

Processing Overview

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Processing Overview

1 INTRODUCTION

- A. The Overview provides overall information addressing processes utilized in the FBI Laboratory Friction Ridge Discipline, to include:
 - o chemicals and reagents used in the processes;
 - o checks of reagents and cyanoacrylate;
 - o processing sequences;
 - o preservation of visualized prints; and
 - o safety.
- B. Personnel will refer to the specific procedure for each process to obtain detailed information on that process.
- C. Available resources in addition to the judgment of the person conducting the processing (within the bounds of good laboratory technique and quality control) determine what examination procedures are appropriate and/or acceptable for certain circumstances as encountered in the daily forensic casework of the FBI Laboratory Friction Ridge Discipline.

2 SCOPE

These procedures are intended for use by appropriately qualified employees who have received training in the processes and chemicals used to develop or detect latent prints.

3 EQUIPMENT

- A. The significant equipment, materials, or reagents used in each process are listed in the specific technical procedure.
- B. Peripheral equipment used for mixing, storing, processing or other routine laboratory activities is implied and determined by the individual.
- C. Unless noted in the individual technical procedure, the reagents used in the mixing of processing solutions are American Chemical Society grade or equivalent.
- D. Unless the process specifically requires distilled water, the water used for the technical procedure can be distilled, reverse osmosis, deionized, or tap.

4 STANDARDS AND CONTROLS

- A. Control samples show the effectiveness of the reagent.
- B. A control sample will consist of a substance the reagent is expected to react with on a surface appropriate for testing.
 - 1. Since personnel process in a variety of locations, the availability of materials to create test samples will vary and is determined by personnel but will be appropriate to what reagent is being tested (e.g. paper with sebaceous/eccrine/other matrix components for porous processes, aluminum dish with sebaceous/eccrine/other matrix components for superglue fuming).
- C. Control samples may be created at the time the reagent is tested or produced en masse for routine testing.

4.1 Checks of Reagents and Cyanoacrylate

- A. The individual technical procedure for each process will be followed when checks are conducted.
- B. No working solution or cyanoacrylate can be used unless it passes the required test.

4.1.1 Cyanoacrylate Checks

- A. Every tenth bottle of cyanoacrylate will be tested at the time of opening prior to being used for processing.
 - 1. Regardless of outcome, the results of every cyanoacrylate test will be recorded in the appropriate log.
 - 2. Positive development of the control sample requires no further steps.
 - 3. If the control sample does not develop, a second sample is tested.
 - 4. If the second sample is unsuccessful, the cyanoacrylate cannot be used.
- B. A control sample must be included when the cyanoacrylate fuming process is used outside of an automated processing chamber as described in the *Cyanoacrylate Fuming* document (FRD-309).
 - 1. Results of that control sample will be retained in the FBI Laboratory File.
 - 2. Positive development of the control sample requires no further steps. If the control sample does not develop as expected, personnel will view the evidence to determine if additional processing is necessary.

4.1.2 Reagent Checks

- A. Regardless of outcome, all reagent checks, and their results are recorded in the appropriate log.
 - 1. Reagent checks for work conducted at an offsite location will be recorded in the FBI Laboratory File.
- B. The working solution will be applied to the appropriate control sample.
- C. Positive development of the control sample requires no further steps.
- D. If the control sample does not develop, a second sample is tested.
- E. If the second sample is unsuccessful, the working solution cannot be used.

4.1.3 When Reagent Checks of Working Solutions are Conducted at FBI Laboratory Sites

- A. The FBI Laboratory Friction Ridge Discipline tests most working solutions when they are prepared and prior to use, provided it has been 24 hours since the solution was tested.
 - 1. The only exceptions are the working solutions of RhoMMeOH (combination of fluorescent dyes Rhodamine 6G and MBD in methanol), Ninhydrin, and 1,2-Indanedione-Zinc.
- B. For the Quantico laboratory location, RhoMMeOH and 1,2-Indanedione-Zinc working solutions are tested when they are first mixed and weekly thereafter while in use.
- C. For the Huntsville laboratory location, RhoMMeOH, 1,2-Indanedione-Zinc, and Ninhydrin working solutions are tested when they are first mixed and weekly thereafter while in use.

