



ATF-LS-LP17 Rhodamine 6G	Published Online: March 2018
Authority: Technical Leader	
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I. **Scope:** Rhodamine 6G, like ardrox and zinc chloride, is a supplemental processing procedure designed to enhance faint or indistinct impressions developed by another technique. Rhodamine 6G is used after cyanoacrylate ester fuming. Rhodamine 6G has an affinity for adhesion to polymerized latent impressions even at levels below visual observation. Excitation of Rhodamine 6G with the 488nm, 510nm, 514.5nm or 532nm lines of the laser produces extremely bright fluorescence at about 550nm.

II. **References:**

FBI Processing Guide for Developing Latent Prints (Revised 2000)

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.

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.

III. **Apparatus/Reagents:**

- Fume Hood
- Alternate Light Source
- Laser - Argon ion, copper vapor and optically pumped semiconductor lasers as well as alternate light sources can be used to illuminate the evidence and produce the desired fluorescence. The most common wavelengths of light used are 488nm, 514.5nm and 532nm.

The examiner can choose from several preparations of Rhodamine 6G solutions. The preparation of choice is primarily dependent upon the reaction of the substrate to the solvent used. A 0.01% to 0.001% Rhodamine 6G in methanol or isopropanol, weight to volume, is productive for most surfaces with methanol being the preferred solvent. Working solutions of Rhodamine 6G should be prepared in small amounts. Weaker solutions are recommended from the viewpoint of health risk and degree of background fluorescence. Aqueous Rhodamine 6G solutions should be used when methanol or other organic solvents will be destructive to the surface being treated.

Methanol/Isopropanol Formula:

Dissolve 0.1 grams of Rhodamine 6G in 1.0 liter of methanol or isopropanol.
Shelf Life: Indefinite

Aqueous Formula:

Dissolve 0.1 grams of Rhodamine 6G in 1.0 liter of distilled water.

Shelf Life: Indefinite

Petroleum Ether Carrier Formula:

Stock Solution: 1 gram Rhodamine 6G dissolved in 1 liter of Methanol.

Working Solution: Mix in order:

1. 3 ml stock solution
2. 15 ml acetone
3. 10 ml acetonitrile
4. 15 ml methanol
5. 32 ml isopropanol
6. 925 ml petroleum ether

Shelf Life:

- Stock Solution: indefinite
- Working Solution: up to 6 months

- IV. Safety Precautions:** Proper safety precautions including avoiding skin exposure and proper eye protection with appropriate optical densities should be utilized when operating ultraviolet light sources, lasers or alternate light sources. Consult the appropriate users manuals for the safe use and appropriate eye protection for the specific equipment being used.

This procedure involves the use of hazardous materials. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment should be utilized to avoid exposure to dangerous chemicals. Consult the appropriate MSDS for each chemical prior to use.

The chemicals utilized in the formulas above are extremely flammable. Vapors can ignite readily at room temperatures. It is considered an extreme hazard.

V. Procedures:

All applications should be performed in a fume hood.

1. Apply the solution to the item of evidence by immersion, or using a squirt bottle or aerosolized spray. Rinse the item with Rhodamine 6G solution and allow to dry completely.
2. Examine the item using a laser or other alternate light source. Appropriate wavelengths are: 488nm, 510nm, 514.5nm or 532nm with maximum absorption occurring at approximately 532 nm.
3. Record any observed impressions.

If impressions are faint, repeated applications of the Rhodamine 6G solution may be attempted. If repeated applications of the dye solution fail to improve the fluorescence, the Rhodamine 6G

concentration may be increased.

- VI. **Quality Assurance/Quality Control:** Dye stains such as Rhodamine 6G, work by staining latent impressions developed with cyanoacrylate ester. Documentation of control testing of working solutions of Rhodamine 6G shall be made using the appropriate reagent log. Test the solution by placing test impressions on a microscope slide and then process with cyanoacrylate fumes. Once fumed, process the slide with the working solution. Under a forensic light source, determine if the test prints fluoresce. If the test prints are visualized, the solution is working properly.