



Document #19
Standard Terminology of Friction Ridge Examination¹
(Latent/Tenprint)

ACE-V

The acronym for a scientific method; Analysis, Comparison, Evaluation, and Verification (see individual terms).

AFIS

The acronym for Automated Fingerprint Identification System, a generic term for a fingerprint matching, storage, and retrieval system.

Analysis

The first step of the ACE-V method. The assessment of an impression to determine suitability for comparison.

APIS

The acronym for Automated Palmprint Identification System, a generic term for a palmprint (or complete friction ridge exemplar) matching, storage, and retrieval system.

Arch – plain

A pattern type in which the friction ridges enter on one side of the impression and flow, or tend to flow, out the other side with a rise or wave in the center.

Arch - tented

A pattern type that possesses either an angle, an upthrust, or two of the three basic characteristics of the loop.

Artifact

1. Any distortion or alteration not in the original friction ridge impression, produced by an external agent or action.

¹ This document provides standard definitions for relevant terminology used in the friction ridge discipline. Common definitions found in other reference sources may not be included.

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2. Any information not present in the original object or image, inadvertently introduced by image capture, processing, compressions, transmission, display, or printing.

Bias

See cognitive bias, confirmation bias, and contextual bias.

Bifurcation

The point at which one friction ridge divides into two friction ridges.

Blind verification

The independent examination of one or more friction ridge impressions at any stage of the ACE process by another competent examiner who is provided with no, or limited, contextual information, and has no expectation or knowledge of the determinations or conclusions of the original examiner.

Bridge

A connecting friction ridge between, and generally at right angles to, parallel running friction ridges.

Characteristics

Distinctive details of the friction ridges, including Level 1, 2, and 3 details (also known as features).

Cognitive bias

The effect of perceptual or mental processes on the reliability and validity of one’s observations and conclusions.

Comparison

The second step of the ACE-V method. The observation of two or more impressions to determine the existence of discrepancies, dissimilarities, or similarities.

Competency

Possessing and demonstrating the requisite knowledge, skills, and abilities to successfully perform a specific task.

Complete friction ridge exemplars

A systematic recording of all friction ridge detail appearing on the palmar sides of the hands. This includes the extreme sides of the palms, joints, tips, and sides of the fingers (also known as major case prints).

Complex examinations

The encountering of uncommon circumstances during an examination (e.g., the existence of high distortion, low quality or quantity, the possibility of simultaneity, or conflicts among examiners).

Consensus determination or conclusion

Agreement reflecting the collective judgment of a group of examiners trained to competency when making determinations or conclusions with respect to one or more impressions.

Conclusion

Determination made during the evaluation stage of ACE-V, including individualization, inconclusive, exclusion.

Confirmation bias

The tendency to search for data or interpret information in a manner that supports one’s preconceptions.

Conflict

A difference of determinations or conclusions that becomes apparent during, or at the end of, an examination.

Consultation

A significant interaction between examiners regarding one or more impressions in question.

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Contextual bias

The effect of information or outside influences on the evaluation and interpretation of data.

Core

1. The approximate center of a fingerprint pattern.
2. A specific formation within a fingerprint pattern, defined by classification systems such as Henry.

Delta

The point on a friction ridge at or nearest to the point of divergence of two type lines, and located at or directly in front of the point of divergence. Also known as a tri-radius.

Deviation

1. A change in friction ridge path.
2. An alteration or departure from a documented policy or standard procedure.

Discrepancy

The presence of friction ridge detail in one impression that does not exist in the corresponding area of another impression (compare with dissimilarity).

Dissimilarity

A difference in appearance between two friction ridge impressions (compare with discrepancy).

Dissociated ridges

1. Disrupted, rather than continuous, friction ridges.
2. An area of friction ridge units that did not form into friction ridges, generally due to a genetic abnormality.

Distortion

Variances in the reproduction of friction skin caused by factors such as pressure, movement, force, and contact surface.

Dot

An isolated friction ridge unit whose length approximates its width in size.

Edgeoscopy

1. Study of the morphological characteristics of friction ridges.
2. Contour or shape of the edges of friction ridges.

Elimination prints

Exemplars of friction ridge skin detail of persons known to have had legitimate access to an object or location.

Enclosure

A single friction ridge that bifurcates and rejoins after a short course and continues as a single friction ridge.

Ending ridge

A single friction ridge that terminates within the friction ridge structure.

Erroneous exclusion

The incorrect determination that two areas of friction ridge impressions did not originate from the same source.

Erroneous individualization

The incorrect determination that two areas of friction ridge impressions originated from the same source.

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Error

A conclusion reached by an examiner that contradicts the mating status of two impressions, and therefore is probably wrong (compare with non-consensus decision).

Evaluation

The third step of the ACE-V method wherein an examiner assesses the value of the details observed during the analysis and the comparison steps and reaches a conclusion.

