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Codes of Practice and Conduct

**Friction Ridge Detail (Fingerprint) Examination –
Terminology, Definitions and Acronyms**

FSR-C-126

Issue 2

Archived

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1. Introduction

This document was compiled under the auspices of the Forensic Science Regulator's Fingerprint Quality Standard Specialist Group (FQSSG) and provides terminology, definitions and abbreviations used in friction ridge detail (fingerprint) examination.

This document complements the Forensic Science Regulator's Friction Ridge Detail (Fingerprint) Comparison FSR-C-128 and Friction Ridge Detail (Fingermark) Visualisation and Imaging, FSR-C-127 appendices to the Forensic Science Regulator's Codes of Practice (the Codes) and the Home Office's Fingermark Visualisation Manual.

This document does not use terminology used in international standards and legal definitions other than to translate meanings applicable to fingerprint (friction ridge detail) examination.

2. Scope

This applies to fingerprint examination provided to the Criminal Justice System of England and Wales only.

3. Terms And Definitions

The terms and definitions set out in the Forensic Science Regulator's Codes of Practice (the Codes) and FSR-C-128 Friction Ridge Detail (Fingerprint) Comparison also apply.

4. Modification

This is the second issue of this document.

Some of the modifications made to create Issue 2 were to ensure compliance with The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018. There is an updated copyright statement, some reformatting, and provision of text alternatives where information has been presented in a non-text format. Any references that have necessarily changed with the passage of time have been refreshed. The nature of these changes is

not detailed, but changes such as those required to correct spelling and grammar and to update references which are altered by the passage of time are not included. Parts of this document which have been significantly altered from the previous issue are highlighted in grey in the following sections: Copyright, 4, 6.

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In all cases the normal document, bearing the identifier FSR-#-###, is to be taken as the definitive version of the document. In the event of any discrepancy between the normal version and a modified version the text of the normal version shall prevail.

5. Implementation

The terminology set out in this document is available for use and incorporation into a provider's quality management system from the date of publication.

6. Definitions

Accidental: A minority pattern that does not conform to the arch, loop or whorl type and yet possesses characteristics common to all three types. The major part of the print usually conforms to the arch pattern, but tightly fitted into the core are usually two facing deltas (or apparent deltas). These tend to give the appearance of a whorl, although no true unspoilt circuit of ridge may exist.

Accreditation: Formal recognition through external assessment that an organisation is competent to perform specific processes, activities or tasks

(which are detailed in a scope of accreditation) in a reliable, credible and accurate manner. Accreditation underpins the quality of results by ensuring their traceability, comparability, validity and commutability.

ACE: Analysis, Comparison and Evaluation, see FSR-C-128 Appendix to the Codes – **Friction Ridge Detail** (Fingerprint) Comparison.

Achievable Resolution: Is a direct measurement of the ability of an imaging system to record detail. It is typically measured by its ability to maintain separation between close subject elements such as fine lines, which are usually stated as 'line pairs or cycles per millimetre'. It is often determined by imaging a resolution test chart. With some imaging systems there may be a slight difference in the horizontal and vertical resolution. If so, the lower of the two values is considered the achievable resolution of the imaging system. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary]

Acid Black 1: An Acid Dye that stains proteins blue-black.

Acid Dye [1]: An anionic dye characterised by substantivity for protein fibres and often applied from an acid dye bath. [Source: 1988, The Society of Dyers and Colourists, Colour Terms and Definitions]

Acid Dye [2]: A collective term for a class of chemical process used to stain proteins present in blood and other protein-rich cores to give a coloured or fluorescent product. See Acid Black 1, Acid Violet 17 and Acid Yellow 7.

Acid Violet 17: An Acid Dye that stains proteins purple.

Acid Yellow 7: An Acid Dye that stains proteins and fluoresces yellow.

Acquired Biometric Sample: Analogue or digital representation of biometric characteristics directly taken from a subject by a sensor. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Adhesive Tape Removal: A preparation process used to separate adhesive surfaces from substrates in order to expose the previously inaccessible internal surfaces for subsequent fingerprint visualisation.

Agreement: The ridge flow, characteristics and/or details appear in the same relative position with the same intervening ridge count, allowing for explainable differences, so as to enable the practitioner to reach their conclusion.

Algorithm: Sequence of instructions that tell a biometric system how to solve a particular problem. [Source: ISO/IEC 19794-2:2011 Information technology – Biometric data interchange formats – Part 2: Finger minutiae data]

Aluminium Powder: A silver-coloured, highly reflective, metal flake powder.

