



## Scientific Development Branch

**Investigation, Enforcement and  
Protection Sector**

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### **Additional Fingerprint Development Techniques for Adhesive Tapes**

#### **Abstract**

HOSDB has developed three new techniques for developing fingerprints on adhesive surfaces:

Black Powder Suspension (BPS)

White Powder Suspension (WPS)

Basic Violet 3 (BV3)

Basic Violet 3 is formulated without the use of phenol and is therefore safer to use than Gentian Violet, which has been recommended to date.

In laboratory trials they have proved to have similar effectiveness to the techniques currently recommended if used appropriately.

#### **Introduction**

There are many factors that affect the quality of developed fingerprints on any surface: the type of surface, the donor of the print, the age of the print and the amount of fingerprint material and contamination on the finger at the time of donation. The adhesive sides of tapes present additional variables, such as the chemical nature of the adhesive coating and backing layer. Also the tape may be stuck to different types of surface. Operationally, decisions will have to be made regarding tape removal methods, which sequential treatments will be used on the different sides of the tape

and whether additional types of forensic evidence need to be gathered.

For these reasons it must be accepted that no one technique will be the most effective in all cases.



*Variety of tapes to be found on the market*

During the HOSDB studies, a diverse range of possible methods was evaluated initially. Those methods demonstrating best performance were then tested in extensive laboratory and subsequent operational trials.

The studies included the effect of the age of fingerprints, different ageing conditions and the effect of different tape removal techniques on subsequent fingerprint development with each of the selected methods.

Except in the case of masking tapes, we currently have insufficient knowledge to be able to update the sequential treatment chart (Chart 7 in the Manual of Fingerprint Development Techniques). HOSDB is hoping to include further studies in its programme of work, after which revised advice on the treatment of adhesive surfaces will be issued.

#### **Adhesive Tape Removal**

Adhesive tapes, labels and films may be removed from surfaces in any of four ways: physical means, cooling, use of solvents and heating. The latter is not generally suitable as tapes and labels may easily be damaged by the use of excessive heat.

It is preferable to remove adhesive surfaces from surfaces by physical means, i.e. by pulling or prising off, as this is likely to cause least damage to fingerprints on either side of the tape or label. However, care must be taken to ensure distortion of the tape is kept to a minimum.

Cooling of most types of adhesives used on tapes below a critical 'glass transition temperature' results in solidification of the

adhesive. This may enable it to be 'fractured' from surfaces to which it is adhering. In the past it had been advocated that exhibits should be placed in freezers and we have had operational successes using a liquid nitrogen cooled plate. An easier alternative method is the use of freezer sprays (Appendix 1). We have used them successfully for the removal of adhesive tapes from problematic surfaces such as thin plastic bags and bubble wrap.

Freezer spray is generally as effective as liquid nitrogen but is easier to use, is safer and can be applied to small areas. It is essential to localise the application and freeze a small section of tape at a time, gradually peeling it off. Goggles and strong impervious gloves must be used and care taken not to expose the skin to the intense cold produced.



*Removal of tape from a polythene bag with freezer spray*

This technique has extremely limited success, however, in removing adhesive surfaces from paper and card and will not separate adhesive from adhesive.

Another precaution needs to be taken if fingerprints are to be developed on the non-adhesive side of the tape using Superglue. Ideally, this treatment must be done before the tape is removed as fingerprints on this side of the tape will be destroyed by condensation generated during the cooling process. Fingerprints on the adhesive side will be protected and can be developed successfully with Superglue after the tape has been removed.

The use of solvents to remove adhesive surfaces should generally be discouraged as the solvents used to dissolve the adhesive can readily damage fingerprints. However, this may be the only suitable method for removing tapes and labels from paper and card and separating adhesive from adhesive. Extreme

care and minimum quantities of solvent should be used.

### **Packaging of Adhesive Tapes**

Adhesive tape removed from surfaces may be placed onto silicon release paper (Appendix 1) which has a smooth, low adhesion surface to protect the adhesive coating during storage, transportation or processing of the non-adhesive surface. The tape may then be easily removed prior to treatment with other techniques on the adhesive side.



*Placing tape on silicon release paper*

However, precautions must be taken to ensure that there are no fingerprints on the paper that could be transferred to the adhesive surface. If other forensic evidence is required it is important also to ensure that the silicon release paper does not contaminate the surface by transferring materials such as dust, fibres or hair.

