

FINGERPRINTS • BLOOD PRINTS • CASINGS • GUN BARRELS • BITE MARKS • TOOL MARKS

# *Preserve the Evidence*

**ACCUTRANS<sup>®</sup>**

AutoMix Dispensing System

## ***The New Solution for an Old Problem!***

ACCUTRANS has been specially developed for forensic applications. This state-of-the-art polyvinylsiloxane material offers high tear resistance and the best dimensional stability. Transparent material eliminates reverse prints!





**Evidence is  
Everywhere**

How Well Is It Preserved?

**ACCUTRANS<sup>®</sup>**  
Casting Silicone Material

**FAST. EASY. ACCURATE...even on rough surfaces.**

- **No mixing required**...fast and easy to use.
- **Accurate dispensing**...minimizes waste and reduces costs.
- **Ideal for rough surfaces**...ridge detail is excellent, even on brick, styrofoam, textured computer housings, and human skin.
- **Flexible & accurate**...perfect for curved surfaces (bottle necks), horizontal and vertical planes.
- **Setting time** is only 4 minutes at 68°F (205°C).
- **Long lasting**...prints are permanent on the lift... cannot be smeared or smudged.
- **Non-toxic**...no harmful reactions or secondary effects.
- **Available in TRANSPARENT, WHITE and BROWN**... for a variety of forensic applications.



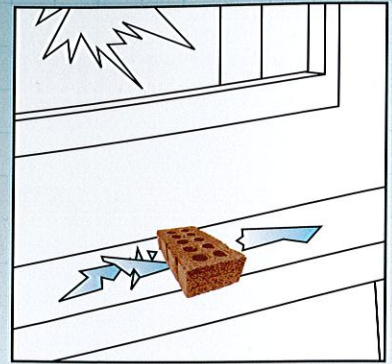
**"The Difference is Clear"**

# ACCUTRANS

Casting Silicone Transparent

*A breakthrough in fingerprint lifting...  
Eliminates reverse prints!*

- No distortion
- Clear material...allows direct comparison of minutia points
- Self-pooling...provides excellent flow rate and even coverage
- Also ideal for skin prints, blood prints, rough and curved surfaces



# ACCUTRANS

Casting Silicone White

*The fastest and easiest  
way to lift latent prints.*

- Preserves prints without smearing
- Lifts prints from rough, curved and textured surfaces
- Also ideal for gun barrels, castings, and palm prints

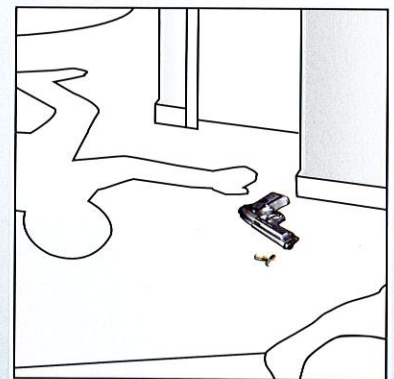


# ACCUTRANS

Casting Silicone Brown

*Unsurpassed detail on tool marks,  
casings and gun barrels.*

- Darker color...Easy to examine under your scope; reduces glare
- Ideal for gun barrels, tool marks, pry marks, and casings



**Also available...**

## The innovative ACCUTRANS Spreader Tip

This 1" wide tip covers a single print perfectly, with a minimal amount of material. The Spreader Tip virtually eliminates operator error.







**WINNER**

## ORDERING INFORMATION



P/N DESCRIPTION

### AUTOMIX KITS

- 78513 AccuTrans AT Automix Kit – Transparent
- 78512 AccuTrans AW Automix Kit – White
- 78511 AccuTrans Automix Kit – Brown

Kit includes:  
2 x 75 ml cartridges, 40 mixing tips, 10 spatulas,  
1 Dispensing Gun

### REFILLS

- 78516 AccuTrans AT Refill – Transparent
- 78515 AccuTrans AW Refill – White
- 78514 AccuTrans AB Refill – Brown

Includes: 4 x 75 ml cartridges



### ACCESSORIES

- 76912 AccuTrans Dispensing Gun
- 78521 AccuTrans Mixing Tips (40)
- 78527 AccuTrans Spreader Tips (40)







## AccuTrans®

IMPRESSION-MAKING WITH FORENSIC PRECISION –  
SIMPLE, QUICK, PRECISE

AccuTrans has been specially developed for forensic applications. The high tear-resistance and the ideal recovery after deformation of over 99.8% are the keys to a precise impression result. With its special colouring and the homogenous mixing without air inclusions the impression can be viewed with the stereo microscope without unwanted light reflexes.

- Easy application – no special mixing tools are required
- Stable even on vertical surfaces – does not drip from the application area
- High elasticity – materials do not tear or tear away even when applied in a thin layer
- Safe to apply – no adverse health effects from any ingredients
- Excellent readability in sided light – at up 80 × magnification
- High storage stability – impression can be stored without problems for several years
- The correct material for every application (brown, black, white, transparent)
- Contains no toxic substances



# A trace of evidence

## *New material aids investigators in lifting trace evidence*

It's long been known trace evidence, which contends that every contact no matter how slight will leave a trace, can help solve a case. This minute evidence is normally left by objects or substances coming into contact with one another, leaving a small sample on the contact surfaces. Today's investigators rely on many types of trace evidence, but some of the most commonly and successfully used are fingerprints and toolmarks.

To successfully use this evidence, an efficient means of collection must be used. A new casting material from Ultrronics Inc. incorporates ease of use, eliminates mixing and applies simply. Researchers set out to examine whether this casting material is a reliable, sensible product for forensic investigators by testing its performance on a variety of surfaces.

### **What is AccuTrans?**

Casting products traditionally are mixed from a tube then applied to a surface, and variables affecting their use typically include temperature, odor and hardening times. AccuTrans Auto Mix Dispensing System, from the Cuyahoga Falls, Ohio, company, utilizes a new material — polyvinylsiloxane — which assists the investigator because it does not require mixing and is easy to use. In addition, AccuTrans is available in a transparent material, alleviating photographic reversals.

This casting silicone is applied with an extruder gun. The material is flexible and does not distort the image. Once the impression is dry

and lifted, it cannot be smeared or smudged, making the lift permanent. The impression is 1:1 and can be placed under a scanner or camera and searched in the Automated Fingerprint Identification System (AFIS) in either the local, state or federal fingerprint data banks.

It is available in white, brown and a transparent material. The transparent version allows for instant print comparison without reversing the image. The transparent silicone enables an investigator to place the lift on any color background, allowing photographic image capture. In fact, it works well for all photographic purposes.

The main material in AccuTrans, polyvinylsiloxane, can be used on curved surfaces, and flat, horizontal or vertical planes. When used on vertical planes, only a small amount of silicone is needed. The material will smooth itself as it runs down over the area. This casting silicone also can be used on smooth or rough surfaces, human skin and blood evidence. The silicone can even be used to make an impression inside a gun barrel by using a light release agent before application.

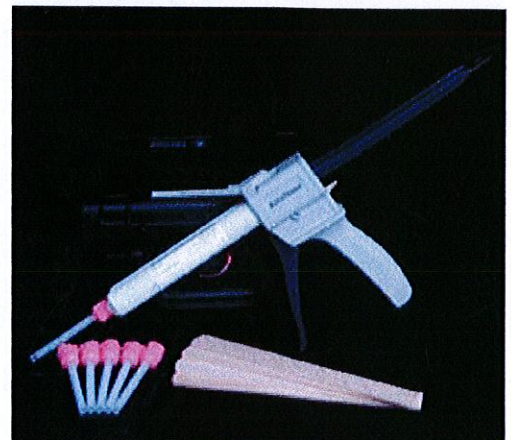
AccuTrans has a boiling point of less than 150 degrees Fahrenheit (F), a relative density of 1.2g/l, and is insoluble in water and soluble in methyl ethyl ketone.

The compound doesn't irritate the skin, and wipes up easily. However, as a general precaution, it is recommended that users do not eat, drink or smoke when handling, wear

gloves and avoid contact with eyes and skin.

### **Using AccuTrans**

It should be noted that before treatment with silicone, forensic investigators should dust rough surfaces with magnetic fingerprint powders to bring out the fingerprint ridges. (See Figure 1 below.) Magnetic powders come in a variety of colors, which is beneficial for surface contrast and photographic purposes. Magnetic powders contain ferromagnetic particles, and are applied using a magnetic applicator or wand. Excess powder is easily removed by moving the appli-



**Top: The AccuTrans system. Bottom: In Figure 1, the investigator applies magnetic fingerprint powder to a golfball's surface before using AccuTrans.**



cator back over the print. However, magnetic powders should not be used on metallic surfaces.

At the beginning of the application, users must squeeze out a small amount of AccuTrans to properly blend the contents in the mixing tube. Doing this prevents large air bubbles in the casting. If small air bubbles are present in the cast, they do not interfere with ridge detail and usually occur in the beginning of the application, or if the user stops and starts or removes the extruder's tip. The extruder gun allows the material, and not the tip of the gun, to come in contact with the fingerprint, thus preserving the print's integrity.

If too much material is applied to a surface, the polyvinylsiloxane may

run down past the fingerprint. In this case, the investigator can simply place a piece of tape a few inches below the print to create a dam. The tape will allow the excess material to gather in this area. After AccuTrans dries, users can cut off the excess with a pair of scissors or a knife.