Amino Acid Reagent: A collective term for a class of chemical process that react with either the amine or carboxylic acid groups of the amino acids and proteins present in latent fingermarks. See DFO, Indandione and Ninhydrin.

Analysis: The first step of the ACE test process, see FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Anchor Point: A clearly defined feature or cluster of features that is the starting point for the analysis and comparison. Also known as a reference point.

Ante Mortem Fingerprints: Fingerprints or mark information collected to aid the identification of deceased person(s). This information can be sourced from documents known to belong to the deceased that have been 'signed' with an inked impression from one of their digits, or from examination of items known to have been handled by them whilst living. This is often collected in conjunction with DNA samples.

Approximating Arch: An area of friction ridge detail where the ridges run from side to side making no backward turn. There is an appearance of a delta. Approximating arches can appear to flow in either a radial or ulnar direction.

Arbitration: The process of resolving any variance of opinion.

Arch (Plain): In a plain arch the ridges run from side to side making no backward turn. There is no delta or approximation to a delta.

Archive Copy: A copy of data placed on media suitable for long-term storage, from which subsequent working copies can be produced. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary]

Area Not Revealed: When a person's (subject's) friction ridge detail is recorded as a control print, not every bit of friction ridge detail will be recorded, as there is limited size and space on the form. A mark retrieved from a scene or an exhibit may be from one of the areas not represented on the tenprint, but may appear on another print set.

Artifact: A visual/aural aberration in an image, video, or audio recording resulting from a technical or operational limitation. Examples include speckles in a scanned picture or 'blocking' in images compressed using the JPEG standard. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary]

Aspect Ratio: The width to height ratio of a pixel or the captured image. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Automatic Match: The use of an algorithm to arrive at a biometric comparison decision when comparing one or many submitted biometric sample(s) against one or many biometric sample(s) within the biometric service data set(s), which results in a positive outcome with no human intervention.

Background Disturbance: A feature of the background (such as the texture or pattern) of the substrate (surface) on which the mark is deposited, which affects the appearance and resultant interpretation of the friction ridge flow or ridge details. See interference.

Basal Layer: The deepest layer of the epidermis and the generating layer in the skin. If this layer is damaged it leads to the cells being unable to reproduce and replace themselves. This damage results in a permanent scar.

Basic Red 14: A Superglue Fluorescent Dye Stain that stains polycyanoacrylate (superglue) red and fluoresces with an orange/red colour.

Basic Violet 3: A chemical process that stains some fatty constituents of sebaceous sweat, shed skin cells and some greasy contaminants resulting in visible fingermarks that are purple in colour. Some marks produced can be further enhanced by Fluorescence Examination.

Basic Yellow 40 (By40): A Superglue Fluorescent Dye Stain that stains polycyanoacrylate (superglue) and fluoresces yellow.

Bifurcation: An area where a ridge divides or forks into two and the parallel ridges on either side diverge to make room for it.

Biometric: See ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

Biometrics: Automated recognition of subjects based on their behavioural and biological characteristics, for example, fingerprints. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Candidate: The biometric data record stored in a database, determined to be sufficiently similar to the biometric data being searched against on that database to warrant further analysis.

Biometric Candidate List: A set of zero, one or more biometric candidates that may be intermediate or final. Intermediate lists may be produced by systems that use multi-pass biometric identification. Biometric candidate lists may or may not be ordered. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Candidate Score: The comparison score for a biometric candidate. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Capture: Obtain and record, in a retrievable form, signal(s) of biometric characteristic(s) directly from subject(s) or from representation(s) of biometric characteristic(s), for example, a photograph of friction ridge detail. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Capture Device: Device that collects a signal from a biometric characteristic and converts it to a biometric sample that is stored as biometric data that comprise part of the biometric data record. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Characteristic: Biological and behavioural characteristic of a subject from which distinguishing, repeatable biometric features can be extracted for the purpose of biometric recognition. In fingerprints this is the friction ridge

topography of the inner surface of the hand. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Comparison: The automated process of measuring the similarity or difference between the biometric features of a biometric sample against stored biometric samples. For example, Print to Mark, Mark to Print or Print to Print.

