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Standard for Processing Evidence for the Detection of Friction Ridge Impressions

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410 North 21st Street
Colorado Springs, CO 80904

Foreword

This document has been developed to improve the quality and consistency of friction ridge examination practices.

This document is the recommended broad class processing techniques to be applied when processing evidence for the detection of friction ridge impressions. The specific processing techniques applied are determined by the FSP based on the specific processes that are appropriate for each particular substrate and matrix combination.

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Standard for Processing Evidence for the Detection of Friction Ridge Impressions

1 Scope

This document provides requirements for the processing of evidence, within a laboratory setting, for the detection of friction ridge impressions. The standard specifies the broad class of processing techniques and sequences to be applied when processing such evidence. This document does not address the processing of evidence at a crime scene, the photography or digital processing of friction ridge impressions or the validation of the various processing techniques, necessary equipment, or storage requirements.

2 Normative References

There are no normative reference documents. Annex A, Bibliography, contains informative references.

3 Terms and Definitions

For purposes of this document, the following terms and definitions apply.

3.1
forensic light source
A light source that may be fixed, filtered or tunable to a variety of spectral ranges.

3.2
Forensic Service Provider
FSP Organization or individual that conducts and/or supplies forensic services.

3.3
matrix
Transfer medium (e.g., grease/oil, sweat, blood).

3.4
semi-porous
Partially but not freely or wholly permeable (e.g., glossy paper).

3.5
sequential processing
The application of chemical and/or physical friction ridge development techniques in a specific order to target specific constituents of friction ridge impressions which may be visualized for examination, and to maximize the preservation of the friction ridge detail during each process.

3.6
substrate
Surface or material upon which a substance is deposited (e.g., porous, non-porous).

4 Processing Considerations

4.1 The processes applied by each FSP shall be based on the efficacy and limitations of the process, availability of resources and processing techniques, and the type and condition of the evidence.

4.2 The FSP shall apply processing techniques in the sequences (i.e., sequential processing) from least destructive to most destructive for the detection of friction ridge impressions. A visual examination shall be completed following every processing technique in every sequence.

4.2.1 The FSP shall document deviations from the processing sequences. The FSP may supplement and/or deviate from the sequences for the detection of friction ridge impressions in certain situations. Some examples of when the FSP may supplement and/or deviate from the sequences are as follows.

a) The item does not react to a processing technique as expected or reacts adversely to a chemical (e.g., thermal paper).

b) The item of evidence has an obvious known contaminant such as blood or grease.

c) The processing technique has not been validated to perform sufficiently in certain environmental conditions.

d) The size of the item does not allow for a specific processing technique that aligns to the required sequence.

4.3 Prior to applying specific processing techniques to evidence, the FSP shall assess the potential for negative implication to other types of examinations and communicate those concerns to the stakeholder.

4.3.1 Communication with the stakeholder regarding negative implications shall be documented. Some potential negative implications to consider are as follows.

a) Forensic light source(s), such as short-wave ultraviolet (UV) light source, and the potential negative impact on DNA examinations.

b) Cyanoacrylate dye stains and the potential negative impact on adhesive side processing, questioned documents, drug chemistry, and trace evidence examinations.

c) Porous chemical processing and the potential negative impact on thermal paper and Questioned Documents examinations.

d) Powder and the potential negative impact on electronic evidence examinations.

4.4 The FSP shall preserve potentially suitable friction ridge impressions prior to applying the next processing techniques within the processing sequence. The appropriate method for digital capture of the friction ridge impressions is up to the FSP.

4.5 The FSP shall establish appropriate health and safety practices, along with universal precautions to ensure the safety of personnel while maintaining the integrity of the evidence.

5 Processing Sequences

5.1 General

5.1.1 The broad class of sequences to be applied are based on the appropriate processes that are specific for a particular substrate and matrix combination and should be used for laboratory-based processing.

5.1.2 Many items of evidence consist of more than one physical property (e.g., a porous envelope with a glassine window). In those situations, the FSP shall apply the processing techniques using sequences appropriate for the relevant areas in a manner that does not negatively impact other areas of the evidence.

5.1.3 Wet items should be allowed to dry prior to processing. Once dried, processing of the items should proceed under one of the sequences listed below.

NOTE 1 The processing sequences below are meant to describe the most universal chemical processing sequences for routinely encountered substrates. It is not meant to be an exhaustive list of all available techniques.

NOTE 2 Guidance related to application, formulation, and optimization of specific processing techniques can be found in the publications listed in Annex A.

5.2 Non-porous

The following is the minimum processing sequence for non-porous items.

a) Visual.

b) Forensic light source(s).

c) Cyanoacrylate fuming.

d) Contrast, such as dye stain, forensic light source(s), and/or powder.

5.3 Porous

The following is the minimum processing sequence for porous items.

a) Visual.

b) Forensic light source(s).

c) Amino acid reagents: 1,2-Indanedione followed by Ninhydrin.

   If 1,2-Indanedione is not practical, another option is 1,8-Diazafluoren-9-one followed by Ninhydrin.

d) Sebaceous reagent: physical developer.

   If physical developer is not practical, another option is Oil Red O.

5.4 Semi-porous

The following is the minimum processing sequence for semi-porous items.

a) Visual.

b) Forensic light source(s).

c) Cyanoacrylate fuming.

d) Magnetic Powder.

If a fluorescent amino acid reagent is not going to be used, regular powder would be an acceptable alternative to magnetic powder.

e) Amino acid reagent: 1,2-Indanedione followed by Ninhydrin.

If 1,2-Indanedione is not practical, another option is 1,8-Diazafluoren-9-one followed by Ninhydrin.

f) Contrast, such as dye stain, forensic light source(s), and/or powder.

5.5 Adhesive

The following is the minimum processing sequence for adhesive surfaces.

a) Visual.

b) Forensic light source(s).

c) Adhesive side powder suspension/Gentian Violet/fluorescent reagent.

5.6 Blood

5.6.1 The bloody surface/item should be dried prior to processing.

5.6.2 Depending on the blood process used, a blood fixative may be needed prior to processing.

5.6.3 Examination by other forensic disciplines, such as DNA or trace evidence, should be completed prior to blood processing.

The following is the minimum processing sequence for bloody surfaces/items.

a) Visual.

b) Forensic light source(s).

c) Protein reagent/Heme reagent/Acid reagent.

d) Forensic light source(s) (if applicable).

Annex A
(informative)

Bibliography

This is not meant to be an all-inclusive list as other publications on this subject may exist. At the time this standard was drafted, these were the publications available for reference. Additionally, any mention of a particular software tool or vendor as part of this bibliography is purely incidental, and any inclusion does not imply endorsement.

1] *Fingerprint Sourcebook* v2 (second edition). United Kingdom: Home Office Centre for Applied Science and Technology. 2018.

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