

Latent Print Units Processing Manual

Preamble

1 Scope

The Latent Print Units use a variety of techniques and procedures to detect latent prints. The Preamble provides overall information addressing processes utilized in the Latent Print Units, to include: chemicals and reagents used in the processes; reagent checks; processing sequences; preservation of visualized prints; and hazardous waste management. Personnel will refer to the specific procedure for each process to obtain more detailed information on that process. These procedures are intended for use by appropriately qualified employees who have received training in the processes used to develop latent prints or chemicals used for processing. 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 Latent Print Units.

2 Equipment/Materials/Reagents

The equipment, materials, or reagents used in each process are listed in the specific standard operating procedure. Unless noted in the individual standard operating procedure, the reagents used in the mixing of processing solutions are American Chemical Society grade or equivalent. Unless the process specifically requires distilled water, the water used for the standard operating procedure can be distilled, reverse osmosis, deionized, or tap.

3 Standards and Controls

Control samples show the effectiveness of the reagent. A control sample will consist of a substance the reagent is expected to react with on a surface appropriate for testing. Since personnel process in a variety of locations, the availability of materials to create test samples will vary 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, blood on an appropriate porous/non-porous substrate for blood processes, adhesive side of tape with sebaceous/eccrine/other matrix components for tape processes, or a superglue processed item for cyanoacrylate dyes). Control samples may be created at the time the reagent is tested or produced en masse for routine testing.

3.1 Reagent Checks

If prints are developed on the control sample, it is noted in the appropriate log book or case record (only for offsite work) and the working solution is approved for use in casework. If prints

are not developed on the control sample, a new control sample is processed to determine the reason for the lack of development, such as a faulty control sample. If prints are developed on the new control sample, the results will be entered into the appropriate log book or case record (only for offsite work) and the working solution will be ready to be used for casework. In situations where prints are not developed on the new control sample, the working solution will not be used and the results entered into the appropriate log book or case record. At this time, the preparer will attempt to determine the reasons why the solution is not properly working.

The Latent Print Units test most working solutions when they are prepared and prior to use, provided it has been 24 hours since the solution was tested. The only exceptions are cyanoacrylate and the working solutions of RAM (combination of fluorescent dyes **R**hodamine 6G, **A**rdrox P133D, and **M**BD), Ninhydrin, and 1,2-Indanedione-Zinc.

For the Quantico laboratory location, RAM and 1,2-Indanedione-Zinc working solutions are tested when they are first mixed and weekly thereafter while in use.

For the Huntsville laboratory location, RAM, 1,2-Indanedione-Zinc, and Ninhydrin working solutions are tested when they are first mixed. RAM, 1,2-Indanedione-Zinc, and Ninhydrin working solutions outside the Biohazard room are tested weekly thereafter while in use.

The first container of cyanoacrylate from each box will be tested at the time of opening prior to being used for processing. In addition, a control sample must be included anytime the cyanoacrylate fuming process is used outside of a standard chamber as described in that standard operating procedure. The use of this control strip will be recorded in the case record. The individual standard operating procedure for each process will be followed when tests are conducted.

4 Sampling

Not applicable.

5 Procedures

A **latent print** is defined as a transferred impression of friction ridge detail that is not readily visible and/or a generic term used for unintentionally deposited friction ridge detail.

The **matrix** is defined as the substance that makes up the latent print. The matrix can consist of a single substance, or a combination of substances, which generally includes perspiration or oil from an individual. Other substances, such as blood, grease, paint, dust, and other compounds that allow the friction ridge details to transfer to an object, can also be a matrix. The type and condition of the matrix contributes to determining how a specimen should be processed for latent prints.

The **substrate** is defined as the surface that a latent print has (or may have) been deposited on. In general, surfaces on which latent prints are deposited can be divided into porous, non-porous, and semi-porous categories. The type and condition of the substrate contributes to determining how a specimen should be processed for latent prints.

To minimize destruction and maximize detection of latent prints, it is necessary to use proper processing techniques and sequences. Personnel conducting examinations must use appropriate judgment in determining which processes to use, inasmuch as not all processes will be used in every situation.

6 Sequences for Various Types of Substrates

The following is a set of processing sequences to be used as a guideline when processing specimens for the presence and development of latent prints. The lists show the optimal sequence of processing; however personnel conducting examinations will determine which processes are needed for each particular substrate and matrix combination. The processes used by personnel are based on the efficiency and limitations of the process, availability of resources, the circumstances of the case, and the type and condition of the evidence items. Some processes, such as Small Particle Reagent and Ninhydrin (as appropriate) are used in very specific circumstances. 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.

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. Visual examinations are implied for each process listed in the sequences. Note: Ultra Violet light may be detrimental to DNA examinations.

