Button ON/OFF

Unit Base

Battery Access

Release Latch and instruction label for operation of unit

Serial Number

For unit registration

Brass Electrodes

(1) Positively Charged

(2) Negatively Charged

Explanation of LEDs	***RED High Voltage Ready** will light when an electrical path has been established between the pickup mat and the ground plate.*
	***GREEN Voltage LED's** indicate the strength of the voltage output. If no LEDs are lit then no High Voltage is applied. One LED indicates approx. 4000 volts. Each additional LED indicates an additional 1000 volts until the max. of 7 LEDs are lit representing 11,000 volts.*
	***YELLOW Low Battery LED** will illuminate shortly before battery life expires. Battery life varies with use. A fresh 9V alkaline battery will provide about 150-200 lifts using a 15 second charging cycle. (See Battery Installation.)*

Battery Installation

The Electrostatic Dust Print Lifter is powered by a single 9V alkaline battery. The battery storage compartment is located on the unit base. A single negatively charged brass electrode protrudes through the battery compartment cover.

BATTERY ACCESS

1. Just below the brass electrode on the bottom of the unit is a release latch. Move the latch down and remove the cover. The battery is installed in the bottom compartment.
2. Observe the polarity of the replacement battery. The "+" terminal is at the bottom terminal in the compartment. Refer to label inside battery compartment.
3. Push the battery into place. A small plastic spacer tab is located at the left side of the battery compartment. The battery should be installed just to the right of the spacer tab with the terminals making contact.
4. With the battery in position, replace the compartment cover.

The unit is ready for use. Press the ON/OFF switch. The green button should illuminate. ***NOTE:*** *Energizing the unit will not produce an electrical charge (see OPERATION).*

Locating Dust Impressions

Locating dust impressions requires careful investigation techniques aided by employing special lighting. Whether prints are visible or not, the search for them should be directed toward areas most likely traveled by the perpetrator. This would include hallways, foyers, and the areas nearest to the point of entrance and exit. The texture of the surface or strong design patterns may make this more difficult (pictured to the right.)

The footprint in the photo above is barely noticeable, but becomes easily visible (as shown below) by darkening the room and using a white light such as the one provided with the TMX100 Tactical MAX Forensic Light Kit at an oblique angle.

Operation

1. Remove one of the pickup mats from its protective tube. Carefully place the mat, black side down, over the area to be examined.
2. Position the Ground Plane 1-2 inches from one edge of the pickup mat as shown (Fig. 1A).

   NOTE: When working on vertical surfaces (Fig. 1B), secure the pickup mat and ground plate in place with tape.

FIGURE 1A

FIGURE 1B

3. Place the electrostatic control unit on the ground plane and the pickup mat. The single brass electrode (uppermost—top) must make contact with the metallized surface of the pickup mat and the 2 brass electrodes at the (lower) other end of the unit must contact the ground plane.
4. Press the ON/OFF button. The button should illuminate and the red LED below the voltage control knob will illuminate if the unit is properly position over the pickup mat and ground plate. If the red LED does not come on, make sure the brass electrodes are making good contact with the pickup mat and ground plate.
5. To apply voltage, turn the control knob one position clockwise. This will apply approximately 4000 volts. On most surfaces, application of the electrical charge will cause the pickup mat to draw down to the surface. If not, advance the voltage control to a higher value. Each click of the knob will apply approximately 1000 additional volts. Rotating the knob clockwise after all the LEDs are lit will have no effect. If arching occurs between the pickup mat and the ground plate, lower the voltage by turning the control knob counter clockwise.

NOTE: You will not receive an electrical shock by touching this knob, provided that your other hand is not touching any other surface.

Touching the pickup mat or ground plane while the charge is being applied, however, could result in electrical shock.

6. While the pickup mat is charging, use the insulated roller to flatten out any air bubbles between the mat and the surface being examined (Fig. 2).
7. Normal charging time is approximately 15-30 seconds. Longer charging produces better results, but will shorten battery life. The pickup mat being flat against the surface is a good indication that further charging is not necessary.
8. Removing the unit from the surface will turn off the high voltage and automatically reset the control knob to the High Voltage off position.
9. Lift the mat and examine the black surface for dust prints.