### **Application of techniques to adhesive tapes**

It is desirable to develop a single effective technique for all types of adhesive tape. However, this is not possible because of the wide variation in the performance of fingerprint techniques on different types of adhesive. This variation is so extreme that the most effective technique on one type of adhesive may be totally ineffective on another. For the purposes of fingerprint development, adhesive tapes have been categorised in two types: those with either

rubber-based adhesives

acrylic-based adhesives

since the type of adhesive present has the greatest effect on the choice of development technique.

Ideally adhesive tapes should be spot tested with powder suspension (Appendix 2) before treatment to determine whether the adhesive

is rubber or acrylic based and hence the most appropriate development process.

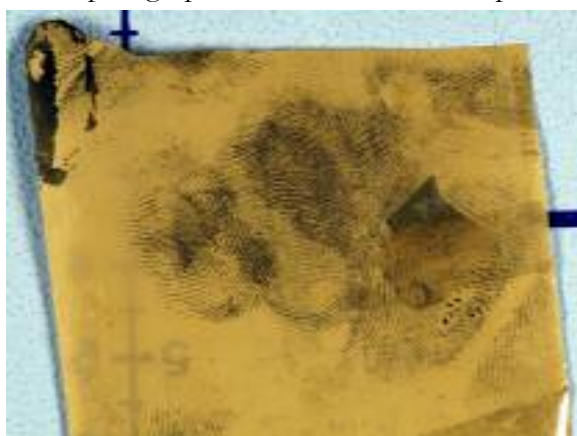
Masking tapes, which may have either rubber or acrylic based adhesives, must be considered separately since their porosity forces a change in fingerprint development processes used.

Fabric tapes also exist but these present the same difficulties regarding fingerprint development as non-adhesive fabrics and have not been included in these studies.

### **Rubber-Based Adhesives**

The majority of tapes fall into this category and come in different sizes and colours. Fingerprint techniques generally perform well on this type of tape, generating little background coloration with dyes or powder suspensions.

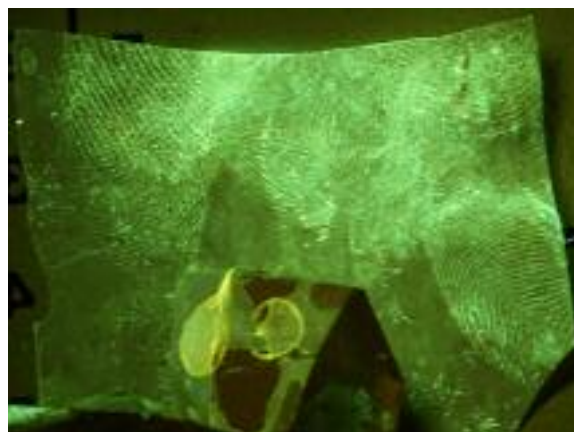
The adhesive side of tapes may be treated with either of the powder suspensions recommended in Appendix 2 (the choice depending on the colour of the tape), or superglued and dyed with basic yellow 40. It must be borne in mind that superglue will develop fingerprints on both sides of tapes.



