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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 specifies (or establishes) broad class processing techniques 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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This document was revised, prepared, and finalized as a standard by the Friction Ridge Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Friction Ridge Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

Questions, comments, and suggestions for the improvement of this document can be sent to ASB Secretariat, asb@aafs.org or 410 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

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## Table of Contents *(to be updated prior to publication)*

# 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 that is deposited or removed by the friction ridge skin when making an impression (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 an item of interest is deposited (e.g., porous, non-porous).
*ISO 21043-1*[1]

## 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 a sequence (i.e., sequential processing) from least destructive to most destructive for the detection of friction ridge impressions.

**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 implications to other forensic discipline examinations, communicate those concerns to the stakeholder, and document the communication. (e.g., DNA, trace evidence, questioned documents, firearms, drug chemistry, etc.).

**4.3.1** The FSP shall have a written policy about communication with the stakeholder regarding negative implications to future examinations. If FSP personnel communicate with a stakeholder, it 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.

[1] 

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 FSP shall have a policy for the appropriate methods for digital imaging (e.g., scanning and photography) of the friction ridge impressions.

**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 processing sequences below are based on the appropriate techniques that are specific for a particular substrate and matrix combination and shall 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 these 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.

**5.1.4** Every processing sequence shall start with a visual examination and then also be completed following every processing technique.

## 5.2 Non-porous

The following is the minimum processing sequence an FSP shall perform 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 an FSP shall perform for porous items.

a) Visual.

b) Forensic light source(s).

c) Amino acid reagent(s) (e.g., 1,2 Indanedione, 1.8 Diazafluoren 9-one, Ninhydrin)

If a fluorescent reagent is used, it shall be used prior to Ninhydrin.

NOTE If the condition of the evidence supports the use of a sebaceous reagent, Oil Red O and/or physical developer may be used.

### 5.4 Semi-porous

The following is the minimum processing sequence an FSP shall perform 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(s) (e.g., 1,2 Indanedione, 1,8 Diazafluoren 9-one, Ninhydrin).

If a fluorescent reagent is used, it shall be used prior to Ninhydrin

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

### 5.5 Adhesive

The following is the minimum processing sequence an FSP shall perform 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 shall be dried prior to processing.

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

NOTE Examination by other forensic disciplines, such as DNA or trace evidence, may need to be preserved or completed prior to blood processing.

**5.6.3** The following is the minimum processing sequence an FSP shall perform 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

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide publications cited informationally, and publications relevant to the standard.

1] *Fingerprint Sourcebook* v2 (second edition). United Kingdom: Home Office Centre for Applied Science and Technology. 2017.

2] *The Fingerprint Sourcebook*. Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. 2011.

3] D'Elia, V., S. Materazzi, G. Iuliano, and L. Niola, L. "Evaluation and comparison of 1,2-indanedione and 1,8-diazafluoren-9-one solutions for the enhancement of latent fingerprints on porous surfaces", 2015, *Forensic Science International* (254), pp 205-214.

4] Levin-Elad, M., Y. Liptz, K.L. Bar-Or, and J. Almog, "1,2-Indanedione - A winning ticket for developing fingermarks: A validation study", 2017, *Forensic Science International* (271), pp 8-12.

5] Rawji, A. and A. Beaudoin. "Oil Red O Versus Physical Developer on Wet Paper: A Comparative Study," 2006. *Journal of Forensic Identification*, Vol 56 (1), pp 33-52.

6] Salama, J., S. Aumeer-Donovan, C. Lennard, and C. Roux. "Evaluation of the Fingermark Reagent Oil Red O as a Possible Replacement for Physical Developer", 2008. *Journal of Forensic Identification*, Vol 58 (2), pp 203-237.

7] Simmons, R. K., P. Deacon, and K.J. Farrugia. "Water-Soaked Porous Evidence: A Comparison of Processing Methods", 2014. *Journal of Forensic Identification*, Vol 64 (2), pp 157-173.

8] Wallace-Kunkel, C., C. Lennard, M. Stoilovic, and C. Roux. "Optimisation and evaluation of 1,2-indanedione of use as a fingermark reagent and its application to real samples", 2007. *Forensic Science International* (168), pp 14-26.


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