### AccuTrans to the test

Researchers recently devised a comparison test using various substrates to determine the ways in which AccuTrans might be used. They applied the product to each substrate, and the drying time was noted for every surface. After the material cured, the impressions were lifted and compared for quality, and to determine whether the latent fin-

gerprint needed to be reversed.

All latent fingerprint impressions produced in the study were photographed on a light table for maximum results and clarity, and scaled 1:1. Researchers used a Nikon D100 Digital Camera, set on ISO 1000 in Aperture Priority Mode at f/16, equipped with a Sigma 50mm Macro Lens.

The tests were conducted with Accutrans transparent and brown casting material using the following surfaces.

#### Rough surfaces:

- Golf ball
- Concrete block
- Bricks
- Rocks
- Fruits (lemon, lime, orange)



Figures 2, 2A and 3 (from left to right). Figure 2 shows a latent print lifted from a lime. Figure 2A shows a latent lifted from a dashboard. Figure 3 shows a fingerprint lifted from a light bulb.

- Computer surfaces
  - Dashboards
  - Unfinished wood
- Smooth surfaces:
- Dollar bill
  - Light bulbs
  - Glass
  - Mirrors

- Finished wood
  - Smith & Wesson 9mm handgun
  - Wesson 9mm slip
- Special surfaces:
- Dry blood prints
  - Human skin
  - Fingers and palms

The brown AccuTrans casting material was tested on the following toolmarks:

- Hammer hit in wood
- Pry marks on screwdriver
- Smith & Wesson 9mm handgun barrel

The examinations considered ease



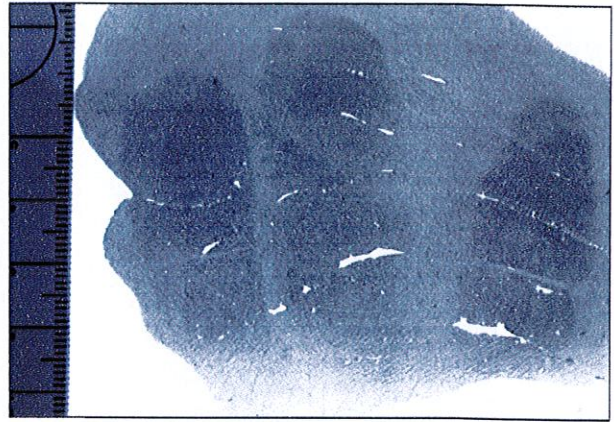
of mix and application, drying time, latent quality, and latent reversal requirements.

The **rough** surfaces tested revealed that latent fingerprint impressions on all of the substrates, except the concrete block, yielded positive results and latent fingerprints of value. The concrete block displayed what appeared to be finger marks, and when AccuTrans was applied and the prints lifted, the finger marks contained little ridge detail. All lifted latents were of AFIS quality, except for those on the concrete block. The product's drying time was approximately 3 minutes at 78 degrees F. Researchers determined back light photography may be needed if the AccuTrans becomes too thick for AFIS entry or comparison. (See



Figure 2 of a latent lifted from a lime and Figure 2A of a latent print from a vehicle dashboard on Page 86.)

The **smooth** surfaces were found to provide an excellent area from which to lift latent fingerprints, furnishing positive results and latent fingerprints of value on all of the substrates tested. In fact, all of the latents lifted were of AFIS quality. Due to the use of the AccuTrans



Above: Both Figures 4 and 4A show latent prints lifted from human skin.

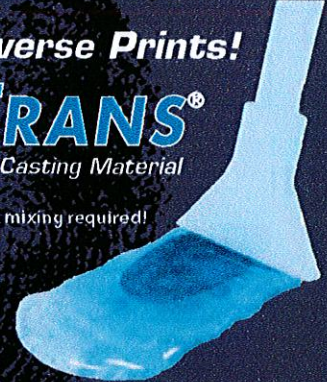

transparent, the latent prints were ready to be added to AFIS immediately. As was the case with rough surfaces, back light photography may be needed if the AccuTrans becomes too thick for AFIS entry or comparison. In this test, latents did not need to be reversed. The product's drying time was approximately

**Eliminate Reverse Prints!**

# ACCUTRANS®

Transparent Casting Material

- AutoMix is easy to use... no mixing required!
- Unique spreader tip for smooth application

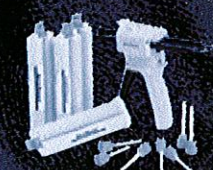


The difference is clear... ACCUTRANS sets a new standard for lifting fingerprints.

- Ideal for all surfaces, including Styrofoam, brick, computer housings, etc.
- Transparent PVS material allows direct comparison of minutia points.

ULTRONICS®

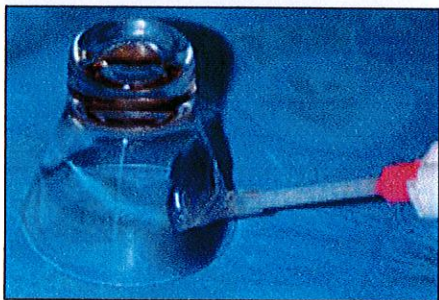
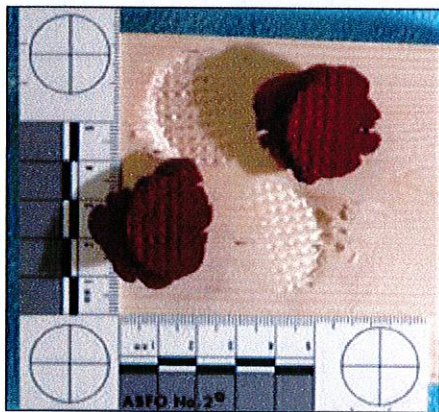
1-800-262-6262  
Cuyahoga Falls, OH 44223  
www.AccuTransUSA.com





3 minutes at 78 degrees F. (See Figure 3 on Page 86 to view a latent print lifted from a light bulb.)

The special surfaces test allowed researchers to experiment a bit with AccuTrans in order to recover fingerprints from human skin and dried blood, and actual finger and palm impressions. The finger and palm impressions were of excellent quality and easily comparable. On deceased persons, it was determined that AccuTrans can be used to assist in identification by casting the decedent's fingerprint impressions. Doing this is fairly simple: When the material is dry, a small amount of release agent is applied to the inside of the cast and the cast is then filled with AccuTrans and allowed to dry. After drying, the impression can be rolled on a fingerprint card for identification purposes. Another method would be to dust the fingers with magnetic powder, apply transparent AccuTrans to the deceased's fingers, allowing the material to dry,



An Examination of Latent Print Lifting with AccuTrans				
Transparent AccuTrans				
Item Processed with AccuTrans:	Ease of Mixing & Application:	Drying Time:	Latent Quality:	Latent Requires Reversing for Examination:
<b>Rough Surfaces</b>				
Golf Ball	5	2 - 3 Minutes	5	No
Concrete Block	5	2 - 3 Minutes	No Value	No
Rocks	5	2 - 3 Minutes	5	No
Fruits: Lemon, Lime, Orange	5	2 - 3 Minutes	5	No
Computers	5	2 - 3 Minutes	5	No
Dashboards	5	2 - 3 Minutes	5	No
Unfinished Wood	5	2 - 3 Minutes	5	No
<b>Smooth Surfaces</b>				
Dollar Bill	5	2 - 3 Minutes	5	No
Light Bulb	5	2 - 3 Minutes	5	No
Glass	5	2 - 3 Minutes	5	No
Mirrors	5	2 - 3 Minutes	5	No
Finished Wood	5	2 - 3 Minutes	5	No
<b>Special Surfaces</b>				
Dry Blood Prints	5	2 - 3 Minutes		No
Human Skin	5	2 - 3 Minutes	3	No
Clip	5	2 - 3 Minutes	5	No
Fingerprint	5	2 - 3 Minutes	5	Yes
<b>Brown AccuTrans</b>				
<b>Tool Marks</b>				
Hammer Marks	5	2 - 3 Minutes	4	N/A
Screw Driver	5	2 - 3 Minutes	4	N/A
Gun Barrel	5	5 Minutes	4	N/A
<b>Legend:</b>				
1-Very Difficult, Very Poor				
2-Difficult, Poor				
3-Normal, Good				
4-Easy, Very Good				
5-Very Easy, Excellent				

The above table shows the results of AccuTrans testing on a variety of materials.

then removing the impressions from the fingers. Back light photography would then be used for comparison purposes, producing a positive print.

When examining fingerprints in blood, the blood must be dry and the fingerprint dusted with magnetic powder before applying the casting material. If the substance is applied when the blood is wet, it will destroy the fingerprint and smear the blood on the surface. When attempting to lift latent

fingerprints from human skin, it is recommended that the application occur within 2 hours. Standard dusting with magnetic powder produces identifiable results with the AccuTrans transparent application. However, photography with back light is necessary to eliminate the need to reverse the latent print. Drying time was approximately 3 minutes at 78 degrees. (Figure 4 and 4A on Page 87 show latents lifted from human skin.)