FIGURE 2

FIGURE 3

Lifting Dust Prints from Metal Surfaces

The ESP900 also lifts prints from metal surfaces such as desktops, vehicle bodies, metal cabinets, and other metal surfaces. Place the ground plane insulating sheet within an inch of the pickup mat (Fig. 3). Center the ground plane on the insulating sheet leaving a 1/2" border around the ground plane.

Failure to use the Ground Plane Insulator may result in arcing between the pickup mat and the metal surface of the pickup mat and may damage the surface being tested.

1. Switch the power ON and slowly increase voltage. On most metal surfaces, it will not be necessary to go beyond the lowest voltage setting. Allow a charge for at least 15 seconds (30 seconds max).
2. After the charging cycle is complete, remove the unit.

3. Using the Static Discharge Cable, press and hold the plungers on both ends of the cable. This exposes a metal contact at each end. Touch one contact to the ground plane and the other to the metallized surface of the pick-up mat simultaneously to discharge any residual charge left in the mat (Fig. 4).

FIGURE 4

4. Carefully, lift and examine the pickup mat (Fig. 5). It may not always be possible to see some of the lifted prints due to low contrast of the dust with the black mat surface. Therefore, examine the mat using oblique light.

FIGURE 5

Preserving Lifted Dust Prints

Photograph lifted dust prints and be certain to include a scale. The prints may be lifted from the pickup mat using Rubber Footprint Lifter No. 647C100 or SIRCHIE's GELifters™.

CAUTION! Attempts to add clear lacquer or similar materials to preserve the print on the lifting mat usually results in the destruction of lifted prints.

CAUTION! Do not use lifting tape or residue lifters other than those recommended above—it is nearly impossible to separate the device from the mat. Static electricity may also cause the matt to be draw to the tape prematurely, damaging the lift.

NOTE: Discard mats after the prints are recorded. While it may be possible to clean the mat, wrinkles and scratches will develop across the surface and interfere with results from subsequent lifts.

Transporting Lifting Mats

If the dust print lift must be transported to the lab for analysis, we recommend the use of ESP908 Dust Print Evidence Box. Each evidence box is supplied with an evidence label for identification and chain of posses-

FIGURE 6

sion purposes. Secure the pickup mat (black side up) inside the transportation box with tape as shown to the right (Fig. 6) and seal the box with three evidence integrity seals. Affix the evidence identification label to the outside (Fig. 7) and complete the information for transportation to the lab.

FIGURE 7

References

Bodziac, William J., **Footwear Impression Evidence,** New York: Elsevier Science Publishing Co.: 1990, p103

Saferstein, Richard, Ph.D., **Criminalistics, Sixth Edition,** New Jersey: Prentis Hall: 1998, p324

Crime-Scene-Investigator, Dwayne S. Hilderbrand, CLPE: **Footwear, The Missed Evidence,** <http://www.crime-scene-investigator.net/footwear.html> February 2009

Troubleshooting

Problem	Possible Causes	Solution
Unit does not turn on	Battery not installed	Install 9V alkaline battery
	Battery installed incorrectly	Check polarity
	Battery dead	Install new 9V alkaline battery
	Power switch isn't ON	Push switch in to turn ON
	Problem with internal circuitry	Return to factory for repair. **NOTE:** Do not attempt repairs, disassemble or alter unit as this will void your warranty.
No dust prints on pickup mat	There were no dust prints present	N/A
	Lifting mat didn't draw down completely to surface	Check positioning of brass contacts between the mat and ground plane
		Increase voltage setting
	Brass contacts positioned incorrectly	Check positioning of brass contacts between the mat and ground plane
Lifted dust prints are very light	Lifting mat didn't draw down completely to surface	Check positioning of brass contacts between the mat and ground plane
		Increase voltage setting
	Brass contacts positioned incorrectly	Check positioning of brass contacts between the mat and ground plane
	Not all dust offers high contrast	Darken room and use oblique lighting to examine