



Latent Print Section
Cyanoacrylate Ester (Superglue) Fuming Procedure
Comparative & Analytical Division



1. Cyanoacrylate Ester (CA) (Superglue) Fuming Procedure

1.1 Scope

- 1.1.1 This document details the procedures for fuming forensic evidence with CA by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents

- 1.2.1 Cyanoacrylate Fuming Chamber (Misonix CA-6000 or Misonix CA-9000, depending on size and amount of evidence)
- 1.2.2 Cyanoacrylate Ester
- 1.2.3 Aluminum Trays
- 1.2.4 Oil Standard Pad
- 1.2.5 Clear Plastic Film (Test Strip)

1.3 Safety

- 1.3.1 Examiners/Processors shall wear appropriate personal protective equipment (PPE) while applying CA.
- 1.3.2 See applicable Safety Data Sheet (SDS).

1.4 Safety Information

- 1.4.1 CA fumes have been shown to be hazardous to the eyes, nose, and throat. Methyl and ethyl cyanoacrylates are lachrymators and can dry out the mucus membranes.
- 1.4.2 Heating of CA above 140°C can lead to the production of hydrogen cyanide gas. Ensure all fumes have been evacuated from the chamber before opening. Avoid inhaling any residual vapors.
- 1.4.3 The hot plate is very hot so caution should be used while operating the fuming chamber.
- 1.4.4 CA is highly adhesive and bonds skin in seconds. Caution should be used while handling CA.

1.5 Procedure

- 1.5.1 Latent print development with CA is commonly accomplished by heating it to a degree that it vaporizes within a fuming chamber, exposing items of forensic evidence to the fumes.
- 1.5.2 Place the evidence in an appropriate sized chamber.
- 1.5.3 Place plastic test strip inside the chamber.
- 1.5.4 Process items of evidence according to the procedures associated with the appropriate fuming chamber below.



- 1.5.5 If latent prints develop prior to completion of the chamber cycle, indicated by the development of the control print or the examiner/processor notices an item of evidence becoming over fumed, press the “Purge” button on the front panel to stop the fuming process and to purge the fumes from the chamber. Otherwise, the chamber will automatically turn off the hot plate and the purge cycle will start after the preset amount of time has lapsed.
- 1.5.6 When the chamber is safe to open, remove the items of evidence.

1.6 Processing Non-Porous Evidence and Semi-Porous Evidence using the Misonix CA-6000 Fuming Chamber

1.6.1 Procedure

- 1.6.1.1 Turn on the chamber using the main power switch located on the front panel.
- 1.6.1.2 Press the unlock button to unlock the main door.
- 1.6.1.3 Insert forensic evidence inside the chamber or hang evidence on the support bars inside.
- 1.6.1.4 Place plastic test strip inside in a position that development can be monitored from the main glass.
- 1.6.1.5 Close the door and turn the handle to seal the chamber.
- 1.6.1.6 Place a quarter size amount of CA in the aluminum tray. If a new container of CA is required, place the appropriate safety label on the new container. Proper labeling should include:
- Name of Reagent
 - Date of Preparation
 - Date of Expiration (if applicable)
 - Preparer’s name or initials
 - Batch Number
- 1.6.1.7 Open the lower hot plate door and place the aluminum tray in the center of the hotplate and secure the door.
- 1.6.1.8 Press the start cycle button.
- 1.6.1.9 Once the humidity level reaches the set point, the hot plate will automatically activate to begin vaporizing the liquid CA.
- 1.6.1.10 **The examiner/processor must do periodic checks of the test strips and evidence to ensure over development does not occur.** If the examiner/processor observes an excessive buildup of white polymerization on the background of the test strip or any piece of evidence, the cycle shall be stopped by pressing the “purge” button on the front control panel. If it is not necessary to stop the cycle, the fuming chamber will automatically turn off the hot plate and begin the purge cycle after a pre-set time.
- 1.6.1.11 Once the purge cycle is complete, press the “Clear” button on the main display panel and the “Unlock” button to disengage the door lock to remove the items of evidence for further evaluation.



1.7 Processing Non-Porous Evidence using the Misonix CA-9000 Fuming Chamber

1.7.1 Procedure

- 1.7.1.1 Turn on the chamber using the main power switch located on the front panel.
- 1.7.1.2 Open the main door by lifting the handle straight out, then turning.
- 1.7.1.3 Insert forensic evidence inside the chamber or hang evidence on the support bars inside.
- 1.7.1.4 Place plastic test strip inside in a position that development can be monitored from the main glass.
- 1.7.1.5 Once complete, close the door and turn the handle to seal the chamber.
- 1.7.1.6 Place an amount of CA to cover the entire bottom of the aluminum tray. If a new container of CA is required, place the appropriate safety label on the new container. Proper labeling should include:
 - Name of Reagent
 - Date of Preparation
 - Date of Expiration (if applicable)
 - Preparer's name or initials
 - Batch Number
- 1.7.1.7 Open the hot plate door and place the aluminum tray in the center of the hot plate and secure the door.
- 1.7.1.8 Press the start cycle button.
- 1.7.1.9 Once the humidity level reaches the set point, the hot plate will automatically activate to begin vaporizing the liquid CA.
- 1.7.1.10 **The examiner/processor must do periodic checks of the test strips and evidence to ensure over development does not occur.** If the examiner/processor observes an excessive buildup of white polymerization on the background of the test strip or any piece of evidence, the cycle shall be stopped by pressing the "purge" button on the front control panel. If it is not necessary to stop the cycle, the fuming chamber will automatically turn off the hot plate and begin the purge cycle after a pre-set time.
- 1.7.1.11 Once the purge cycle is complete, press the "Clear" button on the main display panel and the "Unlock" button to disengage the door lock to remove the items of evidence for further evaluation.

1.8 QA/QC

- 1.8.1 A quality control check must be performed when a new reagent container is opened and placed into service.
- 1.8.2 A quality control check of in service reagents must be performed once a week.
- 1.8.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white or oblique light.



- 1.8.4 To perform a Quality Control Check, apply finger to a Sebaceous Oil Standard Pad and place a test print on a piece of plastic film. (Matrix = Sebaceous Oil Standard; Substrate = Plastic Film). Place plastic film into the appropriate chamber for fuming. Apply CA as described above.

1.9 Results/Records

- 1.9.1 Processes used are documented in the case examiner's/processor's notes via the Laboratory Information Management System (LIMS).
- 1.9.2 Test results shall be recorded in Qualtrax.

1.10 References

Defense Forensic Science Center, *CILALP 52.1 Cyanoacrylate Ester (Superglue) Fuming*, 21 January 2014.

Misonix Cyanoacrylate Fuming Chamber, CA-6000 and CA-9000 Operation Manual

Bandey, H.L., Bleay, S.M., Paine, M., Willson, H. *"The effect of relative humidity on the effectiveness of the cyanoacrylate fuming process for fingermark development and on the microstructure of the developed marks"* Forensic Science International, Volume 212, Issues 1-3, 10 October 2011, Pages 130-142.