In the toolmarks test, brown AccuTrans was used to recover several tool impressions in wood. The tool impressions were produced with a flat-head screwdriver and a framer's

**Top Left: Figure 5 shows that scales can be applied before or after the material's application. The lifted marks were from a screw driver. Bottom Left: AccuTrans applies easily, even to curved surfaces.**



hammer with a check design on the hammer's face. The screw driver and the hammer produced good quality impressions, and brown AccuTrans did a superb job in capturing these toolmarks from the wood; the impressions showed excellent detail and did not need to be reversed. Drying time was approximately 3 minutes at 78 degrees F.

Applying material to the Smith & Wesson 9mm handgun barrel was extremely easy; after adding a plug at the chamber portion of the barrel, a slight amount of a release agent, such as gun oil, was applied and then the barrel was filled with AccuTrans brown. Simply pulling on the impression released the cast from the barrel. The results proved to be of excellent quality with the chamber, lands and grooves clearly visible. The product's drying time was approximately 5 minutes at 78 degrees F. (See Figure 5 of screw driver marks on Page 88.)

### Pro and cons

On the positive side, researchers found AccuTrans easy to use and durable. They noted the material had very little or no shrinkage at various temperatures and produced high quality latent fingerprint and toolmark impressions. In addition, they found the product has no smell and does not stain. They reported that the dispenser gun was easy to operate (once loading is achieved and the cartridge locked into place, attachment of the tips is keyed and a spreader tip is available for even distribution of the polyvinylsiloxane material in a 1-inch wide path for latent fingerprints). On the negative side, brown AccuTrans had visible voids, cracks and air bubbles when applied for casting, which can require the investigator to perform multiple castings. This was the only negative researchers encountered with the product.

Overall, researchers found two primary benefits to AccuTrans use: ease of mixing and ease of application. The accuracy of detail and available colors also weigh heavily in its favor. They concluded AccuTrans is so precise it can capture the ink depth of a dollar bill, making it a logical choice for forensic investigators. ■

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*M. Dawn Watkins is a senior latent print examiner/crime scene investigator at the Palm Beach Gardens (Florida) Police Department. King Brown is the crime scene supervisor with the West Palm Beach (Florida) Police Department.*

For more information on this company, use the Reader Service Card and circle the corresponding number

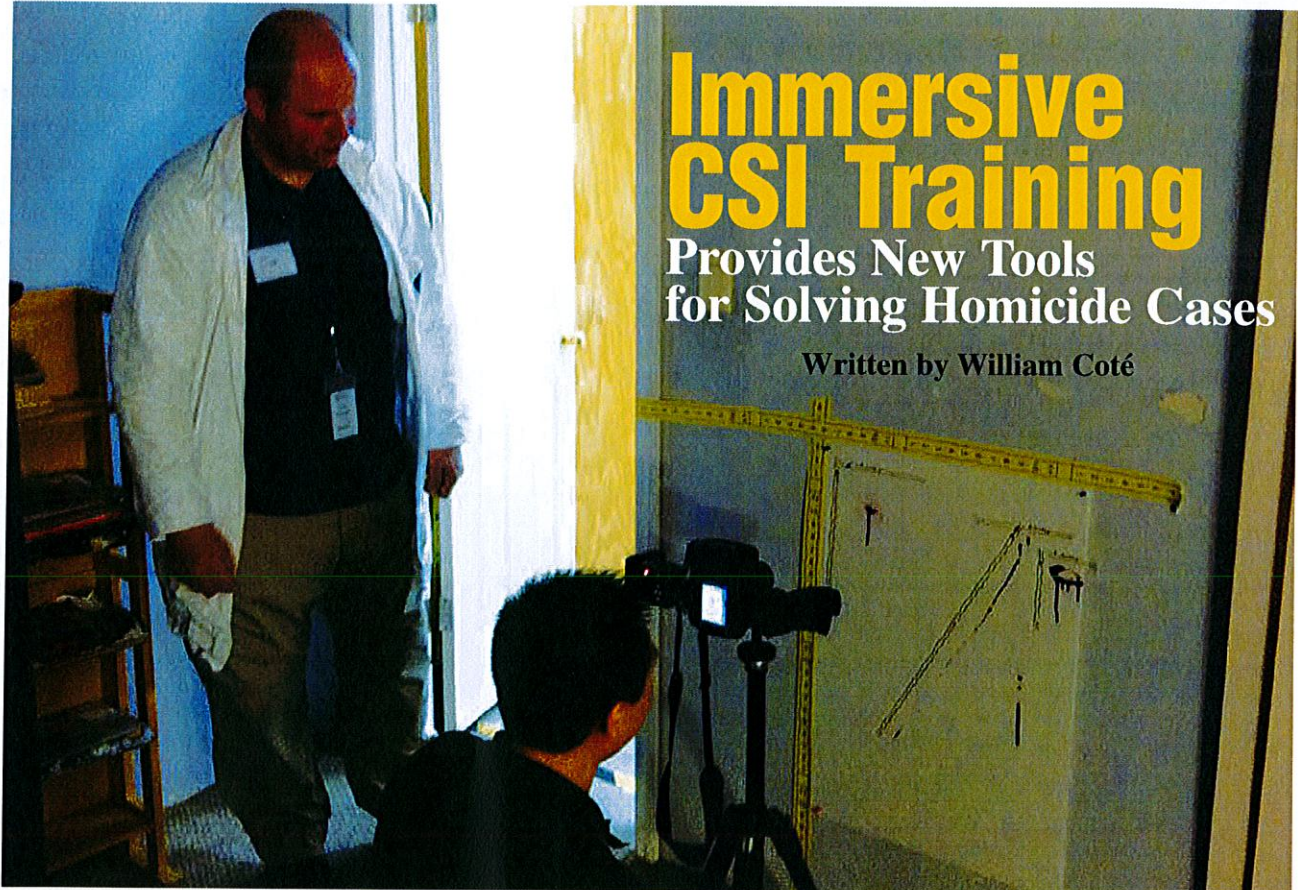
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Ultronics Inc.

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203









# Immersive CSI Training

## Provides New Tools for Solving Homicide Cases

Written by William Coté

Corporal Joe Campbell, Homicide Crime Scene Supervisor of the Tulsa Police Department (left) and Johnny Tram, Evidence Specialist 3, Honolulu, Hawaii (right), discuss documentation of blood spatter during hands-on training.

**The hands-on programs at the National Forensic Science Technology Center (NFSTC) have introduced Campbell to new techniques and tools that he can apply immediately in his casework.**

**T**HE BODY OF A 27-YEAR-OLD man was discovered in a creek in Tulsa, Oklahoma.

The investigator in charge of the case had received information that the suspect's Chevy Tahoe was likely used to transport the body. No latent fingerprints from the victim had been found in the vehicle, but if traces of blood could be located, that would provide key evidence in the murder case.

So Officer Terrence "Joe" Campbell, the homicide crime scene supervisor for the Tulsa Police Department, removed a piece of

trim from the interior of the Chevy and sprayed it with Bluestar Forensic latent bloodstain reagent. Within seconds, a series of streaks brightly fluoresced in the dark. The blood was later determined to be that of the victim.

Bluestar is a reagent that provides safer, more effective presumptive tests for bloodstains than the standard luminal formulation that has long been in use at crime scenes.

"It fluoresces brighter and longer and the room doesn't need to be as dark—so it's easier to photograph,"



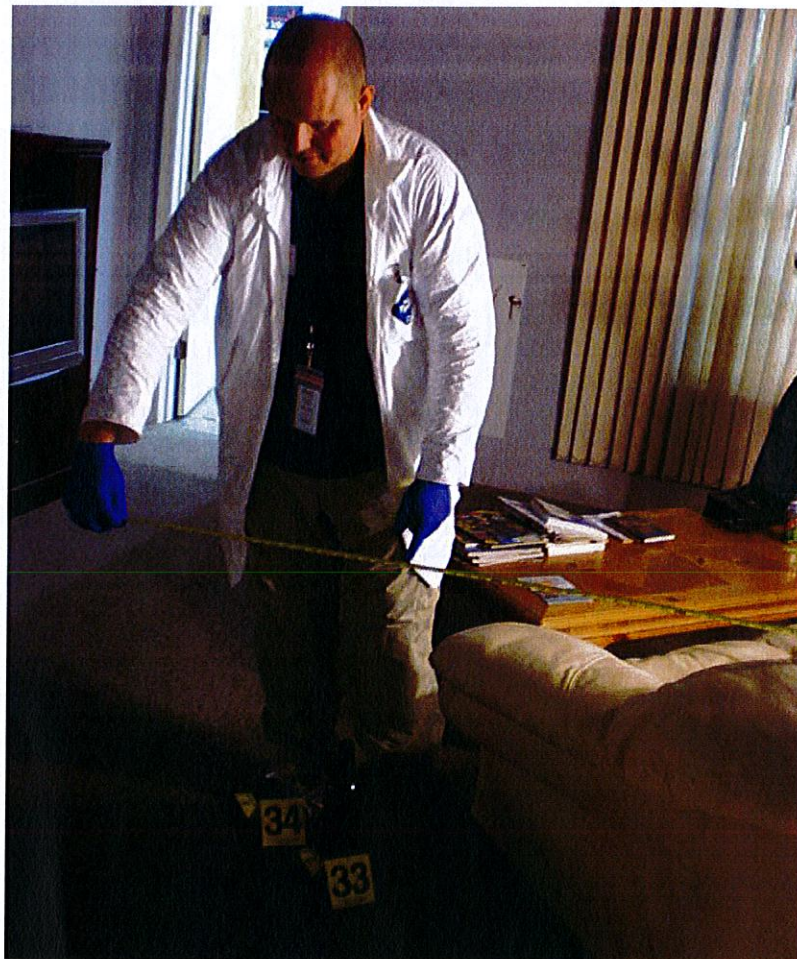
said Campbell. "I had never heard of Bluestar until I attended crime scene training at NFSTC."