Biometric Comparison Decision: Determination of whether two biometric samples have the same biometric source, based on a comparison score(s), a decision policy (ies) including a threshold, and possibly other inputs. A 'match' is a positive comparison decision. A 'non-match' is a negative comparison decision. A decision of 'undetermined' may sometimes be given. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Comparison Score [1]: Numerical value (or set of values) resulting from an algorithmic comparison (a high value does not necessarily mean more similar). [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Comparison Score [2] Dissimilarity/ Distance: A comparison score that decreases with similarity.

Biometric Comparison Score [3] Similarity: A comparison score that increases with similarity.

Biometric Data: A biometric sample or aggregation of biometric samples used at any stage of the process, for example, prints or friction ridge detail from marks.

Biometric Data Record: A data record containing biometric data (and may include non-biometric data). [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Enrolment: The process of collecting acquired biometric samples from a subject and the subsequent preparation and storage of biometric reference templates or models. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Biometric Enrolment Registration: Act of creating and storing a record of the enrolment in accordance with an enrolment policy. In some cases it might not involve storage of biometric data, for example, when biometric data from an enrollee cannot be acquired. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Feature [1]: Numbers or labels extracted from biometric samples and used for comparison. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Feature [2]: Concise representation of information extracted from an acquired or intermediate biometric sample by applying a mathematical transformation.

Note 1 to entry: The use of this term should be consistent with its use by the pattern recognition and mathematics communities.

Note 2 to entry: For the purpose of this document, biometric features are finger pattern spectral components. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Biometric Feature Extraction: Process applied to a biometric sample with the intent of isolating and outputting repeatable and distinctive numbers or labels that can be compared with those extracted from other biometric samples. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Identification: See ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

Biometric Mode: Refers to a specific class of biometric data, for example, fingerprints or DNA.

Biometric Model: See ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

Biometric Quality Score: Quantitative value of the fitness of a biometric sample to accomplish or fulfil the comparison decision. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Recognition: Automated recognition of individuals based on their biological and behavioural characteristics. (Automated recognition implies that a machine-based system is used for the recognition either for the full process or assisted by a human being.) [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Sample [1]: Analogue or digital representation of biometric characteristics prior to biometric feature extraction. A biometric sample may be attributable to either a specific subject (known source) i.e. a reference sample, or representation(s) such as images of fingermarks taken from a crime scene (unknown source). A record containing the image of a finger is an example of a biometric sample. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric Sample [2]: Data obtained from a biometric device, either directly or after processing. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Biometric Service: The operational provision of a biometric system to the user(s), incorporating the associated business and technical requirements.

Biometric System [1]: System for the purpose of the biometric recognition of individuals based on their behavioural and biological characteristics. A biometric system will contain both biometric and non-biometric components. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Biometric System [2]: An automated system capable of:

capturing an acquired biometric sample from a subject;

optionally extracting biometric features from that acquired biometric sample;

comparing the biometric features (or acquired biometric sample) with those contained in one or more reference templates or models;

deciding how well they ‘match’; and

indicating whether or not a recognition has been made.

[Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Black Granular Powder: A popular granular powder consisting of predominantly carbon black, which is suitable for use on smooth surfaces and outperforms others in its class.

Black Magnetic Powder: A two-component magnetic granular powder that is particularly suited for use on textured surfaces and outperforms others in its class. Historically was known as magna powder.

Blind Verification: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Blurred: When there is movement in the friction ridge detail caused by the movement of the hand/foot or the surface the impression has been left on. The friction ridge detail may become hard to analyse due to decrease in the clarity of the friction ridges.

Brass Alloy Powder: A collective term for brass-based metal flake powder. Examples include gold and bronze powder where the names reflect the colour of the powder rather than the chemical composition.

Broken Up: The mark appears to be discontinuous or disrupted due to:

- a. the surface it was left on; or
- b. the development process; or
- c. a skin condition.

See fragmented.

Cadaver: The body of a deceased person.

Cadaver Prints: See post mortem set.

Carpal Delta: A delta formation nearest to the wrist on the palm. The positioning can differ from person to person. The position of the carpal delta may help with the orientation of an impression.

Casting: Covering the surface of the skin (epidermis) with a malleable material that, when set, will form a three dimensional reproduction of the ridge detail

present. There are many commercially available materials suitable for this process.

Central Pocket: Possessing the attributes of a whorl, a central pocket is a very lopsided type of whorl where the two deltas are of varying distances from the core. One delta is typically quite close to the core, while the other is much further away.

Certified Copy: A copy of a control set of friction ridge detail that has been authenticated.

