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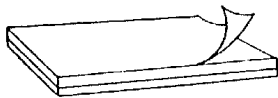
Technical Note No. 1-2072
April 2000

Rubber-Gel Lifters

TECHNICAL NOTES

Introduction

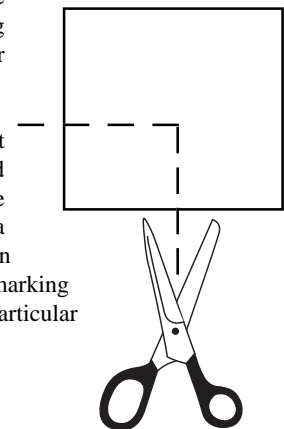
figure one



These rubber-gelatin lifters are especially developed for the lifting of fingerprints, footprints, dustmarks and micro traces. The thick, non-aggressive, low-adhesive gelatin layer permits the lifting of traces from almost every surface, including porous materials, such as paper or cardboard. Lifted prints can be collected for photography or closer examination.

The lifters consist of three layers: the Carrier, the Adhesive and the Cover Sheet (figure one). There are three kinds of lifters: Black lifters, White lifters and Transparent lifters. The black and the white lifters have a carrier of linen rubber. The transparent lifters have a clear polyester film as a carrier. All lifters are protected by a transparent polyester film. Black and white lifters can easily be marked since the white linen rubber backing can be written on. The transparent lifters have non-sticking paper edges for marking and easy lifting of the cover sheet. The lifters can easily be cut with scissors to fit a particular job. Do not remove the cover sheet before cutting (figure two).

figure two



Fingerprints

Lifted prints or marks can easily be photographed after removal of the cover sheet. When the prints have been photographed the cover sheet can be replaced (after careful cleaning to remove any possible contamination).

Powdered fingerprints can always be lifted with rubber-gelatin lifters. Determining which kind of lifter should be used depends on the color of the powder and personal preference. With silver or gray powder, for instance, the black lifters can be used to improve contrast. It should be remembered that, with white and black lifters, a negative image of the fingerprint is obtained. Photography is then necessary to obtain the positive image. With the transparent lifters, a positive image can be obtained directly by photographing them through the transparent backing.

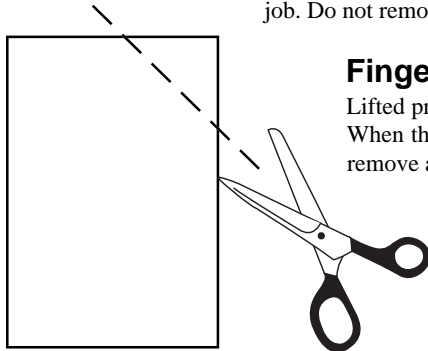


figure three

To lift a powdered print, cut a section large enough to cover the area. It is recommended to cut off or notch a small corner of the lifter (figure three). There are two reasons for this. The first reason is that after lifting, the notched cover sheet can easily be replaced exactly over the lifter. The second reason is that if the lifter is always used in the same way, for instance with the notched edge on the right hand top side while lifting, the orientation of the lifted print can always be reconstructed.

Before lifting the print, the cover sheet has to be removed (figure four) and put aside, upside down (to avoid contamination). The safest and only recommended method for placing the lifter on the print is described in the next paragraph.



figure four



figure five

Adhere an edge of the lifter next to the developed print. The upwardly slanted lifter is now carefully smoothed down, while rubbing with a thumb, so that no air bubbles are locked in (figure five). After that, the lifter is smoothed over the whole surface.

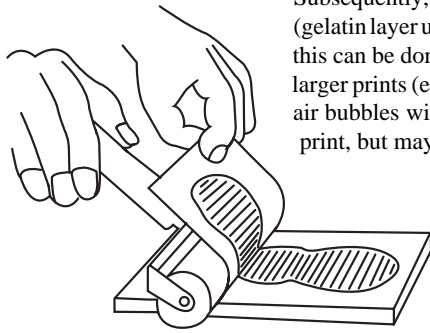


figure seven

Subsequently, the lifter is picked up, beginning at one of the corners. Then put the lifter (gelatin layer up) on a flat horizontal surface to replace the cover sheet. For small prints this can be done analogous to the lifting procedure described above (figure six). For larger prints (e.g., palm prints), a roller is very convenient (figure seven). Trapping of air bubbles will result in the creation of shallow craters, which will not destroy the print, but may cause problems in photography.