*Packing tape after treatment with Black Powder Suspension*



*Black tape after treatment with White Powder Suspension*



*Packing tape after treatment with Superglue and Basic Yellow 40*

### **Acrylic-Based Adhesives**

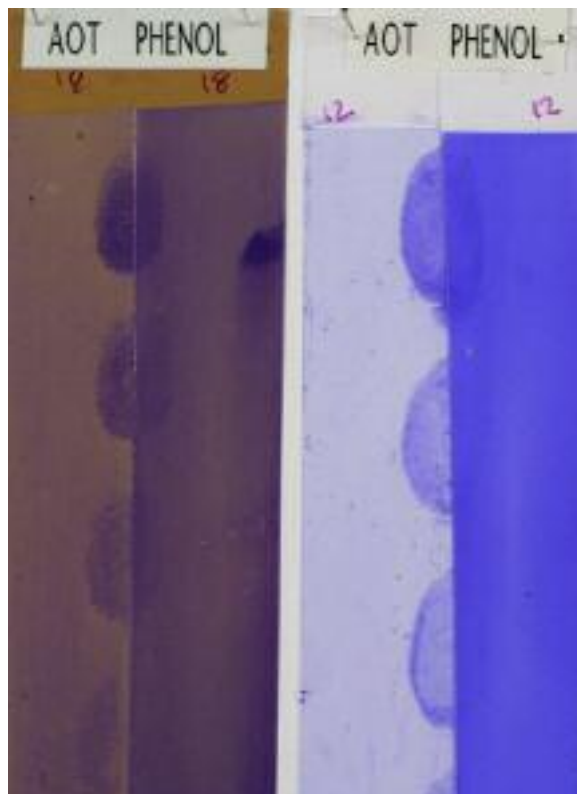
A small minority of tapes fall into this category and are almost indistinguishable visually from those with rubber-based adhesives. They can be most easily distinguished by heavy staining with powder suspensions (see spot testing: Appendix 2) or by infrared spectroscopy. The higher background coloration on this type of adhesive with basic yellow 40 dyed superglue and powder suspensions removes any useful contrast between the fingerprint and the background.



*Black powder suspension used on brown packing tape with rubber-based adhesive (left) and acrylic-based adhesive (right)*

Tapes with adhesives of this type must be treated with basic violet 3, a non-phenolic formulation of gentian violet (Appendix 3). While background staining may be higher with basic violet 3 on acrylic adhesives than on rubber-based adhesives, there is usually enough contrast to distinguish between fingerprint and background.





*Basic violet 3 (left) and gentian violet (right) on acrylic-based adhesive*

### **Masking Tapes**

This term is used to cover all porous and semi-porous tapes, the majority being white or cream coloured paper tapes designed for use when painting and decorating.

As already stated, masking tapes present a more difficult challenge for the development of fingerprints and in general all of the techniques perform less well on masking tape than they do on most other types of tape.

The recommendations presented here for the development of fingerprints on masking tape supersede those in *The Manual of Fingerprint Development Techniques*, 1998.

On the non-adhesive side of masking tapes the most effective technique is vacuum metal deposition (VMD).

If VMD is not available, it is possible to use superglue followed by black powder or black magnetic powder although the effectiveness is significantly less than that achieved with VMD.

The adhesive side of tape should be spot tested with powder suspension (Appendix 2) to determine the type of adhesive. If rubber-based, the adhesive should be treated with black powder suspension. However as superglue is known to adversely affect the performance of subsequent black powder suspension, then it is recommended that if the non-adhesive side is treated with superglue the adhesive side should be protected by placing it on silicon release paper (Appendix 1). If the adhesive is shown to be acrylic-based then this should be treated with physical developer.

### **Acknowledgements**

We would like to thank Avon & Somerset, Surrey, Thames Valley and West Yorkshire police forces for their invaluable contribution to the operational trial of the new techniques reported in this newsletter.

## **APPENDIX 1**

### **Useful Information**

Freezer Spray is available from RS Components Ltd. Tel: 01536 201 201. Cat No 846-682.

Iron (II/III) oxide may be purchased from Fisher Scientific. Product No I/1100/53.

Photoflo is available from general photographic suppliers or Keyphoto Tel: 01727 860 400

Silicon release paper is available from Bartec Paper & Packaging Ltd. Tel: 01606 354664. Double sided silicon release paper 100gsm.

The effectiveness of the titanium dioxide is dependent on the surface coatings and being in finely divided rutile form. The most effective of those tested is no longer being manufactured but a small quantity will be supplied to forces, pending further investigation to find a suitable replacement.

## APPENDIX 2

### POWDER SUSPENSION

process name

#### Black and White

BLACK POWDER SUSPENSION, WHITE POWDER SUSPENSION

alternative process name

BPS, WPS

abbreviated process name

Powder suspensions (black and white) are very effective for developing fingerprints on rubber-based adhesives. However, powder suspensions perform very badly on acrylic-based adhesives: the adhesive surface of the tape develops a very high background coloration and most fingerprint detail is obliterated. Since it is very difficult to recover fingerprint detail once this has happened, it can be avoided by spot-testing articles before treatment with either powder suspension.

#### MAY BE USED ON:

Adhesive surfaces of tapes, labels and decorative and protective films, provided the adhesive is rubber-based.

It is not as effective as SUPERGLUE on the non-adhesive side of tapes.

#### NOT SUITABLE FOR USE ON:

Acrylic-based adhesives and porous surfaces such as paper.