Exclusion

The determination by an examiner that there is sufficient quality and quantity of detail in disagreement to conclude that two areas of friction ridge impressions did not originate from the same source.

Exemplars

The prints of an individual, associated with a known or claimed identity, and deliberately recorded electronically, by ink, or by another medium (also known as known prints).

False-negative rate (FNR)

The proportion of the comparisons between mated prints that result in an erroneous exclusion conclusion.

False-positive rate (FPR)

The proportion of the comparisons between non-mated prints that result in an erroneous individualization conclusion.

Features

Distinctive details of the friction ridges, including Level 1, 2, and 3 details (also known as characteristics).

Fingerprint

An impression of the friction ridges of all or any part of the finger.

Focal points

1. In classification, the core(s) and the delta(s) of a fingerprint.
2. Another term for target group.

Friction ridge

A raised portion of the epidermis on the palmar or plantar skin, consisting of one or more connected ridge units.

Friction ridge detail (morphology)

An area comprised of the combination of ridge flow, ridge characteristics, and ridge structure.

Friction ridge examiner

A person who analyzes, compares, evaluates, and verifies friction ridge impressions.

Friction ridge unit

A single section of ridge containing one pore.

Furrows

Valleys or depressions between friction ridges.

Galton details

Term referring to friction ridge characteristics (also known as minutiae) attributed to the research of English fingerprint pioneer, Sir Francis Galton.

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Ground truth

Definitive knowledge of the actual source of an impression.

Henry Classification

An alpha-numeric system of fingerprint classification named after Sir Edward Richard Henry used for filing, searching, and retrieving tenprint records.

IAFIS

The acronym for Integrated Automated Fingerprint Identification System, the FBI's national AFIS.

Identification

1. See individualization.
2. In some forensic disciplines, this term denotes the similarity of class characteristics.

Impression

Friction ridge detail deposited on a surface.

Incipient ridge

A friction ridge not fully developed that may appear shorter and thinner than fully developed friction ridges.

Inconclusive

The determination by an examiner that there is neither sufficient agreement to individualize, nor sufficient disagreement to exclude.

Individualization

The determination by an examiner that there is sufficient quality and quantity of detail in agreement to conclude that two friction ridge impressions originated from the same source.

Joint (of the finger)

The hinged area that separates segments of the finger.

Known prints (finger, palm, foot)

The prints of an individual, associated with a known or claimed identity, and deliberately recorded electronically, by ink, or by another medium (also known as exemplars).

Latent print

1. Transferred impression of friction ridge detail not readily visible.
2. Generic term used for unintentionally deposited friction ridge detail.

Level 1 detail

Friction ridge flow, pattern type, and general morphological information.

Level 2 detail

Individual friction ridge paths and associated events, including minutiae.

Level 3 detail

Friction ridge dimensional attributes, such as width, edge shapes, and pores.

Lift

An adhesive or other medium used to transfer a friction ridge impression from a substrate.

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Loop

A pattern type in which one or more friction ridges enter upon one side, recurve, touch or pass an imaginary line between delta and core and flow out, or tend to flow out, on the same side the friction ridges entered. Types include left slant loops, in which the pattern flows to the left in the impression; right slant loops, in which the pattern flows to the right in the impression; radial loops, in which the pattern flows in the direction of the radius bone of the forearm (toward the thumb); and ulnar loops, in which the pattern flows in the direction of the ulna bone of the forearm (toward the little finger).

Major case print

A systematic recording of the friction ridge detail appearing on the palmar sides of the hands. This includes the extreme sides of the palms, joints, tips, and sides of the fingers (also known as complete friction ridge exemplars).

Mark

Term commonly used in the United Kingdom and some Commonwealth countries to designate a latent print.

Mated impressions

Impressions intentionally collected to originate from the same source, and used for the purpose of measuring error rates.

Matrix

The substance that is deposited or removed by the friction ridge skin when making an impression.

Minutiae

Events along a ridge path, including bifurcations, ending ridges, and dots (also known as Galton details).

Missed exclusion

The failure to make an exclusion when in fact the friction ridge impressions are non-mated (includes false positive, non-consensus inconclusive and non-consensus no value).

Missed individualization

The failure to make an individualization when in fact both friction ridge impressions are mated (includes false negative, non-consensus inconclusive and non-consensus no value).

Negative predictive value (NPV)

The proportion of exclusion determinations that are correct.

NGI

The acronym for Next Generation Identification, the updated version of IAFIS.

Non-consensus determinations of no value

Decisions of no value that conflict with the consensus.

Non-consensus determination of suitability

When an examiner's determination of suitability does not concur with consensus. Suitability determinations include non-consensus no value, and non-consensus value decisions.

Non-consensus determination of value

Decisions of value that conflict with the consensus.

