

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
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**Name of Procedure:**

RAM / Optional Combination Dyes

**Suggested Uses:**

One of the most effective ways to recover latent prints from items of evidence is to use a laser dye followed by a laser or alternate light source examination. The following laser dyes are normally used on non-porous surfaces ( metal, glass, plastic, etc.); however, under certain conditions can be used on porous or semi-porous surfaces. These dyes are efficient in that they are highly fluorescent and can be used with either a laser or various alternate light sources. These dyes will provide the analyst with additional choices when determining the appropriate processing techniques and combinations of methods which may be utilized.

**Equipment Needed to Perform Procedures:**

A - Laser or alternate light sources

B - Laser Goggles

C - Filter ( Laser )

D - Camera (35mm, 2 1/4, MP-4, CU5 )

E - Fume hood

F - Rubber gloves and apron

G - Face shield visor and/or safety goggles.

H - Plastic applicators with spouts or glass tray for submerging items

**Chemicals Needed For Preparation of Chemical Solution(s):**

The various chemical needed are individually discussed in the following procedures.

**Formula/Directions for Preparation of Chemical Solution(s):**

**Stock Solutions:**

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
------------------	---------------------------------------	---------------------

Some of the following fluorescent dyes will also require stock solutions which may be stored until needed for the working solutions. The following solutions may be used in a number of the working solutions:

**Rhodamine 6G - Stock Solution**

1. 0.10 gram of Rhodamine 6G
2. Twenty (20) ml of Methanol

Stir until thoroughly dissolved.

**MBD - Stock Solution**

1. 0.10 gram of MBD
2. One-hundred (100) ml of Acetone

Stir until thoroughly dissolved.

**Basic Yellow - Stock Solution**

1. Two (2) grams of Basic Yellow
2. One-thousand (1000) ml of Methanol

Stir until thoroughly dissolved.

**Working Solutions:**

The following formulations are working solutions which may be applied to items of evidence:

**Ram - Combination Enhancer**

Mix the following in the order listed in a large beaker with continual stirring:

1. Three (3) ml of Rhodamine 6G stock solution

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
------------------	---------------------------------------	---------------------

2. Two (2) ml of Ardrex P-133D
3. Seven (7) ml of MBD stock solution
4. Twenty (20) ml of Methanol
5. Ten (10) ml of 2-Propanol
6. Eight (8) ml of Acetonitrile
7. Nine-hundred-fifty (950) ml of Petroleum Ether

**RAM - Modified Solution**

Mix the following in the order listed in a large beaker with continual stirring:

1. 0.3 gram of MBD
2. Twenty-five (25) ml of Acetone
3. Forty (40) ml of ethanol
4. Fifteen (15) ml of 2-Propanol
5. Nine-hundred fifty (950) ml of Petroleum Ether
6. One (1) ml of Ardrex P-133D
7. Five (5) ml of Rhodamine 6G Stock solution
8. Twenty (20) ml of Acetonitrile

**YAM solution**

Mix the following in the order listed in a large beaker with continual stirring:

1. Twenty-five (25) ml of MBD stock solution
2. Forty (40) ml of Methanol

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
------------------	---------------------------------------	---------------------

3. Fifteen (15) ml of 2-Propanol
4. Nine-hundred ml of Petroleum Ether
5. One (1) ml of Ardrex P-133D
6. Five (5) ml of Yellow Brilliance(Basic Yellow) stock solution
7. Twenty (20) ml of Acetonitrile

**MRW 10**

Mix the following in the order listed in a large beaker with continual stirring:

1. Three (3) ml of Rhodamine 6G stock solution
2. Three (3) ml of Basic Yellow stock solution
3. Seven (7) ml of MBD stock solution
4. Twenty (20)) ml of Methanol
5. Ten (10) ml of 2-Propanol
6. Eight (8) ml of Acetonitrile
7. Nine-hundred fifty (950) ml of Petroleum Ether

**Processing Procedures for Application to Item(s) of Evidence:**

The first ( critical ) step is to super glue the item of evidence (SEE - Cyanoacrylate ester process). This process will not only locate many latent prints, but more importantly (for the laser process ) will adhere to the most minute of fingerprint residue not visible to the naked eye. The process will virtually “set” the latent print in place. Once this procedure is completed, the Fluorescent Dye solution can be applied.

1. Utilizing a fume hood and rubber gloves, spray or completely submerge the item of evidence with the selected solution and allow to dry.

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
------------------	---------------------------------------	---------------------

2. When completely dry, view the item using either the argon-ion laser, Ultra-Violet light source or an alternate light source while wearing laser safety goggles.

Note: This dye will preferentially adhere to the super glued print, but a certain amount will adhere to the item itself. If too much dye is used, the entire surface will fluoresce and mask the latent print. In this case, simply rinse the item with plain methanol. The excess dye will wash away and in most cases the dye adhering to the latent print will remain.

### **Steps to Preserve Developed Impressions:**

The most appropriate methods to preserve developed impressions is through photography, using the proper techniques (See Photographic Equipment/Procedures) and/or electronically recording the impressions (See Image Processing). The utilization of a 35 mm, 2 1/4, MP-4, or CU5 camera will suffice for photography of developed impressions. However, all laser prints must be photographed using a laser filter; otherwise, they will not be recorded on the film.

### **Safety Concerns:**

Presently the safety concerns have not been thoroughly investigated in respect to the use of a number of the fluorescent dye solutions and there are varied opinions on the associated health effects. This chemical solution should be applied and treated with extreme care until the full health effects are known. As with any chemical it may cause some irritation when in contact with the eyes or skin and may be harmful if inhaled or ingested. The methanol, acetone 2-Propanol and Acetonitrile used in the solutions are corrosive and flammable and should be handled with extreme care.

### **Storage and Location of Chemicals and Solutions:**

Store all reagent in the original shipping containers until needed.

Store all working and stock solutions in dark containers.

Daily use of solutions can be stored in a clear spray bottles and larger solutions should be stored in dark bottles.

### **Shelf Life:**

<b>Section H</b>	<b>RAM/ Optional Combination Dyes</b>	<b>Subsection 9</b>
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All stock solutions - Indefinite

All working solutions - Up to six (6) months.

**Other Information:**

Fluorescent dyes may be used in conjunction with other fluorescent dyes which may be available.

These procedures are not recommended at this time for use on items which may be transferred to other laboratory sections until the health effects are thoroughly investigated.