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Standard for Examining Friction Ridge Impressions

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410 North 21st Street
Colorado Springs, CO 80904

Foreword

This standard provides the minimum requirements for conducting the examination of friction ridge impressions. It includes the overarching examination framework as well as specific requirements for each component of the examination process. In addition to the requirements in this standard, best practice recommendations for the components of analysis, comparison, and evaluation will be provided in other ASB documents to provide guidance in meeting the requirements of this standard.

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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 AAFS-ASB Secretariat, asb@aafs.org or 401 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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Keywords: *friction ridge, impressions*

Table of Contents

Standard for Examining Friction Ridge Impressions

1 Scope

This document specifies the minimum requirements for conducting friction ridge examinations. It includes the overarching examination framework as well as specific requirements for each component of any examination process. This document includes minimum requirements for conducting, documenting, and justifying examinations based on clearly demonstrable and articulable criteria.

This document does not address how each requirement should be achieved.

This document does not address specific requirements for quality assurance/quality control of the examination process.

2 Normative References

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

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1
analysis (phase of the examination process)
The interpretation of observed data in a friction ridge impression in order to categorize its suitability/utility.

3.2
comparison (phase of the examination process)
The search for and detection of similarities and dissimilarities in observed data between friction ridge impressions.

3.3
complexity (of a comparison)
A characteristic of a comparison in which the attributes of one or both impressions may require additional consideration and quality assurance measures relating to the evaluation of a source conclusion.

3.4
complexity (of an impression)
A characteristic of an impression whose attributes may require additional consideration and quality assurance measures.

3.5
evaluation (phase of the examination process)
The weighting of the aggregate strength of the evidence (observed similarities and dissimilarities when considering two competing propositions) between the observed data in the friction ridge impressions being compared in order to formulate a source conclusion.

3.6
examiner (friction ridge) – (compare to trainee)
An individual who has successfully completed their FSP's training program, and is authorized to conduct independent friction ridge examinations for the FSP by observing and interpreting data, making decisions, forming conclusions and opinions, issuing reports and/or providing testimony. Use of the term "examiner" in these documents refers to a "friction ridge examiner" and not a "trainee." Refer to those definitions for further clarification.

3.7
exemplar impression
exemplar or known
exemplar prints
The deliberately recorded images or impressions from the friction ridge skin of an individual.

NOTE Examples may include, but are not limited to, inked tenprints, inked palm prints, Livescan prints, powder and lift prints, casted/moulded prints, or photographs of friction ridge skin.

3.8
f**orensic service provider**
FSP
Organization or individual that conducts and/or supplies forensic services.
ISO 21043-1[1]

3.9
friction ridge detail
friction ridge features
The combination of ridge flow, ridge characteristics, and ridge structure of friction ridge skin, as reproduced and observed in an impression. The observed data used to compare and interpret similarity or dissimilarity between impressions.

3.10
high quality impression
An impression with observed data that are unambiguous and self-evident due to high clarity and quantity.

3.11
interpretation
Explanations for the observations, data, and calculations.
OSAC Preferred Term

3.12
minutia
The point where a friction ridge terminates, or splits into two or more ridges. A subset of the friction ridge detail/features traditionally consisting of ridge endings, bifurcations, and dots, or any combination thereof, used to compare and interpret similarity and dissimilarity between two impressions.

[1]

3.13
observed data
Any information seen within an impression that an examiner may rely upon to reach a decision, conclusion, or opinion. This not only includes minutiae, but attributes such as clarity, scars, creases, edge shapes, pore structure, and other friction ridge features.

3.14
questioned impression (also questioned image or questioned item)
An impression or image of friction ridge skin whose source or identity is unknown; it can include latent impressions, impressions from an unknown source or a known source.

3.15
suitability (synonym of utility)
The usefulness of an impression for a further step in the examination process, such as comparison or Automated Biometric Identification System (ABIS) entry.

3.16
suitability decision (synonym of utility decision)
A decision made by an examiner in accordance with FSP policy and/or procedure as to whether or not an impression will proceed to the next step in the examination process.

3.17
suitability for Automated Biometric Identification System (ABIS) searches
(synonym of utility for Automated Biometric Identification System (ABIS) searches)
A decision made by an examiner in accordance with FSP policy and/or procedure as to whether or not an impression will proceed to an ABIS database search.

NOTE This designation is often referred to as "suitable for ABIS/AFIS" or "of value for ABIS/AFIS."

3.18
trainee [compare to examiner (friction ridge)]
An individual not yet authorized to conduct independent friction ridge examinations for the FSP; usually still in training, and has not yet successfully completed their FSP's training program.

4 Requirements

4.1 General

The examination of friction ridge impressions shall be conducted by a friction ridge examiner (as defined in 3.6), in accordance with the requirements in this standard. It includes the overarching examination framework as well as specific requirements for each component of the examination process.

4.2 Analysis

4.2.1 Analysis is the interpretation of observed data in a friction ridge impression in order to categorize its suitability/utility.

4.2.2 The FSP shall define the observed data examiners use during the examination of friction ridge impressions. Terminology derived from ANSI/NIST ITL 1-2015[1].