4.1.4 When Reagent Checks of Working Solutions are Conducted at non-FBI Laboratory Sites

- A. Working solutions that are transported to or prepared at a non-FBI Laboratory site, to include partner laboratories, (e.g., HEAT deployments) must be checked at the non-Laboratory site prior to use.
- B. A control sample must be successfully tested prior to using the reagent in casework.
- C. After the initial successful test, the reagent is checked every 24 hours or if conditions at the location warrant additional checks.
- D. All reagent checks are noted in the FBI Laboratory File.

5 PROCEDURE

- A. The **matrix** is defined as the substance that makes up the latent print.
 - 1. Consisting of a single or combination of substances such as blood, grease, or perspiration or oil from an individual, the matrix allows the friction ridge details to transfer to an object.
 - 2. The type and condition of the matrix contributes to determining how an item should be processed for latent prints.
- B. The **substrate** is defined as the surface upon which a friction ridge print is deposited.
 - 1. In general, surfaces on which prints are deposited can be divided into porous, nonporous, and semi-porous categories.
 - 2. The type and condition of the substrate contributes to determining how an item should be processed for latent prints.
- C. The use of proper processing techniques and sequences attempts to minimize destruction and maximize detection of latent prints.
- D. Personnel conducting examinations must use appropriate judgment in determining which processes to use, since not all processes are appropriate for every situation.

5.1 Considerations During Examinations

- A. When using powders (magnetic or non-magnetic) or powder suspensions (e.g., Alternate Black Powder), the choice of color or process is made by personnel and is based upon establishing suitable contrast with the color of the substrate.
- B. Ultraviolet light may be detrimental to DNA examinations.

5.1.1 Adhesive Surfaces

- A. The appropriate processing sequence should be used on the non-adhesive surface, as applicable.
- B. When processing the non-adhesive side, the integrity of the adhesive side should not be compromised by encountering cyanoacrylate dyes or other solvents.
 - 1. An appropriate backing should be utilized to protect the adhesive side.
- C. Adhesives affixed to items should be removed prior to processing to prevent damage to the adhesive side and to maximize detection of potential latent prints on the non-adhesive side.
- D. However, cyanoacrylate fuming should be performed on the non-adhesive side of semi-porous and non-porous adhesive items prior to removal.
- E. Fluorescent dye stains may be detrimental to fiber examinations.

5.2 Sequences for Various Types of Substrates

- A. The following sections show the conventional sequence of processing to be used as a guideline when examining certain items for the presence and development of latent prints.
1. Some processes, such as Small Particle Reagent, are only used in very specific circumstances.
- B. The processes used by personnel are based on the efficiency and limitations of the process, availability of resources, the circumstances of the case, management directives, particular substrate and matrix combination, and the type and condition of the evidence items.

5.2.1 Visual Examinations

- A. A visual examination is the examination of an item of evidence for friction ridge prints, in sufficient lighting conditions, using the individual's eyes or with the assistance of a magnification device.
- B. Visual examinations are implied for each process listed in the sequences.

5.2.2 Porous

- Visual
- Forensic Light Source(s)
- 1,2-Indanedione-Zinc with Forensic Light Source(s) and/or Ninhydrin
- Physical Developer

5.2.3 Non-Porous

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Cyanoacrylate dye with Forensic Light Source(s)

5.2.4 Semi-Porous

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Magnetic Powder
- 1,2-Indanedione-Zinc with Forensic Light Source(s) and/or Ninhydrin
- Cyanoacrylate dye with Forensic Light Source(s)
- Physical Developer

5.2.5 Blood Stained Items - Porous

- Visual
- Forensic Light Source(s)
- 1,2-Indanedione-Zinc with Forensic Light Source(s) and/or Ninhydrin