Non-consensus exclusion conclusion

When an examiner reaches a decision of exclusion that conflicts with the consensus, exclusive of false negative errors.

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Non-consensus inconclusive

When an examiner reaches a decision of inconclusive that conflicts with the consensus, exclusive of false positive and negative errors.

Non-consensus individualization conclusion

When an examiner reaches a decision of individualization that conflicts with the consensus, exclusive of false positive errors.

Non-mated impressions

Impressions intentionally collected to originate from different sources, and used for the purpose of measuring error rates.

Original image

An accurate replica (pixel for pixel) of the primary image.

Palmprint

An impression of the friction ridges of all or any part of the palmar surface of the hand.

Pattern classification

Sub-division of pattern type, defined by classification systems such as Henry or National Crime Information Center (NCIC) classifications.

Pattern type

Fundamental pattern of the ridge flow: arch, loop, whorl. Arches are subdivided into plain and tented arches; loops are subdivided into radial and ulnar loops; whorls are subdivided into plain whorls, double loops, pocket loops, and accidental whorls.

Phalanx/Phalange

- 1. A bone of the finger or toe.
- 2. Sometimes used to refer to a segment of a finger.

Poroscopy

A study of the size, shape, and arrangement of pores.

Positive predictive value (PPV)

The proportion of individualization decisions that are correct.

Primary image

The first recording of an image onto media.

Proficiency

The ongoing demonstration of competency.

Quality

The clarity of information contained within a friction ridge impression.

Quantity

The amount of information contained within a friction ridge impression.

Ridge flow

- 1. The direction of one or more friction ridges.
- 2. A component of Level 1 detail.

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Ridge path

1. The course of a single friction ridge.
2. A component of Level 2 detail.

Ridge unit

See friction ridge unit.

Segment (of the finger)

The proximal, medial, or distal section of the finger.

Short ridge

A single friction ridge beginning, traveling a short distance, and then ending.

Simultaneous impression

Two or more friction ridge impressions from the same hand or foot deposited concurrently.

Source

An area of friction ridge skin from an individual from which an impression originated.

Spur

A bifurcation with one short friction ridge branching off a longer friction ridge.

Stand-alone

A segment of a simultaneous impression that has sufficient information to arrive at a conclusion of individualization independent of other impressions within the aggregate.

Substrate

The surface upon which a friction ridge impression is deposited.

Sufficiency

The product of the quality and quantity of the objective data under observation (e.g., friction ridge, crease, and scar features).

Sufficient

The determination that there is sufficiency in a comparison to reach a conclusion at the evaluation stage.

Suitable

The determination that there is sufficiency in an impression to be of value for further analysis or comparison.

Target group

A distinctive group of ridge features (and their relationships) that can be recognized.

Technical review

Review of notes, documents, and other data that forms the basis for a scientific conclusion (see *ASCLD-LAB 2008 Manual*).

Tenprint

1. A generic reference to examinations performed on intentionally recorded friction ridge impressions.
2. A controlled recording of an individual's available fingers using ink, electronic imaging, or other medium.

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Tolerance

The amount of variation in appearance of friction ridge features to be allowed during a comparison, should a corresponding print be made available.

Trifurcation

The point at which one friction ridge divides into three friction ridges.

Type lines

The two innermost friction ridges associated with a delta that parallel, diverge, and surround or tend to surround the pattern area.

Verification

The independent application of the ACE process as utilized by a subsequent examiner to either support or refute the conclusions of the original examiner; this may be conducted as blind verification. Verification may be followed by some level of review as specified by agency policy.

Whorl - accidental

1. A pattern type consisting of the combination of two different types of patterns (excluding the plain arch) with two or more deltas.
2. A pattern type that possesses some of the requirements for two or more different types of patterns.
3. A pattern type that conforms to none of the definitions of a pattern.

Whorl - central pocket loop

A pattern type that has two deltas and at least one friction ridge that makes, or tends to make, one complete circuit, which may be spiral, oval, circular, or any variant of a circle. An imaginary line drawn between the two deltas must not touch or cross any recurving friction ridges within the inner pattern area.

Whorl - double loop

A pattern type that consists of two separate loop formations with two separate and distinct sets of shoulders and two deltas.

Whorl - plain

A fingerprint pattern type that consists of one or more friction ridges that make, or tends to make, a complete circuit, with two deltas, between which, when an imaginary line is drawn, at least one recurving friction ridge within the inner pattern area is cut or touched.

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1. Revision Table

Version	Effective Start	Effective End	Posted	Archived	Change
3.1	02/11/11	11/16/12	09/04/12	11/16/12	Added in terms from new documents
4.0	11/16/12	N/A	11/24/12	N/A	No change to content Reformatted (start of new version number)
4.1	03/14/13	N/A	04/27/13	N/A	Change in definition of "original image"

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