In fact, the hands-on programs at the National Forensic Science Technology Center (NFSTC) have introduced Campbell to numerous new tools and techniques he can apply immediately in his casework. Funded by the National Institute of Justice (NIJ), these programs have provided Campbell with up-to-date theoretical knowledge and immersive real-world training. While the courses were free to his agency, they have quickly paid dividends in real-life homicide investigations.

When Campbell became supervisor of the Tulsa Police Department's Homicide Crime Scene Unit three years ago, he knew he would want to enhance his crime scene investigation skills. He had served as a police officer for a decade, but being responsible for overseeing the work of 17 other investigators would be a daunting challenge for even the most seasoned officer.

"Many crime scene investigators acquire most of their skills on the job," said Campbell. "However, in this day of the CSI effect, juries won't just accept that you're an expert—they will ask you about the kind of training you've had."

Campbell has attended three



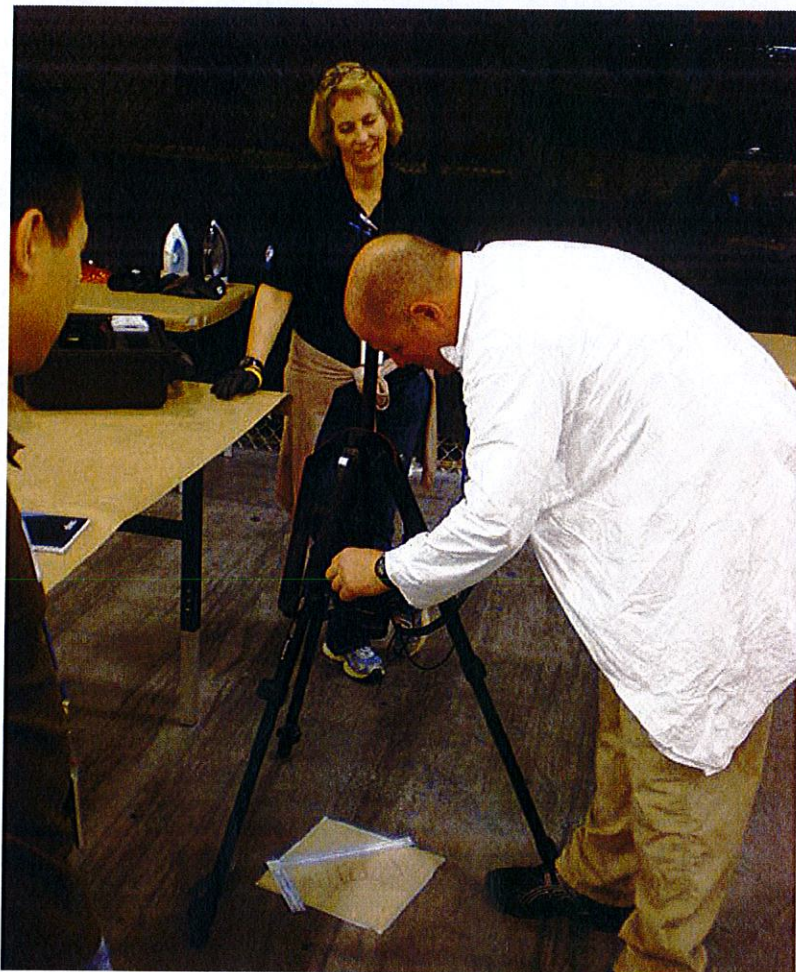
*Corporal Joe Campbell takes a measurement during the mock-crime scene portion of the Intermediate CSI training program.*

hands-on training programs at NFSTC: a Biological Screening Workshop, an Essentials of Crime Scene Investigation program, and the latest, the Intermediate Crime Scene Investigation program for more advanced investigators.

"The indoor crime scene scenarios available at NFSTC make the training extremely realistic," said Campbell. "It's one thing to work with evidence samples in controlled conditions; it's another thing to collect this evi-

**"In this day of the CSI effect, juries won't just accept that you're an expert—they will ask you about the kind of training you've had!"**





*Corporal Campbell documents a footwear print collected from the mock crime scene. Also shown in the photo is Colleen Sellers, Forensic Specialist with the Upland (California) Police Department.*

**“At NFSTC, you have numerous spaces that can be set up so trainees can quickly and efficiently move from one space to another, practicing various techniques.”**

dence from a house or an actual vehicle. This training is as close to the real thing as you can get.”

Instructors appreciate the facilities as well.

“If you train at an agency, you will typically have to instruct the entire class within one room,” said instructor Scott Campbell (no relation to Joe). “But at NFSTC, you have numerous spaces that can be set up so trainees can quickly and efficiently move from one space to

another, practicing various techniques.”

Another new crime scene tool that Joe Campbell was introduced to during these sessions was a tool for lifting latent prints, the AccuTrans system. The AccuTrans device may look like a simple household caulking gun, but it is actually a powerful tool that allows investigators to precisely apply casting silicone to capture fingerprints, blood prints, tooth marks and other evidence from a wide variety of surfaces.

“It’s a fantastic device,” he said. “At a scene you may only get one shot to collect the evidence. You want to make sure you capture it properly.”

He was so impressed with AccuTrans that, when he got home, he conducted a demonstration for all of the crime scene investigators in his department. It didn’t take long for the tool to be used during a serious investigation.

“For a recent homicide case—a murder in a house—our graveyard-shift crime scene unit developed latent prints off a sheetrock wall using conventional powder techniques,” said Joe Campbell. “Then they lifted the print using the AccuTrans system. It didn’t turn out to be the suspect’s print, but it was a comparison-quality print that



was still valuable to the investigation.”

Based on this success with AccuTrans, he ordered a kit for each person in the crime scene unit.

And Joe Campbell is not done sharing his newly acquired knowledge. His agency is in the process of creating training modeled after the Essentials of Crime Scene program he participated in. Joe Campbell will be seeking to certify the training through Oklahoma’s Council on Law Enforcement Education and Training so that it can be used for continuing education credits for investigators in his unit.

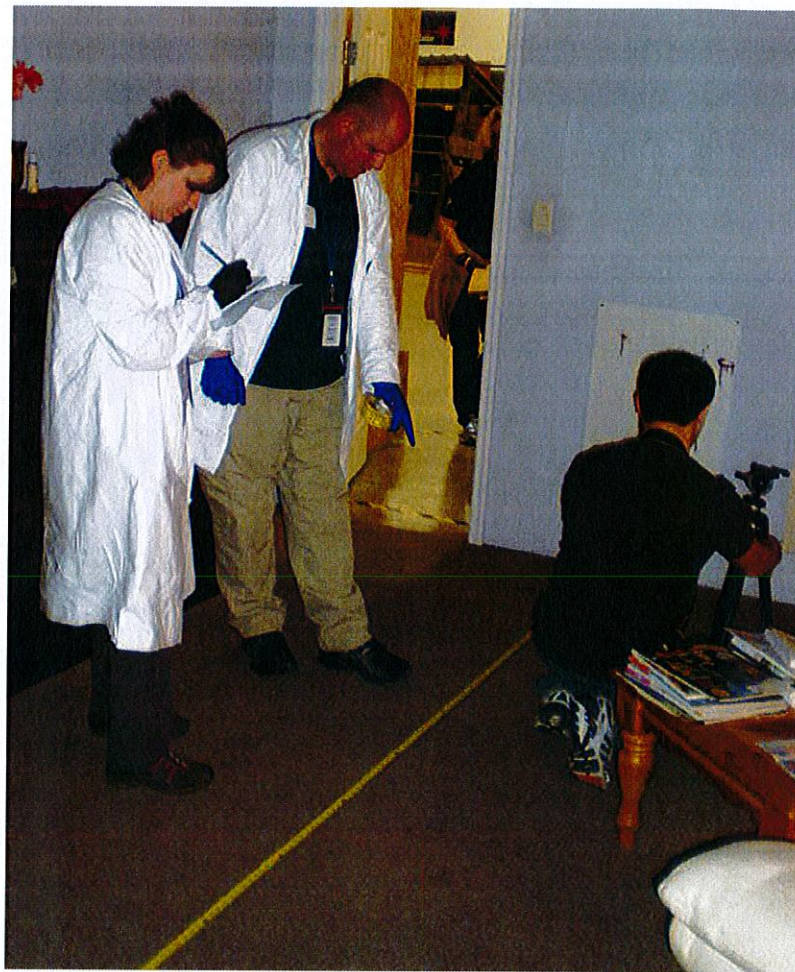
“Once you see first-hand how effective some of these tools and techniques are, you naturally want to share this information with other investigators,” he said.