Lifted dusted prints will fade, and ultimately disappear in time. Fading will be noticeable after days or weeks, depending on the storage temperature (the lower—the better). Prints developed with silver powders, on the other hand, are known to have been stored for several years without apparent fading. It is recommended, though, to photograph prints as soon as possible.

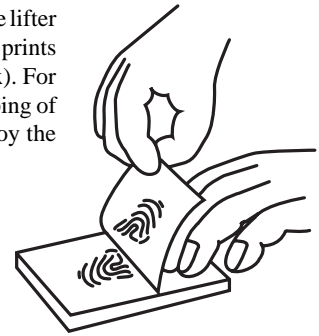


figure six

Splicing a Print

In case too much powder has been used, and the fingerprint ridge detail is filled in, improvement of the print may be possible by the so-called “splicing of the print.” In splicing, two pieces of the same size lifter are used. First, the print is lifted as described above, and the cover sheet replaced. (Replacement of the cover sheet is essential, as will be clear in the following description.) Then the cover sheet is removed again. Due to the presence of excess powder, a copy of the print will be visible on the cover sheet. This copy can be transferred to the second piece of lifter by switching the covers. That is, the cover sheet of lifter #1 is put on lifter #2, and vice versa. In many cases this procedure will also improve the print on lifter #1 as well.

Splicing can be advantageous in another way. When dirt or dust from the surface has been picked up during lifting, the dirt will remain on lifter #1 and the print is transferred to clean lifter #2, so that an undisturbed print is obtained.

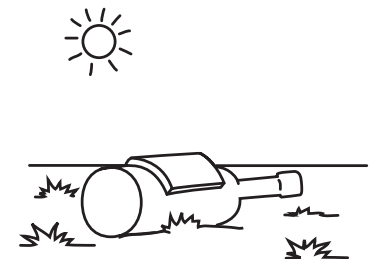
Note: There seems to be a controversy about the ethics of this technique. Some experts, therefore, prefer to use double lifting of a print (described in the next paragraph) when splicing seems advantageous.

Double Lifting

Often, a latent print can be lifted twice with only one application of latent print powder. The second lift will, in many cases be much clearer, but with less contrast. Another possibility is lifting for a second time after an additional application of powder. Of course, no rules can be given for these techniques, as much depends on experience. It is recommended, though, to try it for lifting latent fingerprints on aluminum.

Improvement of Older Prints

Fingerprints on objects which have been standing in sunlight or outside for longer periods are difficult to visualize. Because all of the water is evaporated from the print, very little powder adheres to it. By attaching a piece of lifter to it for a few minutes, the print can be rehumidified. Subsequently, the print can be dusted in the usual way and lifted with a fresh piece of lifter. Before performing this technique, be sure that the objects have cooled.



Footwear Impression in Dust

In dust, the sole of a shoe acts like a stamper, leaving an invisible or barely visible print. Shoeprints can be lifted from all smooth and hard surfaces, such as floor coverings, painted wood, paper, tabletops, etc., with rubber-gelatin lifters. For lifting shoeprints in dust, the large black lifters are commonly used.

Dustprints not visible to the naked eye can be searched for in two ways. Either the prints are first discovered with the aid of a floodlight, Forensic Light Source or flashlight, and then lifted, or the whole area where prints are suspected is covered with lifters. If the whole area is covered with lifters, reconstruction of the pattern is aided by drawing stripes over the seams of the lifters and numbering them. It may be advantageous to leave the lifters on the surface for a few minutes, to fully adhere to the dustprint.