#### ADVANTAGES

An effective, simple, cheap process. Develops fingerprints which are not visible before treatment on adhesive surfaces.

#### DISADVANTAGES

Must not be used on acrylic-based adhesives. Only effective on adhesive side of tapes, labels and decorative and protective films. If used first may prevent other processes being used effectively.

#### CAN INTERFERE WITH FORENSIC EXAMINATION FOR:

Handwriting, ink, paper and indented impressions, body fluids including DNA profiling, fibres, hairs, paint and most other forensic examinations.

Can be used before DNA samples are taken, see INTERFERENCE BETWEEN FINGERPRINT AND FORENSIC EXAMINATIONS (*MoFDT Chapter 2 Page 21*).

#### SAFETY REQUIREMENTS

This process can be carried out with no known hazard to health provided that a few straightforward precautions are observed.

If technical advice contrary to these recommended safety procedures is given by other authorities please inform HOSDB.

#### Recommended safety procedures

Inform all staff preparing or using POWDER SUSPENSIONS of the hazards involved and safety precautions to be taken. Local management must ensure that facilities for the safe use of this process are provided. Safe systems of work relating to local facilities and staff must be produced, see SAFE SYSTEM OF WORK (*MoFDT, Chapter 2, Page 10*).

Wear a laboratory coat, non-porous gloves and eye protection when preparing or using POWDER SUSPENSIONS.

If any chemical or liquid is swallowed seek medical attention immediately. If any chemical is splashed into the eye wash it out with cold, running water and seek medical attention if soreness or other symptoms persist; any solid chemical on the skin should be brushed off whilst dry with a tissue or a cloth. Then wash the area thoroughly under cold, running water. If any chemical solution is spilt onto the skin wash the area thoroughly under cold, running water.

Open container of IRON (II/III) OXIDE or TITANIUM DIOXIDE and prepare solutions in a fume cupboard.

Examine articles which have been treated with a POWDER SUSPENSIONS in a well-ventilated area preferably on a down-draught bench.

Collect used POWDER SUSPENSIONS solution in an appropriate container for disposal by an authorised company.

Immediately wash deposits of POWDER SUSPENSIONS from the scene of crime and equipment.

Exhibits treated with POWDER SUSPENSIONS should be stored in a ventilated exhibit store. The packaging should be labelled with the name of the treatment and a warning not to open without wearing non-porous gloves.

Articles treated with POWDER SUSPENSIONS may be scrubbed with detergent and water and then returned to owner or discarded with ordinary waste.

### **Hazards associated with the chemicals used**

See CLASSIFICATION OF CHEMICAL HAZARD (*MoFDT, Chapter 2, Page 10*) for definition of these classifications. The safety recommendations above were drawn up after consideration of the following:

#### *CHIP CLASSIFICATION OF CHEMICALS*

None Classified.

#### *MANUFACTURERS AND SUPPLIERS SAFETY DATA SHEETS*

There are considerable differences in the data given by suppliers and the following may be presented in addition to the CHIP classification.

IRON (II/III) OXIDE is HARMFUL.

TITANIUM DIOXIDE is HARMFUL.

#### *ADDITIONAL HAZARD INFORMATION*

PHOTOFLO is an IRRITANT.

## PROCESS SUMMARY

### Introduction

BLACK POWDER SUSPENSION and WHITE POWDER SUSPENSION are wet processes. Articles are painted with a WORKING SUSPENSION and then washed with water; this takes about 1 minute. They are then left to dry at room temperature.

### Spot testing of articles with POWDER SUSPENSIONS

**STEP 1** Apply a small but clearly visible spot of BLACK or WHITE WORKING SUSPENSION to the tape using a toothpick, match, or the head of a pin.

Choose a section away from the ends that is less likely to have been handled.

**STEP 2** Immediately wash the spot of WORKING SUSPENSION from the tape using TAP WATER until the excess powder has been removed from the background.

Use as little TAP WATER as possible and keep the wetted area to a minimum as this may reduce the effectiveness of subsequent fingerprint development techniques.

**STEP 3** If a heavy amount of powder remains on the spot after washing, the tape is probably made with an acrylic-based adhesive and is only suitable for treatment with BASIC VIOLET 3 (Appendix 3). If the tape can be seen through any powder deposit left behind or no spot is visible, the tape is probably made with a rubber-based adhesive and it may be treated with POWDER SUSPENSIONS.