## About the Author

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**William.Cote@nfstc.org**

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See Page 2 for  
details.**



*During a hands-on exercise at NFSTC in Largo, Florida, Michelle Arne of the Gresham (Oregon) Police Department (left) records measurements with Corporal Campbell (center) and Johnny Tram, Evidence Specialist 3 of Honolulu, Hawaii (right).*

## For More Information

*NFSTC, a not-for-profit corporation headquartered in Largo, Florida, provides forensic services including training, laboratory assessment, technology assistance, and evaluation to the justice, forensic science and defense communities. NFSTC offers a variety of online and hands-on training programs for forensic science practitioners. The Intermediate Crime Scene training program is currently being offered to 192 investigators through September 2012 (all spaces are filled). To receive details about future training opportunities, law enforcement professionals are encouraged to subscribe to NFSTC’s RSS feed at:*

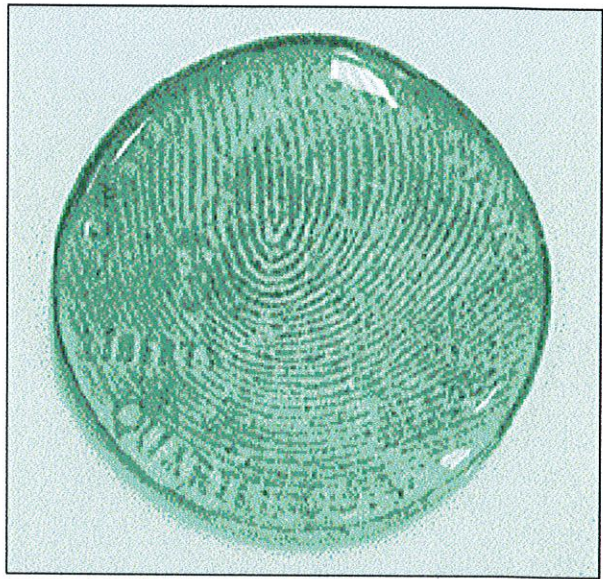
**www.NFSTC.org**



# CLEARLY SUPERIOR RECOVERY



Results with conventional fingerprint lifting tape



Results with AccuTrans<sup>®</sup> transparent polyvinylsiloxane

## The benefits of using transparent polyvinylsiloxane for recovery of developed fingerprints on challenging surfaces

Written by Detective Donald J. Frost II

**E**VERY PROFESSIONAL working in law enforcement understands the value of good fingerprint evidence in supporting the investigation of a criminal case. It can assist greatly in the development of a suspect who is possibly associated with the incident and ultimately the arrest and conviction of the actual perpetrator. Good fingerprint evidence can often be the difference between two extremes: getting a confession and conviction—or going through a lengthy and sometimes risky trial based on less-definitive evidence such as witness testimony and other circumstantial evidence. Or even worse, no arrest and no case at all.

A print can often look “good” at the crime scene—or on a piece of evidence back at the laboratory prior to processing—but it might turn out to be almost useless by the time it is developed, recovered, and examined by the latent-print examiner.

Many examiners have been frustrated by the absence of minutia points (unique characteristics in the ridge detail of the print) caused by the improper recovery of a print submitted for comparison. One or two points of comparison that are lost in the recovery of the print can be the difference between a latent print being positively identified as the suspect’s print or an “inconclusive” comparison

that makes it useless for the prosecution (and conversely beneficial for the defense) in court. That is why proper recovery is imperative.

### Latent-print recovery

There are essentially two methods of latent-print development, depending on the surface involved. The chemical-development method for porous surfaces relies on the applied chemical liquid or fumes to “react” with the components of the fingerprint in a fashion that will make the latent print appear visible on the surface for observation and photography. The physical-development method for non-porous surfaces relies on the development material



# POLYVINYLSILOXANE

(traditionally fingerprint powder) to physically “stick” to the components of the fingerprint. Depending on the porosity of a surface and the quality of the latent fingerprint deposited, physical enhancers and lifters can be employed on some porous surfaces.

Both methods are complemented by photography in order to document the developed print—especially in the chemical-development method where opportunities to physically recover the print from the surface are limited. When possible, however, physically recovering the print from the surface is still extremely desirable for aiding the investigation.

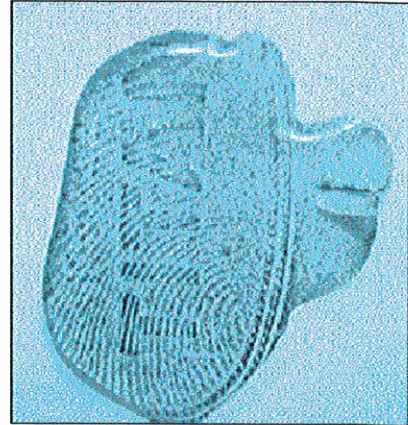
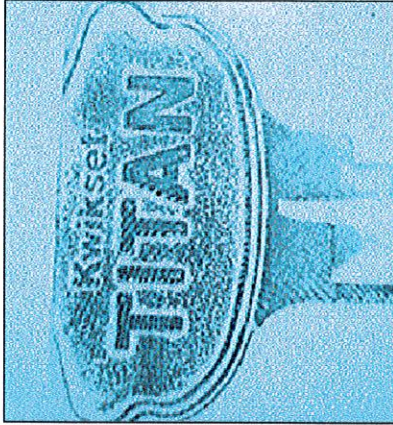
## Print recovery from challenging non-porous surfaces

Curved and textured surfaces often prove challenging to the recovery of developed latent fingerprints. Traditionally, on smooth, flat, and non-porous surfaces, standard fingerprint lift tape or a “hinge-lift” can be used to recover the developed print. Fingerprints, however, are not always deposited on such surfaces. Human skin is extremely flexible and pliable, which allows fingerprints to be deposited down into the depressions of a textured surface or around a curved surface.

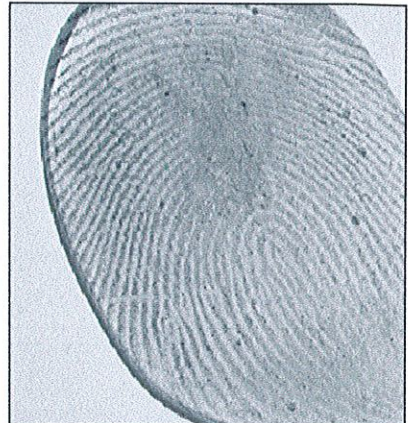
If a print is developed on a textured surface (such as a computer-monitor housing) or on a convex surface (such as a doorknob or a beer bottle), the standard lift mediums usually will not flex around a curvature or make adhesive contact with the depressions or “valleys” of the textured surface. Attempts to use these lifting mediums on such challenging surfaces usually result in spotty and incomplete fingerprint lifts, which make comparisons much more difficult.

## Addressing the limitations of current materials

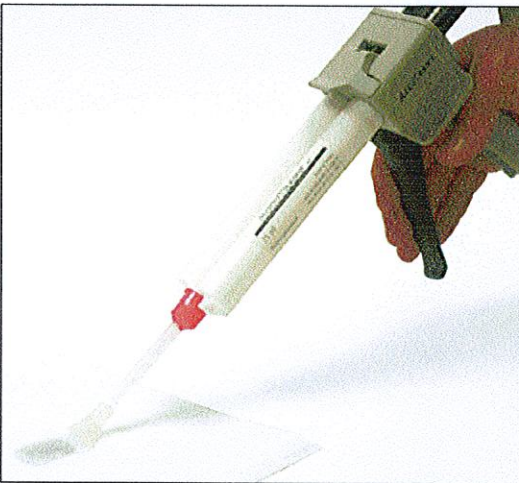
One company that is based in Ohio decided to study the issues involving latent-print recovery from these and other challenging surfaces. Ultrionics Inc. investigated the current practices of law-enforcement agencies and the tools used in the recovery of latent prints. Methods and materials were examined firsthand to see what worked, what did not work, and how improvements could be made. The company



*Latent fingerprints can be deposited in the depressions of a textured surface—and common lifting techniques cannot recover the entire print. The latent print from a key (above, left) was lifted with tape and is only a partial, which could make an ident difficult. The other print (above, right) was recovered using a product called “AccuTrans Transparent” (polyvinylsiloxane). Similar results were achieved when recovering latent prints on coins (facing page).*



*The use of tapes on round surfaces—such as a doorknob—can result in wrinkles that tend to break up the print (above, left). But polyvinylsiloxane conforms easily to curves (above, right).*



*There are a number of ways to apply the polyvinylsiloxane product in order to lift latent prints from round, porous, or other challenging surfaces. The manufacturer (Ultrionics) offers an innovative spreader tip that can be used with an extruder-gun. That application unit is shown here.*



# POLYVINYLSILOXANE

interviewed dozens of crime-scene investigators from different agencies across the state, asking them what they did and did not like about what was currently available and what improvements they would like to see in future latent-print recovery materials. The options they studied included variations of gel-like or rubber-like lifting sheets or tapes and the different semi-aqueous lifting materials, often referred to as glues, putties, or silicones.

After extensive research, it became evident that the semi-aqueous lifting materials offered better flexibility in the field and the better opportunity for product enhancements. And given the longstanding dental materials background of their parent company—the multinational Coltene/Whaledent Inc.—Ultronics was logistically poised to accelerate this particular technology to the next level.

Semi-aqueous materials include two-part casting silicones that cure chemically. These materials were originally designed for the recovery of tool-mark impressions. Their

nature gives them the ability to flow into the texture of most surfaces and makes them for applications involving curved surfaces. They come in color selections—standard whites, grays, browns, and blacks—that tend to vary by brand. They are packaged primarily in one of two different systems: pairs of squeeze tubes and dual-cylinder cartridges for use in extruder-guns.