Characteristic: During the formation of friction ridge detail, the ridges may develop distinctive breaks or deviations, which practitioners refer to as characteristics, deviations, Galton's details or minutiae. The sequencing and random positioning of the characteristics and other features allow the friction ridge detail to be used as a means of human identification. There are two true characteristics:

- a. bifurcation; and
- b. ridge ending.

There are also a number of features which are formed by a combination of one or more characteristics, for example:

- a. a crossover;
- b. a short independent ridge;
- c. lake; and
- d. spur.

Each of these terms is defined separately in this document

Chemical Process: A visualisation process where the principal interaction is chemical in nature, for example, by means of a reaction between a chemical and the fingerprint or by a staining action.

Clarity: The visual quality of the friction ridge detail.

Class Resolution: The value of resolution (scanning or nominal) used to name (or identify) an acquisition process or image, where the resolution is within a specified tolerance around that value.

Example: A scanner is referred to as '500 ppi' (class resolution) if the native scanning resolution is within 1 per cent (%) (5 ppi). [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Closed Delta: The delta is formed when a single ridge forks into two arms, opens out effecting a triangular shaped pattern enclosing the core area.

Cognitive Bias: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Coincident Sequence: This occurs when the same friction ridge features are in the same relative position with the same intervening friction ridge count, in sufficient quantity and allowing for explainable differences in both impressions. The ability or inability to establish a coincident sequence will assist the practitioner with their conclusion.

Collaborative Exercise: An inter-laboratory comparison exercise to determine the performance characteristics of a method or procedure, to establish the effectiveness and comparability of tests (new versus current) or measurement methods, or to assign values to reference materials and assess their suitability for use in specific test or measurement procedures.

Colour Filtration: An optical process used to further enhance fingermarks that are already visible in situations where the fingermark, the background, or both are coloured. The process utilises the colour characteristics of the mark and/or surface and involves selection of appropriately coloured filters and/or light sources to alter the contrast of the mark relative to the background.

Comparison: An evaluation of the similarities and differences between two areas of friction ridge detail, it can be performed manually such as in the second step of the ACE test process (see FSR-C-128 Friction Ridge Detail (Fingerprint) Comparison) or by an automated computer algorithm.

Competence: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Complex (Challenging) Mark: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison.

Complex Comparison: Attributes within the mark and/or print that introduce an increased level of difficulty to the comparison step/stage.

Composite: A composite consists of a complicated combination of patterns possessing three or more deltas.

Conclusion: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison , and reporting outcomes below.

Connective Ambiguity: See Transitional features.

Contaminant [1]: A substance other than a naturally occurring constituent of sweat secretions from the skin that may be found in fingermarks or be the major constituent of them (for example, grease, blood).

Contaminant [2]: Any substance not relevant to recovery and analysis of a particular evidence type, but that is present on the item or surface and may interfere with the recovery and analysis processes (for example, dirt, drugs residue).

Contaminant [3]: A substance capable of being transferred from surface to surface and that may cause a nuisance or hazard to those coming into unprotected contact with it (for example, blood, processing chemicals).

Contamination (Cross): The undesirable presence of a substance not originally associated with a particular item or surface at the time that the event relevant to the crime occurred, introduced by subsequent transfer from another source (for example, DNA picked up from one crime scene transferred to an item recovered from another).

Contemporaneous Notes: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Continuity: A chronological record of events with regards to either a case or an exhibit to form an audit trail. The continuity of a case is to show the signed, dated actions of all individuals (practitioners) involved, such as when a case arrives, who has worked on it, identified it, confirmed and verified the identification. Continuity of an exhibit demonstrates secure custodianship.

Control Print: The prints of a person (subject), associated with a known or claimed identity. See known prints, Livescan, plantar prints, reference sample and tenprints.

Converging Loop: A converging loop has the same basic attributes as a loop but in addition the ridges within the pattern of the core area converge.

Core [1]: The approximate centre of a friction ridge pattern.

Core [2]: A singular point in the fingerprint where the curvature of the ridges reaches a maximum. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Crease: A linear depression on the surface of the hand or foot. These may be grooves at the joint of the phalanges, at the junction of the digits and across the palmar and plantar surfaces that allow flexion. The flow and the appearance of the creases can be useful for orientating a mark.

Critical Findings: See FSR-C-128 Appendix to the Codes – **Friction Ridge Detail** (Fingerprint) Comparison .

CRO Number: A unique Criminal Record Office number assigned to an individual person (subject).

