VMD
FOR LATENT FINGERMARK DEVELOPMENT

FORENSIC TECHNOLOGY
West Technology is the world’s leading designer and manufacturer of Vacuum Metal Deposition systems.

Formed in 1993 as a specialist vacuum engineering company to provide custom made medium and high vacuum systems, the company rapidly developed its business and within a few years had established an unrivalled reputation for innovative design and manufacture of a broad range of custom vacuum systems.

The demand for these systems came from a wide range of industrial and academic customers, including many blue chip companies and world-leading universities.

In 1996, West Technology was invited by a leading establishment for forensic research and development to take a fresh look at the vacuum metal deposition (VMD) technique, in light of new process developments and an outdated range of aging VMD systems that could not meet the demands of the modern forensic laboratory. This led to the introduction in 1998 of our VMD900 system. This system quickly became the standard system throughout the UK and established West Technology in the forensic market.

Our continued commitment to improving our VMD systems, with the goal of making this powerful process more accessible to police forces and forensic laboratories around the world, has led to many product innovations, including the launch of the compact VMD560CX in 2009, and most recently, the introduction of the world’s first ever bench top VMD system – the VMD360.

West Technology also provides training, application support and runs its own research programme to develop new and innovative forensic processing techniques.

West Technology is committed to using our specialist knowledge of vacuum technology and our passion for vacuum engineering, to create new, exciting products for use by forensic providers.

West Technology is an ISO9001:2008 accredited company.
Vacuum Metal Deposition (VMD)

Vacuum Metal Deposition (VMD) is one of the most powerful latent fingerprint development techniques available to the modern forensic scientist. The VMD technique can be used to develop latent fingermarks on a wide range of non-porous and semi-porous exhibits.

The standard VMD technique employs the sequential vacuum deposition of a very thin layer of gold followed by a thin layer of zinc. However, in response to the innovations surrounding plastic materials, with the introduction of more recycled and biodegradable plastics, exciting new forensic research has led to the expansion of the technique to include single metal deposition processes e.g. silver, sterling silver, copper and aluminium and new multi-metal deposition processes e.g. gold/zinc/silver or silver/zinc.

VMD is the optimal technique for a wide range of non-porous and semi-porous exhibits, including flexible plastic packaging, plastic bottles, glass, fabrics, firearms, glossy paper, waxed paper, paper bank notes, polymer bank notes, wood etc.

Research and user experience has repeatedly demonstrated that VMD will develop significantly more (>15%) fingermarks than the cyanoacrylate fuming plus fluorescent dye technique.

Research and user experience has repeatedly demonstrated that VMD will develop significantly more (>15%) fingermarks than the cyanoacrylate fuming plus fluorescent dye technique and unlike the fuming technique, VMD does not ‘gum’ up the firing mechanism of firearms, allowing the development of latent marks before any ballistic testing.

In addition, fingermarks developed by VMD are of a much higher definition (often to 3rd level detail) and have better contrast than marks developed using the cyanoacrylate fuming plus fluorescent dye technique.

The VMD technique is very rapid (typically less than 15 minutes) and produces high quality images that can be photographed straight away. Additional to this, the standard technique is very stable, developing fingermarks that will not fade and can be imaged many days later.

Current research has already generated considerable interest in the ability of VMD to develop fingermarks and palm marks on tight weave fabrics and clothing, such as nylon, satin and polyester.

Current research has also shown that VMD can identify contact areas e.g. grab impressions on fabrics with a loose weave, with the possible application to aid targeted DNA swabbing/extraction. Furthermore, research has shown that VMD does not interfere with or affect DNA recovery.

VMD has also provided remarkable results on exhibits that have been submerged in water or buried underground and has developed latent fingermarks on recovered exhibits even if they have been submerged or buried for many years.

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1 Source: Research by RCMP Forensic Identification Support Section, Ottawa
2 Effect of Common Fingerprint Detection Techniques on Subsequent STR Profiling: Bhoelai, De Jong, De Puit, Sijen NFI, The Netherlands
Affordable and Compact

- The world’s first bench top sized VMD system
- Dimensions (900mm W x 600mm D x 700mm H)
- All the benefits of VMD but at a fraction of the cost of traditional VMD systems
- Generously sized vacuum chamber (360mm W x 360mm H x 300mm D)
- Low maintenance costs
- Low running costs – only atomic layers of gold, zinc or silver required in each process run