Even if the shoeprints did not show up on lighting the surface and were not visible upon lifting, they may show up under oblique lighting of the lifter surface in a dark room (after removing the cover sheet). Lifters with no apparent prints in normal light, may now show a highly detailed image. After photography, the cover sheet can be replaced after careful cleaning. For replacement of the cover sheet on these large lifters, without trapping air bubbles, a large roller is very convenient (figure seven). Shoeprints made visible with fingerprint powder can also be lifted with rubber-gelatin lifters.

WARNING: Avoid contamination of the lifters after having removed the cover sheet. It is recommended to wear dust-free clothing during handling and photographing of the lifters.

Longevity of Latent Shoeprints

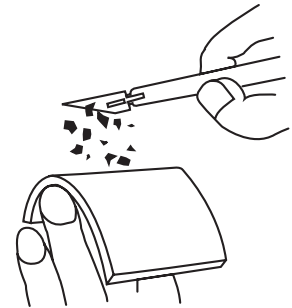
Lifted shoeprints (dustmarks) may slowly fade in time. For very weak prints this may be noticeable after storing for a few days. This will depend on temperature. The lower the temperature, the slower the fading. This, however, should not be a concern, since lifted shoeprints can easily be photographed after removing the cover sheet. Oblique lighting will show details not visible before photography. So far, no materials are known to us that faded on the lifter surface before satisfying photographs had been taken.

When shoeprints contain very coarse material, e.g., sand, problems are expected when replacing the cover sheet. Around the coarse particles, small air bubbles will be present. When too many are present, the cover sheet will not sufficiently be adhered to the lifter.

Several measures can be taken to avoid these problems. First of all, it is recommended to photograph the shoeprint before lifting. Second, the lifted print can be photographed at the crime scene before the cover sheet is replaced. Third, instead of replacing the cover sheet, the lifter can be put in a clean box (e.g., a photo-paper box) and taped to the bottom. Fourth, the cover sheet can be secured to the lifter with staples or adhesive tape, to prevent movement in which the coarse particles might destroy characteristic details.

Paint Traces

When paint left on a vehicle by a hit-and-run accident has to be collected for examination, the white lifters can be used. After removing the cover sheet, one edge of the lifter is attached to the surface of the vehicle, directly under the spot with the paint to be removed. Then, the paint is scraped off carefully with a scalpel. The removed material will fall in the gap between the lifter and the surface of the vehicle, or on the lifter itself. When enough material has been removed, the lifter is pressed to the surface of the vehicle. This way, all loose particles will be picked up by the lifter. The lifter can be removed and the cover sheet replaced. If necessary, the cover can be secured with staples or adhesive tape.

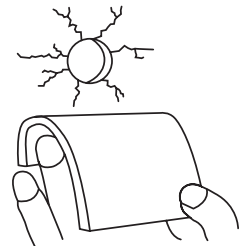


Sampling of Micro Traces

Due to the non-aggressive nature of the lifter, micro traces and hairs can be collected without fear of damaging the sampled material. When it is necessary to remove micro traces from the lifter, the low tack enables removal by using a scalpel or pair of tweezers. Collection of hair is done with white lifters. If an area is to be searched for micro traces, it is recommended to divide the area in squares (e.g., 20 x 20 cm or about 8 x 8 in.) and to use a fresh piece of lifter for each square. The size of the lifter is actually dictated by the amount of contamination in the area to be investigated, since sampling of dirt or large amounts of micro traces will result in quick loss of tack. An 8 x 8 cm piece of lifter (about 3 x 3 in.) usually suffices.

Bullet Hole in Glass

Glass containing bullet holes has a very specific pattern of cracks around the hole. After collection of residues around the hole, it is standard procedure to photograph the bullet hole. This, however, can be difficult due to reflections, disturbing backgrounds or light sources. If this occurs, the bullet hole and its surroundings can be powdered with silver/gray latent print powder **after** residues around the hole have been collected. The image can be transferred to one or more pieces of black lifter.



