

Technical Procedure for the use of the Safefume Cyanoacrylate Fuming Chamber

1.0 Purpose – This procedure is a non-porous development procedure.

2.0 Scope – This procedure is a step in the processing of non-porous evidence that may contain impressions that require developing/enhancing.

2.1 The Safefume Cyanoacrylate Fuming Chamber polymerizes the latent impression using cyanoacrylate in a humidified environment. Numerous materials, including plastic bags, weapons, metals, and various other substrates, may be processed using the Safefume Cyanoacrylate Fuming Chamber. Cyanoacrylate shall be used as a preliminary process when using subsequent processing techniques. Fluorescent dye staining, in conjunction with Laser examinations, is dependent on the proper use of cyanoacrylate fuming techniques.

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 CrimeScope, Mini-CrimeScope, TracER Laser, and Ultra-Lite ALS.
- **Ambient Light:** Light that is readily available in the office environment (i.e., natural light or light that emanates from an office lighting source).
- **CE:** Cyanoacrylate ester, also known as super glue.
- **Safefume Cyanoacrylate Fuming Chamber:** A cyanoacrylate ester fuming unit used in the processing of non-porous items of evidence with the assistance of cyanoacrylate ester in a humidified environment.

4.0 Equipment, Materials and Reagents

4.1 Equipment and Materials

- Safefume Cyanoacrylate Fuming Chamber

4.2 Reagents

- Cyanoacrylate ester (Bottle/Vial)

5.0 Procedure

- 5.1** Items to be processed in the Safefume Cyanoacrylate Fuming Chamber shall first be examined visually in ambient lighting conditions and then with the use of an alternate light source (CS, MCS).
- 5.2** 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).
- 5.3** Turn power on. The menu screens are designed to prompt the actions to be taken to complete a full fuming cycle. Screen is touch operated. Do not tap on the screen with any object that could cause damage. Once running, the unit will prompt the user for each activity. The user shall employ the default setting of 80 % relative humidity for 15 minutes.

Note: Use a stylus or fingertip on touch screen. Do not use metal objects.

- 5.4** Check water level in the humidifier. Using distilled water, ensure that the water level is at or near the fill line. The tank can hold up to one (1) gallon. Filling may be done by removing the top of the humidifier unit or by pouring water through the fill channel.

Note: Ensure that the unit is powered off prior to filling humidifier and ensure all water spills are cleaned prior to unit operation.

- 5.5** Place five (5) to ten (10) drops of cyanoacrylate (super glue) in a foil dish and place the dish on the hot plate (Do not place cyanoacrylate directly on hot plate).

- 5.6** Close and seal the door using the installed clamps.

- 5.7** Set cycle fuming run time. A test print shall be used.

- 5.8** Set desired humidity level. Unit will maintain this level within +/- 5 % variance.

- 5.9** At any time, the purge cycle can be pressed to evacuate the chamber; otherwise, at the end of the fuming cycle, the chamber will automatically purge itself.

Note: NEVER ATTEMPT TO OPEN THE DOOR WITHOUT FIRST RUNNING THE PURGING CYCLE. The purge cycle takes five (5) minutes to complete.

- 5.10** When complete, the words "Cycle Complete" will flash and an alarm will sound until the doors are opened. It is now safe to open the unit door and remove the processed items. DO NOT TOUCH THE HOT PLATE.

Note: In order to properly reset the humidity sensor within the chamber, do not turn off the unit prior to opening the door.

- 5.11** Remove item(s) and allow to rest for twenty-four (24) hours.

Note: The additional twenty-four (24) hour rest allows for full setting of cyanoacrylate.

- 5.12** Examine item(s) for developed latent prints using subsequent processing techniques.

- 5.13** Any developed latent prints shall then be preserved using the method described in the Steps for Preserving Developed Impressions.

- 5.14 Standards and Controls - N/A**

- 5.15 Calibration** – See Safefume Cyanoacrylate Fuming Chamber operating manual for further information on controls and specifications.

- 5.16 Sampling** –N/A

- 5.17 Calculations** – N/A

5.18 Uncertainty of Measurement - N/A

6.0 Limitations – Safefume Cyanoacrylate Fuming Chamber is for use in the processing of non-porous evidence.

- 6.1** The cyanoacrylate fuming process is vital to any subsequent treatment with fluorescent dyes and laser and/or alternate light source examinations (see Fluorescent Dyes and Laser/Alternate Light Sources).
- 6.2** The fuming cycle will not start unless the door is closed and until the chamber humidity reaches the set point. At this time harmful vapors are in the chamber. Do not attempt to open the chamber door until purge cycle is complete.
- 6.3** Refer to the operating manual for further information on controls and specifications.