Flexible Operation

- Can process a range of exhibits from polymer bank notes to large plastic packaging sheets or fabrics up to 480mm x 285mm
- Adaptable work holder for processing bulky exhibits e.g. small firearms or bottles
- Can be used to evaporate other metals e.g. silver, for exhibits such as plastic food wrap (Cling Film/Saran Wrap) or thermal paper
- Can be used to target areas for DNA analysis
- Adjustable shelf height when using flat plate work holder

Innovative Design

- Simple installation – only electric power required (110/230V 50/60Hz)
- Supplied with flat plate and semi-cylindrical work holders
- Powerful vacuum system for fast process times
- Stylish, modern design
- LED lighting to provide excellent chamber illumination
- Secure remote connection for system diagnosis and upgrades

Easy to Use

- Full colour, touch sensitive 7" HMI control screen
- Intuitive menu driven control screens for ease of operation
- Magnetic work holders for simple, quick mounting of exhibits
- One button operation for automatic chamber pump down and vent
- Large chamber window for easy viewing of exhibits when processing

Facilities

<table>
<thead>
<tr>
<th>Electric Supply:</th>
<th>HV: 220-240V, 50Hz, 5A, 1ph</th>
<th>LV: 110-120V, 60Hz, 12A, 1ph</th>
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</thead>
<tbody>
<tr>
<td>Footprint (Floor Loading):</td>
<td>System: 900mm W x 600mm D (135Kg)</td>
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Key Features

- Large Viewing Window
  Large 355mm x 355mm chamber window for easy viewing of exhibits during deposition

- Easy to Use Controls
  Full colour, touch sensitive 7” control panel with intuitive, menu driven control screens

- Versatile Work Holders
  Supplied with flat plate and semi-cylindrical enamelled work holder. The work holders are magnetic for easy fixing of flat exhibits and have a series of pre-drilled holes for fixing of bulky exhibits

- Compact Footprint
  Bench top system with compact footprint 900mm W x 600mm D

- Powerful LED Lighting
  Two LED lighting strips for optimal chamber illumination

Affordable and Compact

- Affordable
- Easy to use
- Compact bench top system

Flexible Operation

- Can process a range of exhibits from polymer bank notes to large plastic packaging sheets or fabrics up to 480mm x 285mm
- Adaptable work holder for processing bulky exhibits e.g. small firearms or bottles
- Can be used to evaporate other metals e.g. silver, for exhibits such as plastic food wrap (Cling Film/Saran Wrap) or thermal paper
- Can be used to target areas for DNA analysis
- Adjustable shelf height when using flat plate work holder

Innovative Design

- Simple installation – only electric power required (110/230V 50/60Hz)
- Supplied with flat plate and semi-cylindrical work holders
- Powerful vacuum system for fast process times
- Stylish, modern design
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- Secure remote connection for system diagnosis and upgrades

Easy to Use

- Full colour, touch sensitive 7” HMI control screen
- Intuitive menu driven control screens for ease of operation
- Magnetic work holders for simple, quick mounting of exhibits
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High Performance
Large View Port
Self-contained System

Compact, Self-contained System
- Dimensions (1150mm W x 665mm D x 1850mm H)
- Fits through a standard laboratory door
- Large horizontal cylindrical vacuum chamber (496mm dia. x 610mm D)
- Powerful cryogenic high vacuum pump
- Low maintenance costs
- Low running costs – only atomic layers of gold, zinc or silver required in each process run

Flexible Operation
- Can process a range of exhibits from polymer bank notes to large plastic packaging sheets or fabrics up to 800mm x 560mm
- Adaptable work holder for processing bulky exhibits e.g. small firearms or bottles
- Can be used to evaporate other metals e.g. silver, for exhibits such as plastic food wrap (Cling Film/Saran Wrap) or thermal paper
- Can be used to target areas for DNA analysis
- Fully retractable work holder with locking positions at 45°, 90° and 180° for easy loading/unloading

Innovative Design
- Only electric power and cooling water required
- Supplied with fully retractable semi-cylindrical work holder
- Powerful vacuum system for fast process times
- Stylish, modern design
- LED lighting gives excellent chamber illumination
- Secure remote connection for system diagnosis and upgrades

Easy to Use
- Full colour, touch sensitive 7” HMI control screen
- Intuitive menu driven control screens for ease of operation
- Magnetic work holder for simple, quick mounting of exhibits
- One button operation for automatic chamber pump down and vent
- Large 400mm diameter chamber view port for easy viewing of exhibits and evaporation sources when processing

Facilities
- Electric Supply: HV: 230V, 50Hz, 40A, 1ph
  LV: 208V, 60Hz, 32A, 3ph
- Footprint (Floor Loading): System: 1150mm W x 665mm D (640Kg)
- Water Cooling: 3.0 – 5.7 l/min @ 25°C
- Water Chiller (Floor Loading): 377mm W x 592mm D (67Kg)