Time can be a critical factor in hand-mixing materials from the squeeze tube systems, because as soon as the two components contact each other, the catalyzation process begins. That means that the mixing process must be maintained long enough to ensure sufficient component integration but within a short enough period of time that the material does not begin to set up prior to and during application.

Extruder-guns automatically mix the components in a matter of seconds by utilizing a special applicator tip during dispensation, thereby making the silicones easier to use. They eliminate the potential ratio errors

that are associated with different-sized tubes, as well as incomplete mixing and premature set-up. They also facilitate a cleaner work environment and utilize the material quantity more economically than squeeze tubes, because you dispense the exact amount of material you need, as you need it. Extruder-gun systems are accurate, precise, more economical in material use, and are well worth the additional investment.

Since traditional casting silicones are pigmented, they recover the fingerprint in a similar fashion to colored gelatinous/rubber lifting sheets. This means that when casting silicones recover a print, you can only view the print from the “bottom”. This is known as a reverse or mirror-image print.

Obtaining prints in this fashion requires the extra step of having to “re-reverse” the print prior to making a comparison. There have been cases where latent-print examiners were not aware of this, and comparisons have been wrongly called *non-ident* between prints from the same finger, where the one print being compared was reversed.

To overcome the difficulties that are associated with print reversal, a brand-name consumer product known as blue gel glue—or its forensic brand-name equivalent—has been used as an alternative in recovering prints from challenging surfaces, because it dries clear and flexible. This makes it ideal for recovering a “forward” print, ready for direct comparison and entry into an AFIS system. It also allows the examiner to change the background color behind the print to maximize contrast. Because they cure through air-drying rather than chemical curing, the cure times can present serious difficulty with these blue gel glues. Cure times usually range anywhere from one to more than twelve hours, depending on application thickness, air temperature and circulation, and relative humidity. This often makes them impractical for use in the field at most crime scenes.

**Clear solutions using AccuTrans transparent polyvinylsiloxane**  
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# POLYVINYLSILOXANE

state-of-the-art product. It is a clear polyvinylsiloxane with the brand name AccuTrans Transparent. Available in squeeze tubes (AccuTrans Tubes) and extruder-gun systems (AccuTrans Automix), the AccuTrans Transparent system carries with it the benefits of drying clear like blue gel glue but also curing quickly like traditional casting silicones. AccuTrans Transparent sets in only six minutes at 72°F.

AccuTrans Transparent is self-pooling on flat, horizontal surfaces. It has a lower viscosity than most other comparable pigmented silicones, which gives it an excellent flow rate and tremendous coverage benefits. On occasions when a flatter lift may be required or the work surface is sloped or vertical, additional manipulation is easy with AccuTrans. It can be easily worked across the surface of a print while still "wet" using standard lift tape or pressed out with a clean, flat object.

The cured material can be removed from the surface after curing and comes up cleanly. The captured prints are durable and will not smudge. The lift can be secured with lift tape on the backing of your choice—usually a standard backing card or sheet of clear acetate—or it can be simply dropped into an envelope and tagged as evidence.

Since its release in August of 2005, AccuTrans has enjoyed success on a variety of test and real-world surfaces, including computer-monitor housings, coins, keys, painted cinder block, styrofoam, doorknobs, plastic and glass drink bottles, and other surfaces. The material has already recovered AFIS-quality prints from a convex surface involved in a current homicide case in Akron, Ohio. Most experts consider this system to be very exciting from an investigative standpoint.

#### AccuTrans application system enhancements

The AccuTrans squeeze tube kits are supplied with a protective transport case to maximize tube life. The tubes are of equal size for easy and accurate component ratio dispensation. The kit also provides a sizable mixing pad that is bound on three sides for easy mixing on a steady surface. In situations

where you want a flatter lift, Ultrionics has an innovative spreader tip attachment for the extruder-gun mixing tip. It dispenses the material in a flat ribbon about one inch wide, which is perfect for most individual fingerprints. It also eliminates the need for manipulation when a thinner lift is required. AccuTrans is also available in white and brown—both in tubes and Automix kits—for a variety of forensic applications.

#### Summary

Latent-print recovery is as much an art as it is a science. It requires a great deal of training, practice, and study for the investigator to remain proficient. A thorough knowledge of materials and techniques is a must for today's crime-scene technician or detective. Just as the variety of situations we face differ vastly from one scene to the next, so should our selection of tools and materials.

AccuTrans Transparent provides today's crime-scene technician with state-of-the-art technology that is one

of the best solutions to the problems associated with print recovery from challenging surfaces.

We now have the opportunity to add an effective new tool to our laboratory and field kits. A wide range of options allows us the very best opportunity to discover, secure, and recover the best evidence possible. This is our primary responsibility as crime-scene investigators and helps ensure that evidence in criminal investigations excludes the innocent and identifies the perpetrator. And that should always be our goal in our part of the investigation. (O)

#### About the Author

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To learn more about AccuTrans, you can go to the Ultrionics website:

[www.ultronicsusa.com/forensics.htm](http://www.ultronicsusa.com/forensics.htm)

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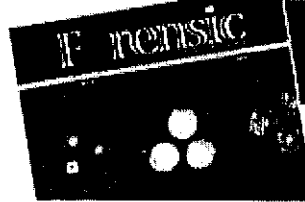


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**Casting materials are not just for bite and tool mark impressions, but can be used to obtain fingerprint evidence on rough surfaces, human skin, blood prints, and other types of evidence.**

Ask any evidence technician or crime scene detective, "What is the best way to collect or preserve bite and tool mark evidence?" The answer would most likely be: use a casting material. Casting materials are great for recording gouges, scrapes, and scratches in metals and some types of wood products.

Traditionally, firearm and tool mark examiners use casting materials to record the scratches and striations on recovered projectiles, firing pin marks on bullet casings, and tool mark impressions from tools used to break in or pry open doors and windows. Tools often have nicks from wear and tear that leave individual characteristics. There are various types of materials used to record impression marks, such as: AccuTrans Auto-Mix, a casting silicone applied by an extruder gun; Mikrosil, a self-mix putty with a catalyst applied by spatula; Liquid Silicone, mixed with several different agents used to release the rubber or thin the rubber; and DuroCast, a compound mixed with a catalyst (hardener) applied by spatula.

### **New Technology for an Old Problem**

As a Crime Scene Detective, I often look for new techniques that will aid me in the collection and preservation of crime scene evidence. When problems arise, old and new methods must be obtained or adapted to meet these problems. There are several common problems that crime scene evidence technicians and detectives encounter. One such problem is that of preserving fingerprint evidence on rough surfaces, human skin, blood prints, and curved surfaces.

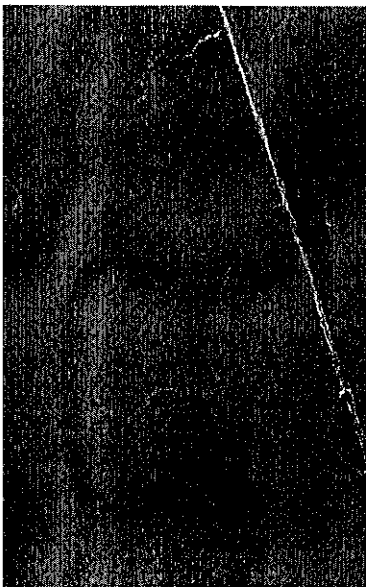
Photography is the current choice to record fingerprints on rough surfaces, human skin, blood prints, and curved surfaces; however, poor lighting conditions, type of surface, and a technician's knowledge of photography all play a crucial role in the quality and usefulness of the photos. Photographs should always be taken but other methods should also be used to preserve fingerprint evidence, especially when photographic means fail to record the image properly. This is the reason why I began to experiment with using casting materials for applications other than what they were intended.

Casting materials usually come in white or brown. Different colors give the evidence technicians a better choice of selecting a contrasting color when used with fingerprint powders. When casting materials are used to lift fingerprints, the technician lifts a reverse image of the print. This image must be reversed for comparison. Reversing the image is accomplished by photography. The image is photographed and the negative is simply reversed for printing. Technicians with access to an AFIS (Automated Fingerprint Identification System) simply scan the lift into the AFIS. The image can then be directly checked in the database.