- Diaminobenzidine (submersion method) or Amido Black
- Physical Developer

5.2.6 Blood Stained Items – Non-Porous

- Visual
- Forensic Light Source(s)
- Diaminobenzidine (tissue method), Leucocrystal Violet, or Amido Black
- Cyanoacrylate fuming with Forensic Light Source(s)
- Cyanoacrylate dye with Forensic Light Source(s)

5.2.7 Semi-Porous (Latex/Nitrile Glove Type Products)

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Magnetic Powder
- Cyanoacrylate dye with Forensic Light Source(s)
- Physical Developer

5.2.8 Light Colored Adhesive Side

- Visual
- Forensic Light Source(s)
- Alternate Black Powder, Ash Gray Powder, Iron Oxide Powder Suspension (see process document for limitations) or Wetwop™ Black

5.2.9 Dark Colored Adhesive Side

- Visual
- Forensic Light Source(s)
- Ash Gray Powder or Wetwop™ White

5.3 Preservation

- At the conclusion of each process, all evidence will be examined for friction ridge prints.
- If sufficient friction ridge information is not present on an item, personnel conducting the examination may move on to a subsequent process.
- If sufficient friction ridge information is present on an item, personnel conducting the examination will ensure that the friction ridge information is preserved, usually through digital capture or photography.

5.3.1 Digital Capture and Photography

- Any digitally captured prints will be preserved per the *Digital Images* document (FRD-400).
- If processing personnel are requesting the assistance of dedicated image capture personnel for acquiring images, they will do the following:

- Mark each print, using caution to avoid damaging the evidence or disturbing other potential latent prints.
 - Prepare a written photographic requisition.
 - Examples include electronic request systems, written case note or the *Friction Ridge Discipline Photographic Request form (FRD-004)*.
 - Use appropriate evidence tracking methods.
 - After the evidence is returned, determine if the request has been satisfied.
 - Any issues with returned work will be brought to the dedicated image capture individual's attention to be addressed.
 - Once accurate images have been obtained, move on to a subsequent process as applicable.
- C. Fluorescent compounds will suffer from loss of intensity over time; as such, these prints will be captured as soon as is practicable.

5.3.2 Lifting or Casting

- A. Processing personnel may preserve friction ridge prints by lifting or casting if authorized to conduct those examinations.
- B. Lifting or casting may be done at any time in the processing sequence.
- C. Prior to lifting or casting, an attempt will be made to capture the friction ridge information photographically or digitally.
- D. All lifts or casts, except for exploratory or test lifts or casts, will be captured photographically or digitally for retention as part of the FBI Laboratory File and returned to the contributor as secondary evidence.
- E. All lifts or casts returned as secondary evidence will be marked with the source, date of capture, and individual who created the lift or cast in addition to the Laboratory number and Item number.

6 SAFETY

- A. Personnel will reference the FBI Laboratory Safety Manual for appropriate information and for guidance on Laboratory waste management practices in addition to other topics on laboratory safety.
 - 1. Any questions will be addressed to the appropriate safety personnel.
- B. Processing personnel will follow universal precautions when handling blood or other potentially infectious materials.
- C. For all processes, processing personnel will wear appropriate safety equipment (e.g., laboratory coats, gloves, shoes, and safety glasses).

7 REVISION HISTORY

Revision	Issued	Changes
09	05/16/2022	Reformatted Added RhoMeOH to both sites and removed RAM for Huntsville in Section 4.1.2. Removed Powder from Section 5.1.2 and Section 5.1.5. Added Iron Oxide Powder Suspension to Section 5.1.8. Added A-#1 to Section 5.2.
10	08/01/2024	Section 1 – Removed first subsection and changed hazardous waste management to safety and expanded reagent checks. Section 4 – reduced number of examples and added determination responsibility Section 4.1 – reorganized and updated data. Section 4.1.3 – removed RAM Section 4.1.4 – reworded Section 5 – combined wording Section 5.1 and Section 5.1.1 – added with information from other parts of document Section 5.2 – combined wording Section 5.3 and Section 5.3.1 – remove extraneous information Section 5.3.2 – clarified secondary evidence Section 6 – removed extraneous information