### Treatment of articles with POWDER SUSPENSIONS

Ensure photographs have been taken of fingerprints already visible before beginning treatment.

**STEP 1** Apply the WORKING SUSPENSION using a small, soft animal hair brush. The brush should be kept thoroughly wetted with WORKING SUSPENSION during treatment.

Unless evidentially unacceptable, tape should be cut into manageable lengths of about 25 centimetres. Random zigzag cuts will enable subsequent reconstruction of the original tape length. Some transparent cellulose-based tapes must not be wetted on their non- adhesive side as this can cause them to curl: they must be painted very carefully.

If the brush is allowed to dry out during treatment, brush marks may appear on the tape.

**STEP 2** Leave the WORKING SUSPENSION in place for a few seconds then wash the tape with TAP WATER until all excess powder is removed from the background.

If the working suspension is allowed to dry on the tape it can be difficult to wash off.

Transparent cellulose-based tapes prone to curling are best floated on the surface of a large dish of TAP WATER until excess powder has been removed from the tape.

**STEP 3** Allow tape to dry at room temperature.

**STEP 4** Photograph useful fingerprints.

### Retreatment

If the fingerprints developed are faint or of insufficient detail it may be beneficial to repeat the treatment with POWDER SUSPENSIONS starting at STEP 1 above.

## **PREPARATION OF SOLUTIONS**

### **Introduction**

The WORKING SUSPENSION is usually prepared by adding powder to a DETERGENT SOLUTION. POWDER SUSPENSIONS have been proposed with a variety of powders and detergents but the formulation which follows is recommended.

### **Preparation of BLACK POWDER WORKING SUSPENSION**

**STEP 1** Weigh out 20g of IRON (II/III) OXIDE. Pour into a clean, dry, 100ml plastic beaker.  
IRON (II/III) OXIDE must be precipitated  $\text{Fe}_3\text{O}_4$ . Other forms of IRON (II/III) OXIDE will not be as effective.

**STEP 2** Add 20ml of STOCK DETERGENT SOLUTION slowly whilst stirring with a soft animal hair brush. A BLACK POWDER WORKING SUSPENSION will be produced. Use within a few hours.

Ensure no lumps remain. The animal hair brush may be used to apply the WORKING SUSPENSION.

### **Preparation of WHITE POWDER WORKING SUSPENSION**

**STEP 1** Weigh out 10g of TITANIUM DIOXIDE. Pour into a clean, dry, 100ml plastic beaker.  
TITANIUM DIOXIDE must be finely divided rutile form. Other forms of TITANIUM DIOXIDE will not be as effective.

**STEP 2** Add 20ml of STOCK DETERGENT SOLUTION slowly whilst stirring with a soft animal hair brush. A WHITE POWDER WORKING SUSPENSION will be produced. Use within a few hours.

Ensure no lumps remain. The animal hair brush may be used to apply the WORKING SUSPENSION.

### **Preparation of STOCK DETERGENT SOLUTION**

**STEP 1** Measure 500ml of PHOTOFLO. Place in a clean, 2 litre glass beaker.

**STEP 2** Measure 500ml of DISTILLED WATER. Add to the PHOTOFLO, whilst stirring with a magnetic stirrer. Stir for 10 minutes. A colourless STOCK DETERGENT SOLUTION will be produced.

**STEP 3** Transfer STOCK DETERGENT SOLUTION into a clean, 1 litre, plastic bottle with a well fitting screw top and label (including the date).  
STOCK DETERGENT SOLUTION will keep indefinitely.



## APPENDIX 3

### BASIC VIOLET 3

AOT-BASED BASIC VIOLET 3

BV3, AOT-BV3

process name

alternative process name

abbreviated process name

Basic violet 3 is a dye which stains fatty constituents of sebaceous sweat producing an intense purple staining. It is effective for the development of latent fingerprints on acrylic-based adhesive tape and decorative or protective films. The reagent is easy to use but basic violet 3 is toxic.

#### MAY BE USED ON:

Acrylic-based adhesive surfaces of tapes, labels and decorative and protective films.

It is not as effective as SUPERGLUE on the reverse side of adhesive surfaces.

#### NOT SUITABLE FOR USE ON:

Non-adhesive surfaces and porous surfaces such as paper.

