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 Latent Evidence Section including, but not limited to, the CrimeScope, Mini-CrimeScope, and TracER Laser.
- **Resin Coated (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

5.0 Purified Water (1 Liter) Procedure

5.1 Mixing Procedure

5.1.1 Place 1 liter of purified water in a dark chemical storage bottle and add 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 cyanoacrylate ester and powder processes are acceptable).

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

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 1-2 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 Technical Procedure for TracER Laser and Technical Procedure for Crimescope).

5.2.3.3 Preserve the developed impressions through photography, according to the techniques in the Technical Procedure for Nikon Digital Camera, and/or by electronically recording the impressions (see Technical Procedure for 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 where the latent impression is transferred to RC paper, 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 Technical Procedure for Image Processing and Technical Procedure for Nikon Digital Camera).

5.3 Standards and Controls – Forensic Scientists shall produce a self-made test print to be processed concurrently with items of evidence.

5.4 Calibration - N/A

5.5 Sampling – N/A

5.6 Calculations – N/A

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 SDS for detailed information.

8.0 References

Hammond, J. *Cyanoacrylate Ester Fuming For the Development of Latent Prints.* Loctite Corporation, 1-24.

Kent, T. ed. *Manual of Fingerprint Development Techniques: A Guide to the Selection and Use of Processing for the Development of Latent Fingerprints.* Police Scientific Development Branch, London (July 1992).

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

Lennard, C.J. and P.A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints." *Proceedings of the International Forensic Symposium on Latent Prints,* (July 1987): 141-142.

Manual of Fingerprint Development Techniques. (January 1986): 2-8.

Manual of Fingerprint Development Techniques: A Guide to the Selection and Use of Processes for the Development of Latent Fingerprints. Scientific Research and Development Branch, London (1986).

Trozzi, T.A., R.L. Schwartz and M.L. Hollars. *Processing Guide for Developing Latent Prints.* **(**2000): 1-64.

US Department of Justice. *Chemical Formulas and Processing Guide for Developing Latent Prints.* FBI Laboratory Division, Latent Fingerprint Section (1994).

9.0 Records – N/A

10.0 Attachment – N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original Document
10/31/2013	2	Added issuing authority to header
08/29/2014	3	5.2 – Changed "superglue" to "cyanoacrylate ester"
03/30/2017	4	Header Update – Removed Digital reference.
01/19/2018	5	Updated issuing authority in header 5.2 & 5.3 – Moved requirement for test print to "Standards and Controls."
02/01/2019	6	Changed number and time references to be numerals only instead of spelled out throughout document Changed "distilled" to "purified" throughout document 3.0: spelled out "RC"; removed UltraLite ALS 4.2: removed chemical amount 5.2: corrected grammar 5.2.3.2, 5.2.3.3: corrected reference to technical procedure; added "where the latent impression is transferred to RC paper"