

Recover<sup>TM</sup> Latent Fingerprint Technology is a revolutionary new technique for the development of 'impossible' fingerprints. This is how it compares to VMD and Cyanoacrylate (superglue) fuming:

	RECOVER:LFT	VMD	Cyanoacrylate
<b>System Technology</b>			
Hardware Cost	\$\$	\$\$\$ - \$\$\$\$\$	\$
Running Cost	\$ - \$\$	\$\$\$\$	\$
Automated	✓	✗	✓
Preset Consumables	✓	✗	✗

Cyanoacrylate fuming is the most widely used technique for non-porous evidence. VMD is a powerful technique for a variety of surfaces, but less widely used due to the high cost of the vacuum chamber and the specialist expertise required to operate the system. RECOVER is a completely new fuming technique, offering many advantages over VMD on metal surfaces, at a significantly lower cost.

<b>Fingerprint Development</b>			
Effective <b>with</b> biological material	✓	✓	✓
Effective <b>without</b> biological material	✓	✗	✗

While VMD and Cyanoacrylate adhere to the biological materials (oils, salts, and amino acids) present in fingerprint residues, the RECOVER<sup>TM</sup> technique is also effective on metal items even after these biological residues have been removed.

<b>Common Surfaces</b>			
Metals	✓	✓	✓
Glass	✓	✓	✓
Plastics	✓	✓	✓
Fabrics/Materials	✗	✓	✗

Each of the techniques is suitable for a wide range of 'common' surfaces. Cyanoacrylate is widely utilised for the treatment of plastics (using VMD it is difficult to develop prints on heavily plasticized polymers such as clingfilm and plasticized vinyl). VMD is capable of revealing marks on some fabrics (primarily 'silky' synthetic polymers such as nylon).

<b>Typical Applications</b>			
Item that have been crushed/folded/warped	✓	✗	✗
Metals exposed to extreme heat	✓	✗	✗
Metals exposed to water	✓	✗	✗
Metals exposed to cleaning agents	✓	✗	✗

Because RECOVER<sup>TM</sup> vapour permeates all surfaces, it is possible to develop prints on crumpled or folded items. For example, a scrunched ball of aluminium foil may be treated without having to first be untangled and laid flat. Using VMD or Cyanoacrylate, prints are only developed on surfaces that are directly within the vapour flow.

Sweat and skin oils are eradicated under extreme conditions or maybe purposely wiped clean following a criminal act. However, as RECOVER<sup>TM</sup> does not require biological material to be present, fingerprints can still be revealed on surfaces including bullet casings and bomb fragments (heat), items discarded in fresh or salt water, and items that have been cleaned with chemicals including detergents or even concentrated bleach.

What is

## RECOVER:Latent Fingerprint Technology?

RECOVER:LFT is a unique chemical vapour enhancement technique capable of revealing fingerprints on a range of difficult surfaces including discharged bullet casings and items that have been washed 'clean' in an attempt to prevent identification.

The cutting-edge technology uses an innovative chemical to develop the fingerprint via a chemical reaction that takes place within a specialised evidence fuming chamber.

Predominantly used for the treatment of metallic items, RECOVER can develop fingermarks even when there is no trace of biological materials (oils, salts and amido acids etc.).



### Recover Fingermarks from Fired Ammunition Casings

The act of manually loading ammunition into a gun's chamber or magazine may leave fingermarks that can be recovered and identified. However, in the vast majority of cases, the extreme flash temperature and gaseous blowback that ammunition is exposed to when a gun is fired will burn away any biological residues, effectively removing the fingerprint.

Now, using the RECOVER technique, fingermarks may be visualised *even* after biological residues have been removed with in-house tests having demonstrated the technique to be highly effective at recovering marks from fired ammunition casings.