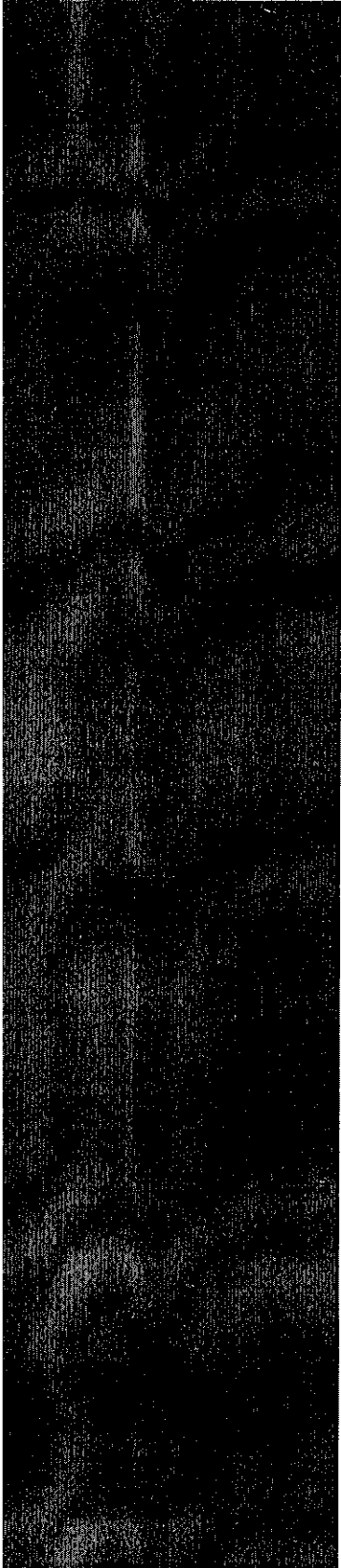
Rough surface prints do not lift with ordinary hinge lifters. The textured surfaces tend to break up ridge formations. Casting materials fill in the textured areas allowing the whole print to be lifted. I set out to determine if casting materials could be used for lifting prints from surfaces that are traditionally difficult.

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Current casting studies talk about lifting prints from uneven surfaces and tool marks. Few studies have been done involving the use of casting materials to recover latent fingerprints on other types of surfaces or evidence.

### **Choice of Casting Silicone**

For my experiments, I chose to use AccuTrans® Auto Mix from Ultronics, Inc., a casting silicone applied by extruder gun. The material, also used in the dental industry for making impression molds, is flexible and does not distort the image. Once the impression is lifted, it cannot be smeared or smudged; it is permanent on the lift. The extruder gun allows the material, and not the tip of the gun, to come in contact with the fingerprint, preserving the integrity of the print.

The silicone comes in both white and brown and is also available as a transparent material. This allows for instant comparison of the print without reversing the image. The transparent silicone allows the technician to place the lift on any color of background. This works well for photographic purposes. The silicone can be used on curved surfaces, horizontal, and vertical planes. When used on vertical planes, only a small amount of the silicone is needed. The material will smooth itself over the area. If too much of the material is applied, the silicone may run down past the fingerprint. To avoid this, the technician can simply place a piece of tape a few inches below the print. The tape will allow for the excess to gather in this area. This casting silicone can be used on rough surfaces, human skin, blood evidence, and curved surfaces.

It should be noted that before treatment with silicone, rough or grooved surfaces should first be dusted with magnetic fingerprint powders. Magnetic powders come in a variety of colors, which is beneficial for surface contrast and for photographic purposes. Magnetic powders contain ferromagnetic particles. The powder is applied using a magnetic applicator or wand. The powder sticks to the wand. The advantage here is that the applicator does not come into direct contact with the print, just the powder. Excess powder is easily removed by moving the applicator back over the print. Magnetic powders cannot be used on other ferrous surfaces.

### **Experiment 1: Rough Surfaces**

My first experiment was to place test prints on rough surfaces. Prints were placed on bricks and textured surfaces including the side of a computer monitor, textured wall, and leather handbag. The prints were then dusted with black magnetic powder. The prints could be viewed by the naked eye and could have been photographed. Both white and transparent casting silicones were then placed on top of the dusted prints. Once the silicone had hardened, the casts were removed from the four surfaces. The silicone lifts contained very good ridge detail; they were of comparison quality. One must remember that the prints lifted by the white silicone contain a reversed image and the transparent lift would not be a reversed image because the image can be viewed as it was on the surface. The transparent lift allowed me to do a direct comparison for minutia points. Figures 1-7 show my results.





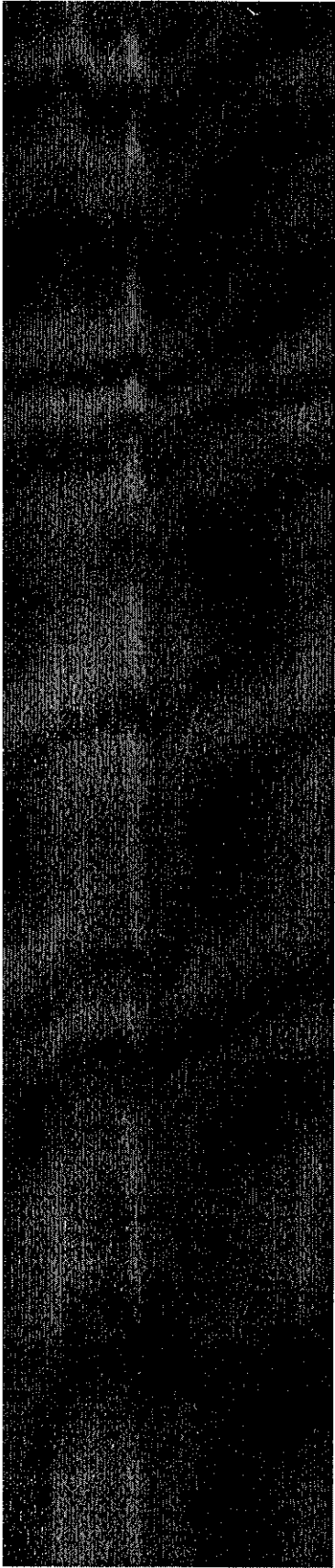


Figure 1 Print on Brick

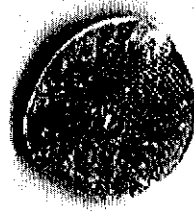


Figure 2 Transparent silicone lift from brick



Figure 3 White silicone lift from brick

Figure 4 Fingerprints on side of textured surface (computer)



Figure 5 White silicone lift from textured surface (computer)

Figure 6 Transparent silicone lift from textured surface (computer)

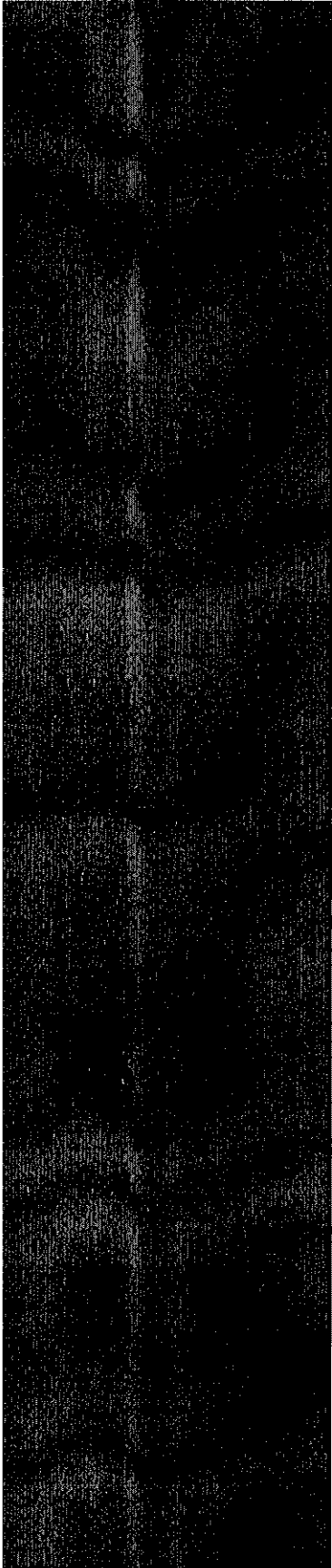


Figure 7 Transparent silicone lift from textured wall

### Experiment 2: Human Skin

Lifting fingerprints from human skin is one of the hardest tasks a crime scene technician can attempt. There are many factors that contribute to the rapid deterioration of the fingerprints on human skin. Heat, moisture, age of the fingerprint, condition of the skin, and environmental





**Figure 8 Fingerprint on human skin**

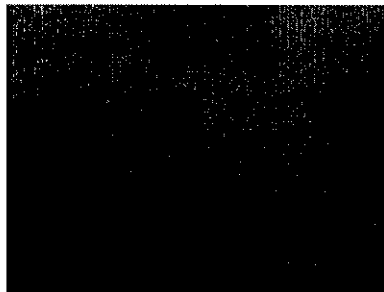
**Figure 9 Transparent silicone lift from human skin**

### **Experiment 3: Blood Prints**

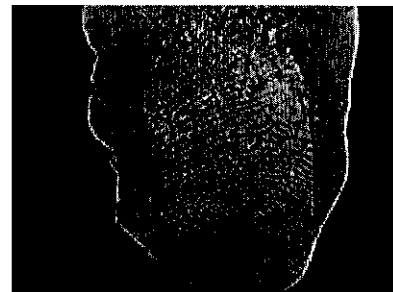
Bloody fingerprints are often found on crime scenes. Bloody fingerprints are traditionally treated with chemical properties to enhance them for photographic purposes. They cannot be lifted after treatment. The chemicals used are attracted to the proteins in blood or heme (hemoglobin molecules) of red blood cells. Benzidine was previously one of the most popular chemicals used to enhance prints; however, it was found to be extremely carcinogenic and is no longer used for the enhancement of bloody fingerprints. Other chemical applications used to enhance bloody fingerprints include Amino Black, which is sensitive to the proteins in blood.

Fresh blood prints that are easily seen are photographed for evidential value and comparison purposes. Again, the technician must rely on his or her photographic abilities and hope nothing goes wrong during the photo taking or the processing of the film. Technicians find blood prints on a variety of surfaces and items which often cannot be taken back to the laboratory for further analysis. Being able to lift a blood print would allow the technician to preserve the print for court purposes or take any additional photography after the technician has left the crime scene.

