3a.4 Dye Stains

3a.4.1 Introduction

Dye stains may be used to increase the visual contrast of cyanoacrylate developed latent prints on non-porous items.

3a.4.2 Safety Considerations

3a.4.2.1

Application should be performed in a fume hood using the appropriate PPE.

3a.4.2.2

Appropriate eye protection goggles shall be worn when using alternate lighting.

3a.4.2.3

Standard safety precautions from the SDS available at each worksite for the components in this protocol shall be followed.

3a.4.3 Storage

Dye stains should be stored in clear or dark glass or plastic bottles. Dye stains containing methanol should only be stored in glass bottles.

3a.4.4 Preparations

Examiners may choose from several preparations of dye stains considering best contrast with the surface and preferred color and intensity of fluorescence.

3a.4.4.1 Ardrox

Formula #1
Methanol/Isopropanol:
Mix 5.0 milliliters of Ardrox with 500 milliliters of methanol or isopropanol.

Formula #2
Multi-Solvent:
2 ml of Ardrox
15 ml Acetone
10 ml Acetonitrile
15 ml Methanol
33 ml Isopropyl alcohol
925 ml Petroleum ether

Viewing:
May visualize in the UV range at 280-365nm range using clear goggles. May visualize using a Forensic Light Source at 435-480nm using yellow goggles.

Photography:
Photograph suitable latent prints using a yellow bandpass filter.

3a.4.4.2 Basic Yellow 40

Formula
2 g Basic Yellow 40
1000 ml isopropyl alcohol or methanol (or other reagent alcohol solvent)

Viewing:
May visualize in the UV range around 365nm range using clear goggles. May visualize using a Forensic Light Source at 450-485nm using yellow goggles.

Photography:
Photograph suitable latent prints using a yellow bandpass filter.

3a.4.4.3 RAY

Formula #1
Combine in order:
.5 g Basic Yellow 40 dye
10 ml Glacial acetic acid
.05 g Rhodamine 6G dye
4ml Ardrox P133D
450 ml Isopropanol or -denatured Ethanol
40 ml Acetonitrile

Formula #2
1 g Basic Yellow 40
0.1 g Rhodamine 6G
8 ml Ardrox
940 ml Isopropanol (or denatured ethanol)
50 ml Acetonitrile (optional for increased brilliance)

Viewing:
Visualize using a Forensic Light Source at 450-550nm using orange or red goggles.

Photography:
Photograph suitable latent prints using an orange or red bandpass filter.

3a.4.4.4 Rhomdamine 6G

Formula #1
Methanol/Isopropanol Formula
0.1 grams of Rhodamine 6G
1.0 liter of methanol or isopropanol.

Formula #2
No rinse formula/Applied with a spray bottle
Stock Solution:
100mg Rhodamine 6G
100ml Methanol

Working Solution:
3ml of Stock solution
997ml Methanol

Formula #3
Multi-solvent Formula
Stock Solution:
1 gm Rhodamine 6G
1000ml Methanol

Working Solution
3 ml of Rhodamine stock solution
15 ml Acetone
10 ml Acetonitrile
15 ml Methanol
32 ml Isopropyl alcohol
925 ml Petroleum ether

Viewing:
Visualize with a Forensic Light Source at 495-540nm using orange or red goggles.

Photography:
Photograph suitable latent prints using an orange bandpass filter.

3a.4.5 Application

1. Tray immersion or wash bottle for most applications for approximately 5 seconds. Exceptions listed in the formula.
2. Water rinse with a wash bottle application or immersion under a gently running stream of water for approximately 10 seconds. Exceptions listed in the formula.
3. Allow the item to fully dry.

4. View under the appropriate wavelength.
5. Photograph the results using a bandpass filter.

3a.4.6 Instrumentation

The use of a Forensic Light Source and photographic equipment is required.

3a.4.7 Controls

The dye stain must be periodically checked under the appropriate wavelength for fluorescence to confirm it is working as expected and that reagent check entered into the reagent log. The result of the control test must be added into the worksheet of the case records in which it is used.

3a.4.8 Interpretation of Results

Visualization of a fluorescent product under the appropriate wavelength of light indicates the process is performing as expected.

3a.4.9 Minimum Quality Standards

3a.4.9.1

Shelf life, expiration date, of the purchased reagent shall be used as the destruction date.

3a.4.9.2

Shelf life of the mixed reagent is approximately two years. Control testing shall dictate continued use throughout the two years.

3a.4.10 Other Related Procedures

Cyanoacrylate Fuming

3a.4.11 Limitations

3a.4.10.1

The dye staining process stains superglue and does not independently develop latent prints.

3a.4.10.2

The dye staining application to cyanoacrylate fumed items is an additional step which has a potential of destroying existing latent prints. Discretion should be used for photographing latent prints prior to the application of dye stain.

3a.2.10.3

Dye stains chosen must fluoresce in a different range of wavelengths than the item being examined for optimal results.

3.2.10 References

Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.

Kent, Terry, ed. Fingerprint Development Techniques; Heanor Gate Publisher: Derbyshire, England, 1993.

McCarthy, Mary M. "Evaluation of Ardrox as a Luminescent Stain for Cyanoacrylate Processed Latent Impressions"; Journal of Forensic Identification, 1990, 40, 2, 75-80.

Murbarger, Melissa; Lisa Zaccagnini. Substitute for Freon-Ardrox Formula. Illinois State Police Internal Publication, 1997.

Vachori, G.; J. Sorel. "New Fingerprint Development Process, in Proceedings of the International Forensic Symposium on Latent Prints"; U.S. Department of Justice: U.S. Government Printing Office, 1987

Minutiae Magazine, Summer Special 1994, Issue No. 24, pg.5.

Friction Ridge Skin: Comparison and Identification of Fingerprints by James F. Cowger Manual of

Fingerprint Detection by Fluorescence Examination by the British Home Office

1981. Lee, Henry C.; Gaensslen, R. E., eds. Advances in Fingerprint Technology; Elsevier Science Publishers: NY, 1991. Kent, Terry, ed.

Fingerprint Development Techniques; Heanor Gate Publisher: Derbyshire, England, 1993. McCarthy, Mary M.; David L. Grieve.

Masters, Nancy E. "Rhodamine 6G: Taming the Beast"; Journal of Forensic Identification, September/October 1990, 40, 5, 265-270.

Menzel, E. Roland. Fingerprint Detection with Lasers; Marcel Dekker: New York, 1980.

Menzel, E. Roland. "A Guide to Laser Latent Fingerprint Development Procedures"; Identification News, September 1983.

Menzel, E. Roland. "Detection Of Latent Fingerprints By Laser-excited Luminescence"; Analytical Chemistry, 1989, 61, 8, 557-561.

http://www.cbdiai.org