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### Success Rates Greater than 1:4

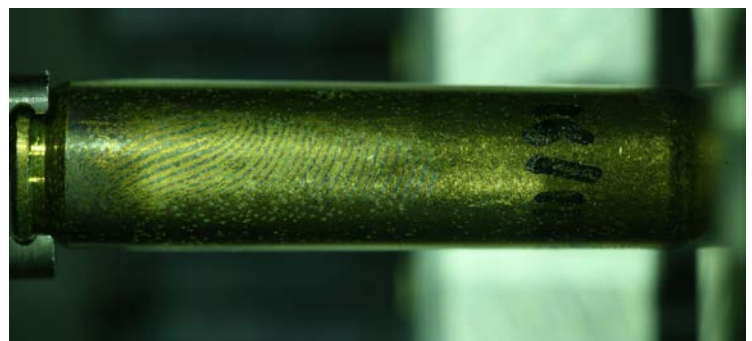
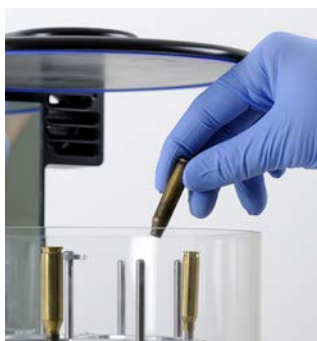
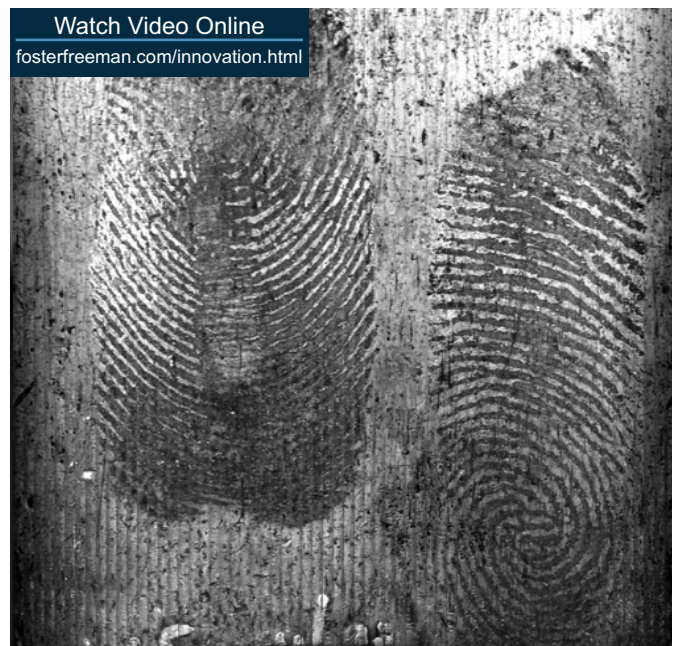
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When a fingermark remains *in situ* on a metal object for a period of time, the naturally corrosive effect of the fingermark residues creates minute changes in the metals surface energy. RECOVER exploits these minute changes to reveal fingermarks even after all physical trace has been removed.

Previously, fingerprint recovery from fired ammunition had a success rate of less than 1%, extensive testing of the RECOVER system, using a large selection of bullet calibres fired by a variety of firearms, has seen success rates greater than 1:4\*.

In testing, optimum results were achieved when marks were photographed under coaxial illumination using a Cylindrical Surface Unwrapper to create a 2-D image of the print.

\* Tests conducted in multiple locations on cartridges hand-loaded 30-minutes prior to firing.



After being treated in the RECOVER chamber, fingermarks are clearly visible to the naked eye. To obtain the best possible image, the fingermarks are then photographed and digitally unwrapped to create a 2-D image

### Recover Fingermarks from IED Fragments

Before its commercial release, RECOVER was deployed by the British military for the detection and visualisation of fingermarks on Improvised Explosive Device (IED) fragments.

In cases where an IED includes metal components (the device container or items of shrapnel, for example) RECOVER can be used to reveal fingermarks even after the device has been triggered. This may assist in the identification of the bomb maker or enable examiners to connect a single person with multiple devices.



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### High-quality identifiable marks