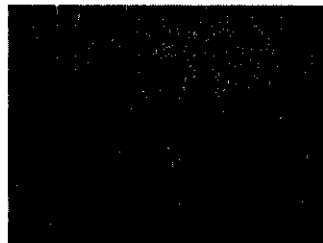
For my third experiment, I placed several bloody test prints on tile, painted walls, a plastic dispenser, and raw drywall. After the prints dried, they were dusted with black magnetic powder. The white and transparent casting silicone was then placed on top of the dusted blood prints. After the silicone had hardened, the lifts were removed. Both the white and transparent silicones were able to lift the prints from the tile, plastic dispenser, and painted wall. The raw drywall blood print could not be lifted. I speculate that this is due to the absorption of the blood into the raw drywall. The prints that were lifted were of comparison quality. It is also important to note that after the first lift was removed, a second dusting of magnetic powder was applied and then the silicone again. The second lift was of better quality than the first. This technique would allow the technician to preserve the print after photography. See Figures 10-12 for photos of my results.



**Figure 10 Blood print**

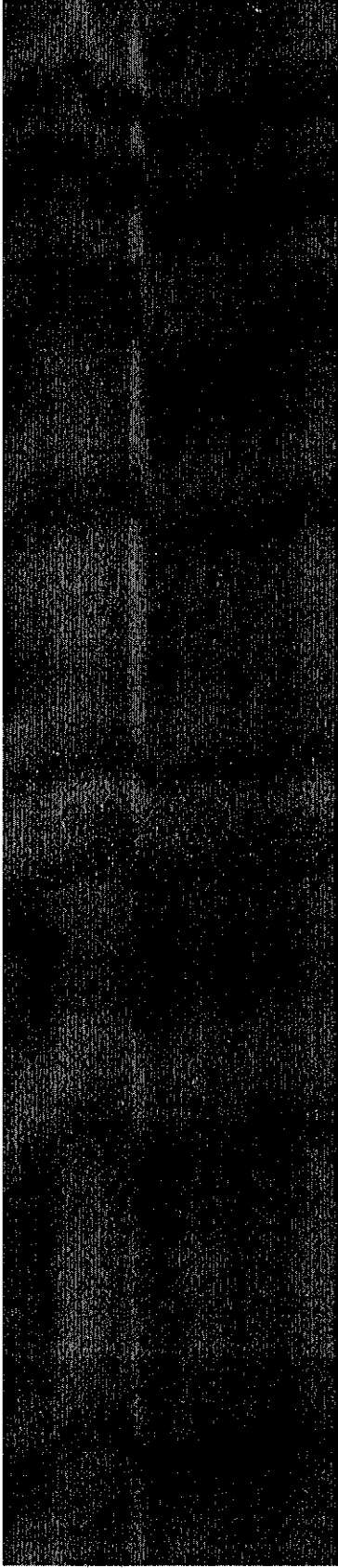


**Figure 11 White silicone blood print**



**Figure 12 Transparent silicone blood print lifted from plastic dispenser**





exposure all affect recovery. Most prints on human skin must be recovered within the first few hours of deposit. There are many chemical applications used to enhance fingerprints on human skin. Cyanoacrylate (superglue), fuming (then treated with a luminescent stain), iodine fuming, and ninhydrin are just a few of the chemicals used for enhancing fingerprints on dead bodies. The most common techniques for preserving prints off of "live" skin are the use of magnetic powders, lifting paper, and photography.

For my second experiment, I placed several test prints on my skin. I pressed several of my fingers into my forearm for about 20 to 30 seconds. Afterward, I dusted the area with black magnetic powder. The prints could be seen by the naked eye and were of photographic quality. I tried to lift the prints with conventional hinge lifters, but this did not produce a quality lift. I then covered the test prints with white and transparent AccuTrans casting silicone. After the silicone had hardened, the lifts were removed.

The ridge details on the transparent lifts were of comparison quality. The transparent silicone had better ridge detail than the white. The white casting silicone lifted the print too, but skin patterns could be seen on the print. The skin pattern interfered with the minutia points of comparison. This problem can be corrected by using a scanner program that allows the technician to remove the skin pattern by filtering them out. Once the area is filtered, the print can be seen.

The transparent casting silicone eliminates this process altogether. No skin patterns were seen in the transparent casting silicone. The transparent material allows for direct comparison of minutia points. This technique, which worked well for fresh prints, under two hours old, can be used on live and dead bodies. The main advantage of the casting silicone over lifting papers is that there is no fear of smearing the print. The silicone lift also preserves the print for additional examination at a later date.

Note that magnetic powder is not carcinogenic thus is safe to use on live persons. After dusting and lifting a print, the area dusted with magnetic powder should be washed with soap and water. Those persons who have skin rashes or skin allergies should not be dusted with the magnetic powder. Dusting them may cause additional irritations and redness.<sup>1</sup> The AccuTrans is also non-toxic. The material is made from Polyvinylsiloxane, a silicone elastomer. It has no harmful reactions or secondary effects.<sup>2</sup> It is advised to wash with water after handling the silicone and avoid contact with eyes.<sup>3</sup> This type of material was originally developed for use in dental procedures. Figures 8 and 9 show results of my experiments using human skin.

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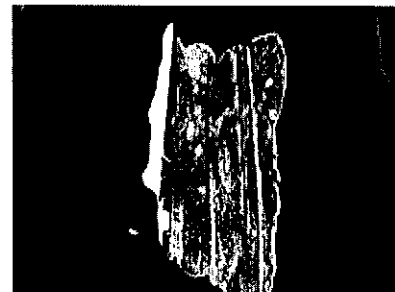
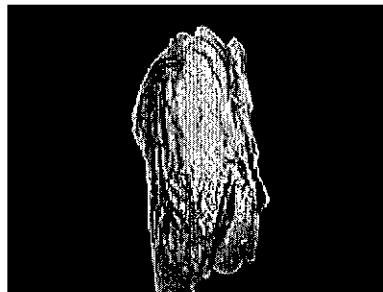




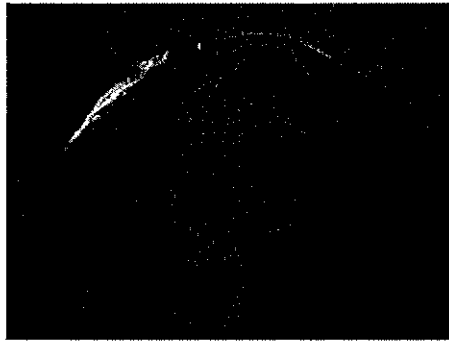
#### Experiment 4: Curved Surfaces

Fingerprints are often found on curved surfaces such as doorknobs, bottlenecks, cans, and glasses. Fingerprints developed on curved surfaces are usually lifted by gel-lifters or roll tape. Care must be taken to ensure that no air bubbles are trapped, which could lead to the distortion of the fingerprint. Most often, gel-lifters or tape must be cut to fit the curved surface. When ordinary hinge lifters are used on curved surfaces or tape that has not been cut properly to fit the area, creases often form because the tape or lifter tries to wrap around the curve surface. These creases interfere with the fingerprint. My experiments showed that casting silicone can be used to lift prints on curved surfaces.

Several test prints were placed on various curved surfaces for my fourth experiment. I placed prints on doorknobs, bottlenecks, and a gun magazine. The test prints were dusted with black magnetic fingerprint powder. The white and transparent casting silicone was then placed on the test prints. The white silicone lifted the prints on the gun magazine. The material molded itself around the magazine. The lifts were of comparison quality and the ridge detail was excellent. The transparent silicone was used on a beer bottleneck. The transparent silicone smoothed itself around the print. The detail and quality of the lift was excellent. The transparent silicone would lay flat after it was removed from the bottleneck. The white silicone from the gun magazine did not lie flat by itself. The white and transparent silicones are excellent sources for lifting fingerprints from curved surfaces. Figures 13-17 show my results.







**Figure 17 Transparent silicone lift from the neck of a beer bottle**

### **Conclusion**

In conclusion, all fingerprints must be photographed before any type of recovery is attempted. Photography, however, should not be the only means used to preserve fingerprints. Hard to lift prints, such as those on rough surfaces, human skin, blood, and curved surfaces can be accomplished by using magnetic powder and casting silicone. Silicone lifts provide a means to preserve fingerprints from some of the most difficult surfaces. Additionally, transparent silicone will allow the technician to lift the prints and perform a direct fingerprint comparison without having to reverse the image. The silicone lifts are permanent and will not smear or become smudged when touched. The use of silicone casting is faster and safer than most chemical applications. My experiments prove that casting silicone is not just for tool and impression marks, but fingerprints too!

### **References**

1. Lightning Powder Company, Inc., January 20, 2003, Material Data Safety Sheet
2. Coltene Whaledent, January 2004, Product Instruction for Use Sheet
3. Coltene Whaledent, December 2004, Safety Data Sheet

*Detective Mill Morris is a thirteen year veteran of the Akron, OH Police Department. She holds a Master of Evidence Technician certification from the Ohio State Police Training Academy. Detective Morris can be reached at [forensics@ultronicsusa.com](mailto:forensics@ultronicsusa.com)*

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