7.0 Safety – Proper purging of the system is necessary as the fumes may cause some irritation when in contact with the eyes or skin and may be harmful if inhaled or ingested. Protective goggles, gloves and apron/lab coat shall be worn during processing. Additionally, cyanoacrylate ester is an adhesive/glue. Care shall be taken to avoid application to unintended surfaces.

8.0 References

- Besonen, J.A. "Heat Acceleration of the Superglue Fuming Method for Development of Latent Fingerprints." *Identification News*. (1983): 3-4.
- Bessman, C.W., et al. "A Comparison of Cyanoacrylate Fuming in a Vacuum Cabinet to a Humidity Fuming Chamber." *Journal of Forensic Identification*. Vol. 55, 1: 10-35 (2005).
- Cummings, H., M. Hollars and T. Trozzi. "Getting the Most from Cyanoacrylate Dyes." *Journal of Forensic Identification*. Vol. 43, 1: 37-43 (1993).
- Day, K.J. and W. Bowker. "Enhancement of Cyanoacrylate Developed Latent Prints Using Nile Red." *Journal of Forensic Identification*. Vol. 46, 2: 183-187 (1996).
- Deobald, G.W. "The Effect of Cyanoacrylate Fuming on Firearms Examinations." *Identification Canada*. (1992): 4-13.
- Fallano, J.F. "Alternatives to Alternate Light Sources: How to Achieve a Greater Print Yield with Cyanoacrylate Fuming." *Journal of Forensic Identification*. Vol. 42, 2: 91-95 (1992).
- Fertgus, R.E. *Latent Print Destruction and Superglue Stabilization*. Florida Division of the International Association for Identification. (1993): 7.
- Froude Jr., J.H. "The Super Glue Fuming Wand: A Preliminary Evaluation." *Journal of Forensic Identification*. Vol. 46, 1: 19-31 (1996).
- Howorka, H., and K. Kretschmer. "Experimental Study of Using Cyanoacrylate Ester Vapor for Developing Latent Fingerprints." *Forensic Science International*. Vol. 46: 31-32 (1990).
- Kendall, F.G. and B.W. Rehn. "Rapid Method of Super Glue Fuming for the Development of Latent Fingerprints." *Identification News*. (June 1982): 3-4.

Kendall, F.G. "Superglue Fuming for the Development of Latent Fingerprints." *Identification News*. (May 1982): 3-5.

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).

King, W.R. "The Effects of Differential Cyanoacrylate Fuming Times on the Development of Fingerprints on Skin." *Journal of Forensic Identification*. Vol. 59, 5: 537-544 (2009).

Kobus, H.J., R.N. Warrenner and M. Stoilovic. "Two Simple Staining Procedures Which Improve the Contrast and Ridge Detail of Fingerprints Developed with "Super Glue" (Cyanoacrylate Ester)." *Forensic Science International*. Vol. 23: 233-240 (1983).

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.

Llewellyn Jr., P.E., and L.S. Dinkins. "A New Use for an Old Friend." *Journal of Forensic Identification*. Vol. 45, 5: 498-503 (1995).

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).

Mazzella, W.D. and C.J. Lennard. "An Additional Study of Cyanoacrylate Stains." *Journal of Forensic Identification*. Vol. 45, 1: 5-18 (1995).

Menzel, E.R., et al. "Laser Detection of Latent Fingerprints: Treatment with Glue Containing Cyanoacrylate Ester." *Journal of Forensic Sciences*. Vol. 28, 2: 307-317 (April 1983).

Mock, J.P. "Cyanoacrylates and Heat – A Word of Caution." *The Identification Section*. Vol. 3, 3 (June 1985).

Olsen, R., and M.F. Shonberger. "A Slow-Reacting Catalyst for Cyanoacrylate Fuming." *Journal of Forensic Identification*. Vol 45, 6: 651-653 (1995).

Sahs, P.T. and R.J. Wojcik. "Moisture Catalyst for Cyanoacrylate Fuming." *Identification News*. (September 1984): 9.

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

Watkin, J.E., et al. "Cyanoacrylate Fuming of Latent Prints: Vacuum Versus Heat/Humidity." *Journal of Forensic Identification*. Vol 44, 5: 545-556 (1994).

Weaver, D.E, and E.J. Clary. *A One Step Fluorescent Cyanoacrylate Fingerprint Development Technology*. State of Alaska Scientific Crime Detection Laboratory Research Team.

Wilkinson, D.A., and A.H. Misner. "A Comparison of Thenoyl Europium Chelate with Ardrex and Rhodamine 6G for the Fluorescent Detection of Cyanoacrylate Prints." *Journal of Forensic Identification*. Vol. 44, 4: 387-406 (1994).

9.0 Records – N/A

10.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original Document
10/17/2012	2	7.0 - Removed "not" from last sentence