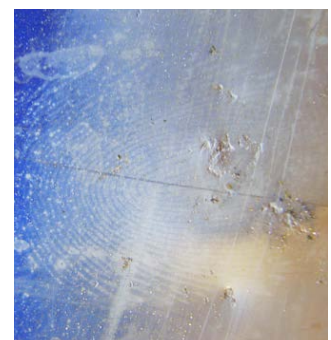
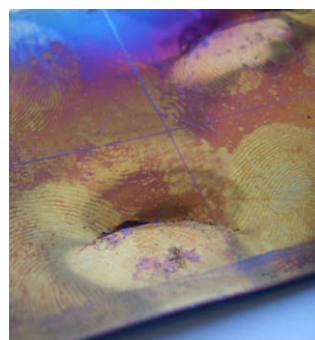
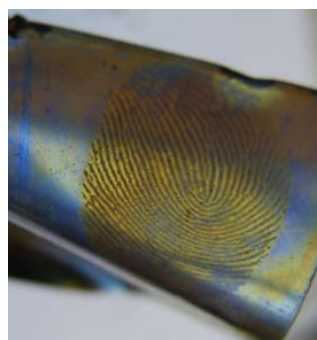
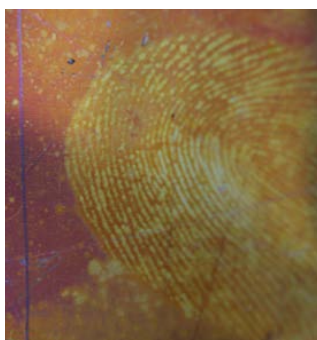
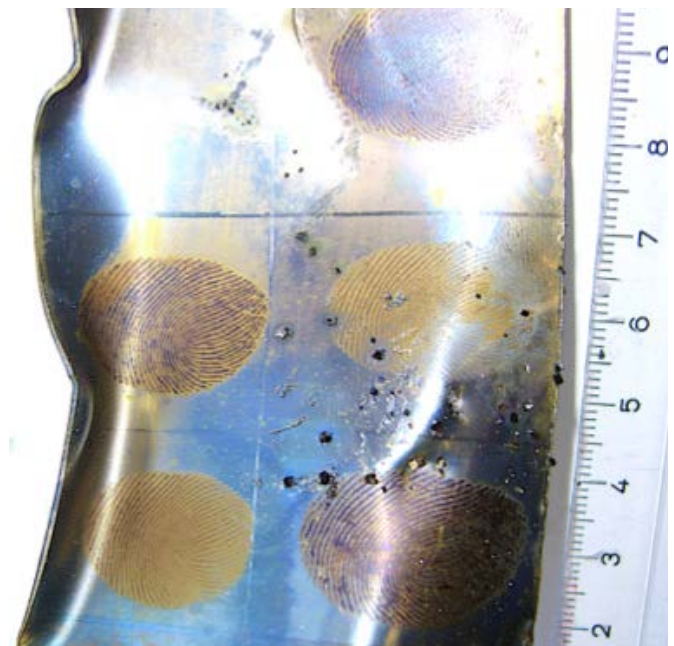
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Improvised Explosive Devices (IED), are commonly used by insurgent groups and have been responsible for a high number of coalition military casualties in recent years\*.

In most cases, an IED will consist of a trigger, detonator, explosive charge, and a power source. These components will then be packaged, together with additional shrapnel, within a container.

Tests conducted on simple IED's, loaded with varying charges and packaged within metal tins, proved that it was possible to recover extremely high-quality identifiable marks.

\* IEDs accounted for 63% of coalition deaths in the second Iraq war and have caused over 66% of coalition casualties in the 2001-present war in Afghanistan



Following detonation, small metal IED fragments were located and then treated using the RECOVER technique. Despite being directly exposed to the powerful explosive blast, a large number of marks were clearly visible.

### Recover Fingermarks from Items Recovered From Fresh/Salt Water

A criminal may attempt to cover their tracks by discarding potentially valuable items of evidence into a body of water, a river or canal, or perhaps the sea.

In the past, submersion in water, particularly corrosive salt water, would have eradicated any fingerprints that may have been left on an item. Now however, examiners using the RECOVER technique are able to visualise fingerprints even after they have been washed clean off of the surface of an item.



### Third-Level Pore and Ridge Details

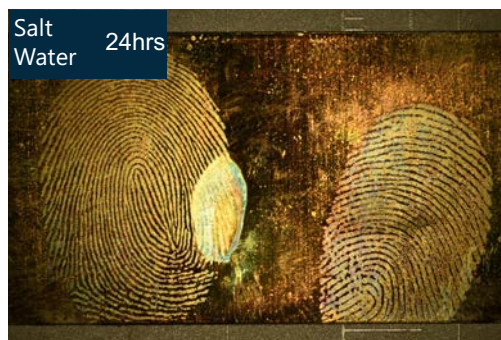
As RECOVER does not require biological material to be present in order for the technique to develop fingerprints on metals, the act of water 'washing away' a fingerprint has little effect on the high-quality results that can be achieved.

However, prior to testing, researchers were concerned that the corrosive effect of salt water may see the fingerprints deteriorate or perhaps be destroyed completely. In reality, the opposite occurred.