#### ADVANTAGES

The only process that develops fingerprints on acrylic-based adhesive surfaces. An effective, simple, cheap process. Develops fingerprints on adhesive surfaces which are not visible before treatment.

#### DISADVANTAGES

Only effective on adhesive side of tapes, labels and decorative and protective films. If used first may prevent other processes being used effectively.

#### CAN INTERFERE WITH FORENSIC EXAMINATION FOR:

Handwriting, ink, paper and indented impressions, body fluids including DNA profiling, fibres, hairs, paint and most other forensic examinations.

Can be used before DNA samples are taken, see INTERFERENCE BETWEEN FINGERPRINT AND FORENSIC EXAMINATIONS (*MoFDT, Chapter 2, Page 21*).

#### SAFETY REQUIREMENTS

This process can be carried out with no known hazard to health provided that a few straightforward precautions are observed.

If technical advice contrary to these recommended safety procedures is given by other authorities please inform HOSDB.

#### Recommended safety procedures

Inform all staff preparing or using BASIC VIOLET 3 of the hazards involved and safety precautions to be taken. Local management must ensure that facilities for the safe use of this process are provided. Safe systems of work relating to local facilities and staff must be produced, see SAFE SYSTEM OF WORK (*MoFDT, Chapter 2, Page 10*).

Wear a laboratory coat, non-porous gloves and eye protection when preparing or using BASIC VIOLET 3.

If any chemical or liquid is swallowed seek medical attention immediately. If any chemical is splashed into the eye wash it out with cold, running water and seek medical attention if soreness or other symptoms persist; any solid chemical on the skin should be brushed off whilst dry with a tissue or a cloth. Then wash the area thoroughly under cold, running water. If any chemical solution is spilt onto the skin wash the area thoroughly under cold, running water.

Open container of BASIC VIOLET 3 and prepare solutions in fume cupboard.

Examine articles which have been treated with a BASIC VIOLET 3 in a well-ventilated area preferably on a down-draught bench.

Collect used BASIC VIOLET 3 solutions in an appropriate container for disposal by an authorised company.

Immediately wash deposits of BASIC VIOLET 3 from the scene of crime and equipment.

Exhibits treated with BASIC VIOLET 3 should be stored in a ventilated exhibit store. The packaging should be labelled with the name of the treatment and a warning not to open without wearing non-porous gloves.

Articles treated with BASIC VIOLET 3 may be wiped or washed with soap and water and then safely returned to owner or discarded with ordinary waste.

### **Hazards associated with the chemicals used**

See CLASSIFICATION OF CHEMICAL HAZARD (*MoFDT, Chapter 2, Page 10*) for definition of these classifications. The safety recommendations above were drawn up after consideration of the following.

#### *CHIP CLASSIFICATION OF CHEMICALS*

ETHANOL is HIGHLY FLAMMABLE.

#### *MANUFACTURERS AND SUPPLIERS SAFETY DATA SHEETS*

There are considerable differences in the data given by suppliers and the following may be presented in addition to the CHIP classification.

AEROSOL OT is HARMFUL and an IRRITANT.

ETHANOL is HARMFUL.

BASIC VIOLET 3 (CI 42555) is TOXIC and IRRITANT. It is also a suspected CARCINOGEN, MUTAGEN and TOXIC FOR REPRODUCTION.

#### *ADDITIONAL HAZARD INFORMATION*

It is important to adhere to the personal protective equipment recommendations as some people may develop a skin reaction to AEROSOL OT solutions if the reagent is repeatedly splashed over the hands or if the hands are immersed in the solution without wearing gloves.

## PROCESS SUMMARY

### Introduction

Articles are treated with a WORKING SOLUTION and then washed in TAP WATER: fingerprints are stained a purple colour. Processing will take about five minutes then articles are allowed to dry at room temperature. Fresh WORKING SOLUTION must be prepared each time the process is used.

### Treatment of articles with BASIC VIOLET 3

Ensure photographs have been taken of fingerprints already visible before beginning treatment.

**STEP 1** Pour sufficient WORKING SOLUTION into a clean, dry, glass dish to treat article. The smallest practicable dish and volume of WORKING SOLUTION should be used.

Petri dishes are most convenient for treating adhesive tape. All glassware must be perfectly clean. Wipe with tissue wetted with ETHANOL then rinse with ETHANOL.