6.1 Porous

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

6.2 Non-Porous

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

6.3 Semi-Porous

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

6.4 Blood Stained Items - Porous

- Visual
- Forensic Light Source(s)
- 1,2-Indanedione-Zinc or Ninhydrin
- Diaminobenzidine (submersion method) or Amido Black
- Physical Developer

6.5 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)
- Powder

6.6 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

6.7 Adhesive Surfaces

The appropriate processing sequence should be used on the non-adhesive surface, if present. When processing the non-adhesive side, the integrity of the adhesive side should not be compromised by coming into contact with cyanoacrylate dyes or other solvents. An appropriate backing should be utilized to protect the adhesive side.

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. However, cyanoacrylate fuming should be performed on the non-adhesive side of semi-porous and non-porous adhesive items prior to removal.

Note: Fluorescent dye stains may be detrimental to fiber examinations.

6.7.1 Light Colored Adhesive Side

- Visual
- Forensic Light Source(s)
- Alternate Black Powder, Ash Gray Powder or Wetwop™ Black

6.7.2 Dark Colored Adhesive Side

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

7 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 a specimen, personnel conducting the examination may move on to a subsequent process. If sufficient friction ridge information is present on a specimen and not already preserved, personnel conducting the examination will ensure that the friction ridge information is preserved, usually through digital capture or photography.

7.1 Digital Capture and Photography

The most common method of preserving friction ridge information is through digital capture or photography. An identifier tag with a scale or measurable item must be captured with each specimen. If a measurable item is utilized, the appropriate measurement must be taken with an American National Standards Institute/National Institute of Standards and Technology ruler and the measurement recorded in the case record.

The print will be digitally or photographically captured (see FBI Latent Print Units Operations Manual, Standard Operating Procedures for Digital Images). If processing personnel are requesting the assistance of dedicated image capture personnel for acquiring images, he/she will do the following:

- Mark each print, using caution to avoid damaging the evidence or disturbing other potential latent prints.
- Prepare a photographic requisition using the appropriate request system. If the system is unavailable, the processing personnel will record the requisition in the case notes or use the *Latent Fingerprint Section Photographic Unit*

Requisition form (7-230) (Appendix A).

- Use appropriate evidence tracking methods.
- After the evidence is returned, determine if the print(s) has been captured accurately. Any issues with returned work will be brought to the photographer's attention to be addressed.
- Once accurate images have been obtained, move on to a subsequent process as applicable.

Note: Fluorescent compounds will suffer from loss of intensity over time; as such, these prints will be captured as soon as is practicable.

7.2 Lifting or Casting

Processing personnel may preserve friction ridge prints by lifting or casting if properly trained. Lifting or casting may be done at any time in the processing sequence. Prior to lifting or casting, an attempt will be made to capture the friction ridge information photographically or digitally.

All lifts or casts will be captured photographically or digitally for retention as part of the case record. If the print(s), as it appears on the lift or cast, is claimed, the lift(s) will be returned to the contributor as secondary evidence. Any lift or cast with no claimed print(s) will not be retained; however, personnel may return the lift or cast as secondary evidence. 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.

8 Calculations

Not applicable.

9 Measurement Uncertainty

Not applicable.

10 Limitations

Not applicable

11 Safety

Personnel will reference the FBI Laboratory *Safety Manual* for guidance on Laboratory waste management practices and procedures in addition to other topics on laboratory safety. Any questions will be addressed to the appropriate safety personnel.

Processing personnel using any of these procedures must be familiar with the Safety Data Sheets for each chemical used in the process. Processing personnel will follow universal precautions when handling blood or other potentially infectious materials.

For all processes included in this manual, processing personnel will wear appropriate laboratory coats, gloves, shoes, and safety glasses. Additional personal protective equipment specific to a process will be listed in that process's section of the manual.

12 References

Latent Print Unit Quality Assurance Manual, Procedures for Management of Equipment, Chemicals, Supplies, and Services. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Laboratory Safety Manual. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Rev. #	Issue Date:	History
6	05/30/18	Section 3, added clarification on control sample. Section 6, ultraviolet note is made more general. Section 6.6, removed Iodine Spray Reagent. Section 6.7, specificity of items removed and non-porous added for fuming. Section 7.1, "as applicable" added to last bullet. Section 7.2, qualification requirement added.
7	08/21/19	Section 4, changed heading. Removed discontinued exams from Section 6 and Section 6.5. Removed acetate from Section 6.7. Modified requirement for personnel for lifting, added casting and removed lift examples in Section 7.2.

Approval

Redacted - Signatures on File

Latent Print
Technical Leader

Date: 08/02/2019

Latent Print Operations
Unit Chief

Date: 08/02/2019

Latent Print Support
Unit Chief

Date: 08/02/2019

Scientific and Biometrics
Analysis Unit Chief

Date: 08/02/2019

QA Approval

Quality Manager

Date: 08/02/2019

Appendix A: Latent Fingerprint Section Photographic Unit Requisition

Redacted - Form on File