Tests revealed that the accelerated corrosive effect of salt water on metal caused the surface *around* the fingerprint to tarnish at a faster rate than the fingerprint itself. Following treatment with RECOVER this led to vivid inverse fingerprints being revealed complete with third-level pore and ridge details.



A stainless steel knife, seeded with fingerprints, was placed in a freshwater pond. 7-days later the knife was removed from the pond and treated in the RECOVER chamber - identifiable fingerprints were clearly visible



Brass and stainless steel plates were seeded with fingerprints and submerged in containers of fresh, chlorinated, and salt water. The plates remained for varying periods of time before being removed and treated using RECOVER. In all cases identifiable marks were developed. In the case of those plates submerged in the highly corrosive salt water the clarity of the fingerprint visibility actually increased over time as the rest of the plate tarnished.

### Recover Fingermarks from Items Purposely Washed Clean

Following a criminal act, it would not be uncommon for the perpetrator to attempt to avoid detection by washing clean items of evidential value. In the case of metal items such as knives or hand tools, for example, this may no longer be enough...

One of the reasons that the RECOVER technique has been described as being capable of revealing 'impossible fingerprints' is that it has the ability to develop marks on items that have been purposely washed clean.

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#### High-quality prints on a variety of surfaces

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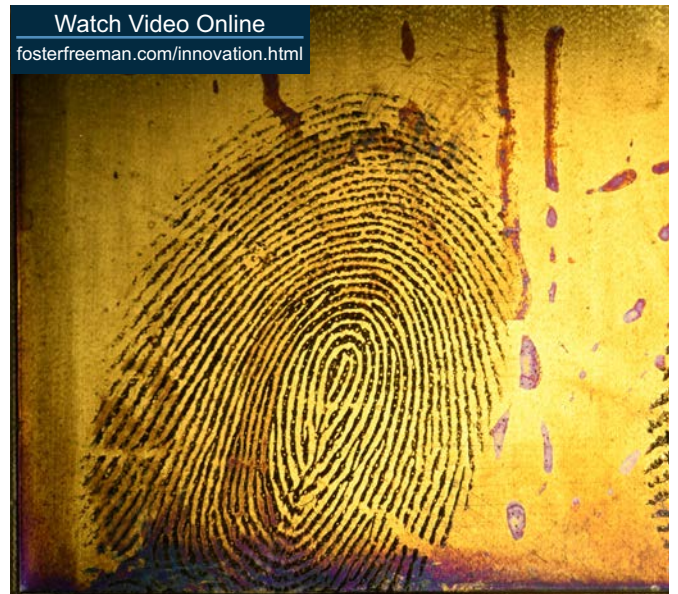
An ideal demonstration of the RECOVER technique, fingerprints can be placed onto a metal object and then, having been left in place for a short period of time, wiped clean.

In-house tests have proven the RECOVER technique to be effective at developing high-quality prints on a variety of surfaces that have been cleaned using a wide range of detergents and cleaning chemicals.

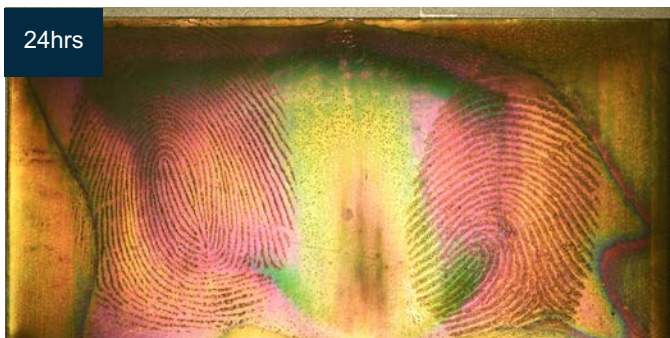
So powerful is the technique that even after an item has been washed clean with undiluted bleach and then left submerged in a container of that same bleach for 7-days, fingermarks of identifiable quality can be revealed.



Watch Video Online  
[fosterfreeman.com/innovation.html](http://fosterfreeman.com/innovation.html)



A brass plate seeded with fingermarks and washed with dilute bleach before being treated using the RECOVER technique.



In a recent in-house test fingerprints were placed onto brass and stainless steel plates before being washed clean and then left submerged in undiluted bleach. After development using the RECOVER process, the prints were clearly visible - even on plates that were left submerged in the cleaning chemical for a full 7-days.