**STEP 2** Draw adhesive tapes slowly through the solution or across the surface 2 or 3 times.

If the solution has a gold film on the surface it should be discarded as this will yield a high background reducing the contrast of any fingerprints developed.

Unless evidentially unacceptable, tape should be cut into manageable lengths of about 25 centimetres. Random zigzag cuts enable subsequent reconstruction of the original tape length. Some transparent cellulose-based tapes must not be wetted on their non- adhesive side as this can cause them to curl: they must be floated on the surface of the solution.

**STEP 3** Look for signs of fingerprint development. If the background is clean and there is weak staining of a fingerprint it may be necessary to repeat STEP 2. Fingerprint development on black surfaces will normally not be visible. Go onto STEP 4

WORKING SOLUTION must be discarded after use.

**STEP 4** Rinse article under slowly running, cold TAP WATER until excess dye has been removed from the background.

Transparent cellulose based tapes prone to curling are best floated on the surface of a large dish of TAP WATER until excess dye has been removed from the background.

**STEP 5** Photograph useful fingerprints. Fingerprints on dark adhesive surfaces will generally be invisible therefore the TRANSFER PROCESS must be used (*see MoFDT, Chapter 4 GENTIAN VIOLET Process Instructions Section 10.2*).

Fingerprints on some coloured surfaces are difficult to see and the transfer process will often improve them.

Fluorescence examination may be used to reveal or enhance fingerprints developed with BASIC VIOLET 3.

Fingerprints which have been transferred by the adhesive surface from the object on which it was stuck are laterally reversed.

### Retreatment

Faint fingerprints may sometimes be improved by retreatment with BASIC VIOLET 3 starting at STEP 1 above.

## **PREPARATION OF SOLUTIONS**

### **Introduction**

BASIC VIOLET 3 uses a WORKING SOLUTION which is prepared by dilution of a CONCENTRATED SOLUTION.

### **Preparation of WORKING SOLUTION**

**STEP 1** Measure 1ml of CONCENTRATED SOLUTION in a clean syringe. Expel into a clean, dry, 100ml, glass beaker.

All glassware must be perfectly clean. Wipe with tissue wetted with ETHANOL then rinse with ETHANOL.

**STEP 2** Add 25mls of STOCK DETERGENT SOLUTION slowly whilst swirling beaker. A faint reddish-gold coloured film will form initially on the surface of the solution, but usually disappears. A purple WORKING SOLUTION will be produced.

The STOCK DETERGENT SOLUTION should be between 15 and 25°C. If an obvious gold film is present after the complete addition of STOCK DETERGENT SOLUTION, the WORKING SOLUTION should be discarded. The glassware should be cleaned again with ETHANOL and STEPS 1 and 2 repeated. The solution can be difficult to prepare. If a solution with a gold film is used it may give a high background coloration and obliterate weak fingerprint detail.

WORKING SOLUTION should be discarded after use.

### **Preparation of CONCENTRATED SOLUTION**

**STEP 1** Weigh out 5g of BASIC VIOLET 3. Place in a clean, dry, 250ml, glass beaker.

**STEP 2** Measure out 50ml of ETHANOL. Add to the BASIC VIOLET 3. Stir with a plastic stirring rod until BASIC VIOLET 3 has dissolved. A purple CONCENTRATED SOLUTION will be produced.

**STEP 3** Transfer CONCENTRATED SOLUTION to a clean, 100ml, plastic-coated, glass bottle with a well fitting, screw top and label (including the date).

CONCENTRATED SOLUTION will keep indefinitely.

### **Preparation of STOCK DETERGENT SOLUTION**

**STEP 1** Measure out 1 litre of DISTILLED WATER. Pour into a clean, 2 litre, glass beaker.

**STEP 2** Weigh out 10g of AEROSOL OT. Put the weighing boat containing this into DISTILLED WATER whilst stirring with magnetic stirrer. Stir for at least 12 hours. All of the AEROSOL OT should have dissolved. A colourless STOCK DETERGENT SOLUTION will be produced.

**STEP 3** Transfer STOCK DETERGENT SOLUTION into a clean, 1 litre, plastic bottle with a well fitting screw top and label (including the date).

STOCK DETERGENT SOLUTION will keep indefinitely.

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