At a minimum the examiner shall consider the following observed data if present:

a) size and shape of the impression: the (surface area) and the outline of the impression border;

b) classification patterns: the presence, size, and shape of defined classifiable patterns present in the friction ridge skin (e.g., arch, loop, whorl);

c) cores and deltas: the existence, number, position, and shape of the cores and deltas;

d) ridge flows: the overall ridge flow that may lack a classifiable pattern but facilitate the search;

e) flexion crease: the existence, position, and path of flexion creases;

f) scars: the existence, position, and path of scars;

g) ridge paths: the location, direction, length, width, and curvature of the path of a ridge;

h) minutiae: the location, type, and direction of minutiae;

i) spatial relationships: the ridge counts, distances, directions, and angles between features.

In addition, the examiner should consider the following observed data if present:

a) secondary creases or wrinkles: the existence, position, path, and density of secondary creases or wrinkles;

b) incipient ridges: the location, direction, length, width, morphology, and density of incipient ridges;

c) pores: presence, location, and shape of pores;

d) occasional features: the existence, position, and path of occasional features (e.g., warts or healing skin);

e) ridge morphology: the edge shapes or texture of a ridge;

f) flexion crease morphology: the edge shapes or texture of a flexion crease;

g) scar morphology: the edge shapes or texture of a scar;

h) occasional feature morphology: the edge shapes or texture of an occasional feature.

4.2.3 The FSP shall define the suitability decisions that may be used in casework. This is an operational decision, not a scientific one, and FSP policies shall include a statement to this effect. At a minimum, the suitability decisions shall include suitability for proceeding to a comparison. If applicable, it shall also include suitability for an Automated Biometric Identification System (ABIS) search.

NOTE While there is no scientific basis for selecting a particular threshold to establish the suitability of an impression, an agency may choose to set a threshold for operational reasons, such as available resources. In theory, any friction ridge impression could be compared, but many are so fragmentary that a meaningful conclusion could not be reached or supported, thus it would be inefficient and ineffective to do so. Similarly,

an agency may make an operational decision not to proceed with comparison of some impressions because of a higher perceived risk of error.

4.2.4 The FSP shall have a written procedure for documenting the anatomical region(s) and orientation(s) assigned.

4.2.5 The FSP shall define the criteria for suitability decisions. At a minimum, the criteria shall include the observed data necessary to support the suitability of the impression.

4.2.6 The FSP shall have a written procedure for documenting which impressions will proceed to a further step (commonly known as "of value" or "suitable") and, if applicable, Automated Biometric Identification System (ABIS) search. This procedure shall include a process for indicating which impressions will not proceed to a further step (commonly known as "no value" or "not suitable" impressions).

NOTE 1 This may be achieved by a blanket policy stating that any unlabeled impressions will not proceed to a further step.

NOTE 2 "Unlabeled" means an impression that has not been marked or otherwise designated for further use.

4.2.7 The FSP shall have a written procedure for designating and documenting which impressions are "complex" and may have a procedure for designating and documenting which impressions are "high quality."

4.2.8 The FSP shall have a written procedure for documenting the information that supports the suitability decision. The procedure shall address the following.

a) Process of documentation (e.g., marking hard-copies or using software programs).

   NOTE For Automated Biometric Identification System search processes, the auto-encoded features may be retained as documentation.

b) Documentation of the support for the suitability decision. This shall include, at a minimum, the observed data relied upon. Documentation of the observed data in the questioned friction ridge impression shall take place prior to proceeding to the next step.

c) Criteria for increasing or decreasing the level of documentation of the information (generally based on the complexity of the impression or the complexity of the comparison).

4.3 Comparison

4.3.1 Comparison is the search for and detection of similarities and dissimilarities in observed data between friction ridge impressions.

4.3.2 The FSP shall have a written procedure for specifying and documenting which questioned friction ridge impressions and exemplars were compared.

4.3.3 The FSP shall have a written procedure for documenting relevant information regarding the exemplar friction ridge impression (e.g., name, identifier, date recorded).

4.3.4 The FSP shall have a written procedure for documenting exemplar friction ridge impressions that are not suitable to complete comparisons.

NOTE 1 Requirements for documentation of corresponding regions are specified in 4.4.5.

NOTE 2 The requirements in 4.3 do not apply to comparisons made during Automated Biometric Identification System (ABIS) candidate list screening/comparison.

4.4 Evaluation

4.4.1 Evaluation is the weighting of the aggregate strength of the evidence (observed similarities and dissimilarities when considering the two competing propositions) between the observed data in the friction ridge impression(s) being compared in order to formulate a source conclusion.

4.4.2 The FSP shall define the conclusions available for use in casework.

4.4.3 The FSP shall define the criteria for each conclusion.

4.4.4 The FSP shall require that the conclusion reached for each comparison be recorded.

4.4.5 The FSP shall have a procedure for documenting the relevant data that was evaluated to reach a conclusion. The procedure shall address the following.

a) Process of documentation (e.g., marking hard-copies or using software programs).

b) The observed data that was evaluated to reach a conclusion.

c) Criteria for increasing the documentation of the observed data (generally based on the complexity of the impression or the comparison) or decreasing the documentation of the observed data (generally based on the high quality of the impression).

d) Changes in the interpretation of the observed data in the questioned friction ridge impression after the initiation of the comparison process.

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 examples of publications addressed in the standard.

1] ANSI_NIST_ITL_1-2015 - American National Standard for Information Systems - Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information[2]

[1] Available from: https://www.nist.gov/programs-projects/ansinist-itl-standard

Academy Standards Board
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Colorado Springs, CO 80904

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