Versatile Work Holder
Supplied with fully retractable enamelled semi-cylindrical work holder. The work holders are magnetic for easy fixing of exhibits

Evaporation Control
Precise evaporation current control for accurate zinc layer deposition

Large View Port
Large 400mm diameter chamber view port for easy viewing of exhibits and evaporation sources during deposition

Easy to Use Controls
Full colour, touch sensitive 7” control panel with intuitive, menu driven control screens

Compact, Self-contained System
Dimensions 1150mm W x 665mm D x 1850mm H

Flexible Operation
Can process a range of exhibits from polymer bank notes to large plastic packaging sheets or fabrics up to 800mm x 560mm
Adaptable work holder for processing bulky exhibits e.g. small firearms or bottles
Can be used to evaporate other metals e.g. silver, for exhibits such as plastic food wrap (Cling Film/Saran Wrap) or thermal paper
Can be used to target areas for DNA analysis
Fully retractable work holder with locking positions at 45°, 90° and 180° for easy loading/unloading

Innovative Design
Only electric power and cooling water required
Supplied with fully retractable semi-cylindrical work holder
Powerful vacuum system for fast process times
Stylish, modern design
LED lighting gives excellent chamber illumination
Secure remote connection for system diagnosis and upgrades

Easy to Use
Full colour, touch sensitive 7” HMI control screen
Intuitive menu driven control screens for ease of operation
Magnetic work holder for simple, quick mounting of exhibits
One button operation for automatic chamber pump down and vent
Large 400mm diameter chamber view port for easy viewing of exhibits and evaporation sources when processing

Facilities
Electric Supply: HV: 230V, 50Hz, 40A, 1ph
LV: 208V, 60Hz, 32A, 3ph
Footprint (Floor Loading): System: 1150mm W x 665mm D (640Kg)
Water Cooling: 3.0 – 5.7 l/min @ 25°C
Water Chiller (Floor Loading): 377mm W x 592mm D (67Kg)
**Key Features**

- **Ultimate Performance**
- **Extra Large Chamber**
- **Self-contained System**

**Large Chamber System**
- Dimensions (1400mm W x 2059mm D x 1974mm H)
- Powerful, robust mechanical booster/rotary vane pump combination
- Large horizontal cylindrical vacuum chamber (770mm dia. x 1260mm D)
- Powerful cryogenic high vacuum pump
- Low maintenance costs
- Low running costs – only atomic layers of gold, zinc or silver required in each process run

**Flexible Operation**
- Can process a range of exhibits from hunting rifles to large plastic packaging sheets or fabrics up to 1214mm x 1200mm
- Adaptable work holder for processing bulky exhibits e.g. firearms or baseball bats
- Can be used to evaporate other metals e.g. silver, for exhibits such as plastic food wrap (Cling Film/Saran Wrap) or thermal paper
- Can be used to target areas for DNA analysis
- Fully retractable work holder with locking positions at 45°, 90° and 180° for easy loading/unloading

**Innovative Design**
- Only electric power and cooling water required
- Supplied with fully retractable unique split work holder
- Powerful vacuum system for fast process times
- Unique busbar arrangement
- LED lighting gives excellent chamber illumination
- Secure remote connection for system diagnosis and upgrades

**Easy to Use**
- Full colour, touch sensitive 10.4” HMI control screen
- Intuitive menu driven control screens for ease of operation
- Magnetic work holder for simple, quick mounting of exhibits
- One button operation for automatic chamber pump down and vent
- Large 400mm dia. chamber view port for easy viewing of exhibits and evaporation sources when processing

**Facilities**
- **Electric Supply:**  
  - HV: 415V, 50Hz, 32A, 3ph  
  - LV: 208V, 60Hz, 63A, 3ph
- **Water Cooling:**  
  - Flow 5.7 - 15.0 l/min @ 25°C
- **Footprint (Floor Loading):**  
  - System: 1400mm W x 2059mm D (1,400Kg)
- **Water Chiller:**  
  - 377mm W x 592mm D (73Kg)

**Removable Liners**
Set of stainless steel removable liners to protect chamber walls from build up of zinc deposits

**Versatile Evaporation Sources**
- 4 evaporation busbars to provide three sequential evaporations e.g. gold, zinc then silver

**Self-contained System**
- The rotary pump, high vacuum pump and compressors are concealed inside the system, helping to reduce noise

**Evaporation Control**
- Precise evaporation current control for accurate zinc layer deposition