Technical Procedure for Crystal Violet

1.0 Purpose - This procedure describes how to make the crystal violet solution and apply it to items of evidence.

2.0 Scope – This procedure applies to the adhesive side of tape and can be used to develop impressions on duct tape, masking tape, clear plastic tape, plastic surgical tape, reinforced packing tape, packing labels and black electrical tape.

3.0 Definitions

- **Alternate light source:** Any of the multiple forensic light sources readily available in the Digital/Latent Evidence Section including, but not limited to, the Crime Scope, Mini-Crime Scope, TracER Laser, and Ultra-Lite ALS.
- **RC Paper:** Positive photographic paper which has been processed chemically.

4.0 Equipment, Materials and Reagents

4.1 Equipment and Materials

- Protective gloves and apron/coat
- Face shield visor and/or safety goggles
- Dark shatter-proof container (one liter)
- Glass processing tray
- Camera/scanner
- Fume hood
- Forceps
- For black electrical tape, the following additional equipment will be required: iron, blotter paper, and resin coated (RC) paper

4.2 Reagents

- Crystal violet crystals (1 gram)

5.0 Distilled Water (1 Liter) Procedure

5.1 Mixing Procedure

5.1.1 Place one liter of distilled water in a dark chemical storage bottle and add one (1) gram of crystal violet.

5.1.2 Shake the container until all crystals have dissolved. Thoroughly shake the container prior to each use.

5.2 Application Procedure – The non-adhesive side of the tape must be processed prior to using Crystal Violet (the use of superglue and powder processes is acceptable). Forensic Scientists shall produce a self-made test print to be processed concurrently with items of evidence. (See Section Technical Procedure for Ensuring Quality Control.)

5.2.1 Duct, Scotch, Packaging Tape and Adhesive Side of Labels:

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5.2.1.1 Pour the dyeing solution into a glass processing tray.

5.2.1.2 Soak the tape or label in the dyeing solution for approximately one (1) to two (2) minutes to dye the impressions.

5.2.1.3 Rinse the item with tap water to remove the excess chemicals and allow the item to dry completely prior to proceeding.

5.2.2 Black Electrical Tape:

5.2.2.1 Repeat the above steps when processing this type of tape; however, the latent impressions will not be visible at this point.

5.2.2.2 Dampen the glossy or emulsion side of the RC paper and place the adhesive side of the tape against the glossy side of the RC paper.

5.2.2.3 Fold the remainder of the RC paper over the tape and cover with blotter paper.

5.2.2.4 Gently iron the blotter paper with a warm iron (do not use steam).

5.2.2.5 Remove the blotter paper, unfold, and remove the tape from the RC paper to view any developed latent impressions which have transferred to the RC paper.

5.2.3 Laser/Alternate Light Sources Examination:

5.2.3.1 An impression may be weak or may not appear during the above procedures and may be enhanced with the introduction of specialized light from a laser or an alternate light source.

5.2.3.2 This may be accomplished using any standard laser or light source, following the above procedures and viewing the item at various wavelengths until the impression fluoresces (See Laser/Alternate Light Sources).

5.2.3.3 Preserve the developed impressions through photography, according to the techniques in the Photographic Equipment/Procedures, and/or by electronically recording the impressions (See Image Processing). When photographing clear tapes, ensure that the adhesive side of the tape is facing the camera to record the correct position of the impression. A piece of paper may be placed behind the impression to improve the contrast of the image on clear or transparent tapes. With black electrical tapes, reverse from left to right to record in the correct position. When a laser or alternate light source is utilized, follow normal procedures to record the fluorescent images (See Image Processing and photographic equipment procedures)

5.3 Standards and Controls – N/A

5.4 Calibration - N/A

5.5 Sampling – N/A

5.6 Calculations – N/A

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5.7 Uncertainty of Measurement – N/A

6.0 Limitations - The process is most effective in developing latent impressions on adhesive surfaces as the dye involved in the chemical attaches to the dead skin cells and some sebaceous materials when the tape and/or adhesive surface comes in contact with the friction ridges. Subsequent dye staining processes and laser/alternate light source examinations may be used after crystal violet to develop additional impressions.

6.1 Crystal violet crystals and working solution have an indefinite shelf life.

6.2 The crystal violet crystals shall be stored in the original shipping container until needed.

6.3 The working solutions shall be stored in dark non-breakable plastic containers until needed.

7.0 Safety - Crystal violet is listed as a **carcinogen** in the National Toxicology Program. The Crystal Violet solutions have toxic properties and shall be handled with care. The solutions can be harmful if inhaled or ingested and shall be used in a fume hood when processing evidence or when mixing. Protective gloves, eye goggles and aprons/coats shall be worn as the staining solution will stain clothing and skin. Review the MSDS for detailed information.

8.0 References

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Lee, H.C. "Methods of Latent Print Development." *Proceedings of the International Forensic Symposium on Latent Prints.* (July 1987): 15 – 24.

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9.0 Records – N/A

10.0 Attachment – N/A

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Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original Document

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