Photography of Prints

Prints can easily be photographed using oblique lighting from a photoflood or Forensic Light Source held at a 45° angle. The film plane of the camera has to be parallel to the lifter. All reflections should be avoided; therefore, photographing should be done in a totally dark room. To avoid reflections, the camera should be shielded from the light source (e.g., with black cardboard). A scale should be placed next to the lifter together with a case number, date, initials, etc. Before photographing, the cover sheet has to be removed. To avoid contamination, care should be taken to work in a dust-free environment (no smoking during photographing).

Shoeprints in dust on black lifters are the most difficult to photograph. To find the correct lighting, a set of photographs should be taken. Use different shutter speeds and with $f/11$ as a standard. Due to the extreme black of the foil, heavy overexposure is possible, thereby enabling the reproduction of even very weak traces. Once the standard is set, the camera can be adjusted to the effective film sensitivity. A film rated at 125 ISO can, for example, be found to have an effective film

sensitivity of 32 ISO. With weak traces (weaker than the standard), longer shutter times are necessary. With powdered shoeprints, much more light is reflected towards the camera. Therefore, shorter exposure times have to be used. The same holds for lifted, powder-developed latent fingerprints.

For reproduction of all the details in dustprints, the weakest details (or the part farthest away from the light) should be the criterion for the exposure time. Relative overexposure of other parts is corrected in printing. To be certain that a good reproduction is made, a series of three photographs is normally taken, bracketing the exposures. Due to the oblique lighting, the side of a lifter closest to the lamp receives more light than the other side. Therefore, it is advisable to put the side of the lifter with the weakest details closest to the light source.

Effective Temperature Range

The upper temperature that objects can have from which lifts are to be made is a maximum of 40° Celsius (104° Fahrenheit), since the gelatin layer will melt between 40° and 45° Celsius (104° and 113° Fahrenheit). Objects which have been standing in the sun will soon exceed this temperature limit. These objects first have to be cooled down before the lifting process is started. The temperature in cars left in the sun can become very high. Therefore, the lifters should certainly not be left in sunlit areas, but kept in shaded areas (e.g., under a front seat). In very hot climates it may be necessary to use an ice chest. The lifters can be used at freezing temperatures. With black and white lifters the rubber becomes somewhat less flexible, though the main problem at these temperatures is removal of the cover sheet. This becomes more difficult at lower temperatures. It can be circumvented by keeping the lifters in a warmer area prior to use in a very cold area. Lifting, without problems, at temperatures as low as -15° Celsius (5° Fahrenheit) has been reported.

Storage

Lifters are normally stored at room temperature (20° Celsius, 68° Fahrenheit), though storage in a refrigerator is advantageous. While black and white lifters have no known shelf life, it is best to not keep more than a six-month to one-year supply in stock. The transparent lifters slowly develop a brown tint. This is due to a chemical reaction between the gelatin and the ingredients added to give the transparent lifters a higher tack than white and black filters. It becomes noticeable after a number of months storing at room temperature. Therefore, it is preferable to store the transparent lifters in a refrigerator. Upon prolonged storage, especially in a humid environment, the lifters will attract some water, resulting in a small loss of tack. Although this does not render the lifters unusable, storing in a humid atmosphere should be avoided. Due to the presence of (food) preservatives in the gelatin layer, fungal growth on the lifters will not occur.

Ordering Information

Catalog No. 1-2083 Rubber-Gelatin Lifter, White, 5.2" x 7.2", pack of 10
Catalog No. 1-2084 Rubber-Gelatin Lifter, Black, 5.2" x 7.2", pack of 10
Catalog No. 1-2085 Rubber-Gelatin Lifter, White, 5.2" x 14.4", pack of 2
Catalog No. 1-2086 Rubber-Gelatin Lifter, Black, 5.2" x 14.4", pack of 2
Catalog No. 1-2087 Rubber-Gelatin Lifter, Transparent, 5.2" x 7.2", pack of 10
Catalog No. 1-2088 Rubber-Gelatin Lifter, Transparent, 5.2" x 14.4", pack of 2
Catalog No. 3-3015 Footprint/Dustprint Boxes, 25 boxes