Crop: Removal of the outer regions of an image to reduce the size. [Source: Adapted from ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Cross Hatching: A term that describes the crease pattern that is generally found in the thenar area of the palm. These creases intersect other creases running in a perpendicular direction, giving a 'grid-like' appearance.

Crossover: This appears as a short ridge that, as its name suggests, crosses over the space between parallel ridges forming a link between them.

Cyanoacrylate (CNA): See Superglue Fuming.

Databases: Collections of data and associated material designed to provide information rather than for archive, which are stored systematically in hard copy or electronic format and are, for example, used for:

storing known source data, for example, ground truth or PEDB;

providing information on the possible origin of objects or substances found in casework; and/or

providing statistical information.

Dead Set: The term used for a post mortem set of finger and palm prints. See cadaver prints and post mortem set.

De-Gloved/De-Gloving: Where the epidermis becomes loose and finally detached during the decomposition of a cadaver or other post mortem processes.

Delta: A triangular type formation in the friction ridge flow, where ridges flowing in three different directions meet. Deltas are usually found in the bottom half of the finger impressions, offset to either the left or the right (or both). Two of the 'branches' of the delta will usually open out to enclose the core area. Deltas appear in all patterns except arches and also appear on various parts of the palm. Deltas can be classified as either 'open' or 'closed'. See open delta and closed delta and ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data.

Deposition Pressure: The amount of force applied per unit area by the finger on the surface. This can affect both the extent of the final contact area as well as the degree of compression of the ridges and possibly of the substrate. See Pressure Distortion.

Dermal Layer/Dermis: The layer of the skin that sits under the regenerative cells of the basal layer. If this layer is damaged the friction ridges in the damaged area cannot be reproduced /replicated and a scar will form on the surface of the skin.

Development: A subset of visualisation where a process applied to the fingermark results in it becoming visible in a progressive way, producing a gradual change from invisible to clearly visible. Most chemical and physical processes can be considered to 'develop' fingermarks. See chemical process and physical process.

Deviation: An interruption in the friction ridge path caused by a bifurcation or ridge ending.

DFO: 1, 8-Diazafluoren-9-one, a chemical process that reacts with amino acids in latent fingermarks to give a fluorescent product. It also reacts with amine-containing compounds (mainly proteins) in blood. See also Indandione and Ninhydrin.

Difference/Variance Of Opinion: Where two practitioners examining the same areas of friction ridge detail do not arrive at the same opinion; this should not be confused with an error in the first instance, as it may or may not be an error (see FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison).

Differential Growth: The random variation in the development of cells. During foetal development in the womb the stresses and strains affect the development of the friction ridges. This randomness in development leads to the different ridge flows, patterns and sequences of characteristics. Even in identical twins the friction ridge development for each twin is different.

Digit: A finger or a toe.

Digit Determination: For marks suitable for comparison or search, the practitioner will consider whether it is possible to ascertain from which finger or area of friction ridge detail the mark may have originated. This may be due to:

- a. the presence of fault ridges;
- b. the direction that a pattern flows;
- c. the type of friction ridge flow (especially in the case of palm); or
- d. multiple marks in certain positions such as a sequence.

Dimension: Number of pixels in a biometric sample image, either in the 'x' or 'y' direction.

Disagreement: Where the friction ridge flow between impressions differ, the ridge characteristics and/or details do not appear in the same relative position, do not have the same intervening ridge count, and/or there may be differences that cannot be explained.

Distal: This refers to the first joint in from the tip of the finger or toe.

Distal Segment: The area of a finger or thumb farthest from the palm. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard.]

Distortion: Variances in the reproduction of friction skin caused by factors such as pressure, movement, force, and contact surface (for example, stretching of carrier bag).

Dot: A ridge feature defined as a small isolated ridge unit, where its length should not be greater than the width and is shorter than an island or short independent ridge.

Dotted: The impression may have friction ridges that have the appearance of a series of dots, where the ridges are broken up. See granulated.

Down Sample: Reduce the resolution of an image by re-sampling the image with a reduced number of pixels.

Note 1 to entry: Proper filtering is implied to prevent aliasing. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Down Twice/Double Impression/Double Tap: The friction ridge detail has been deposited more than once in a similar position, but the impressions may overlap in some areas. Each impression is treated separately for comparison.

Eccrine Sweat: Sweat produced by the eccrine gland and secreted through sweat pores located all over the body. Eccrine glands are the only type of gland present on the palms, fingers and soles of the feet and the pores are located along the summit of the ridges. It consists of predominantly water and water-soluble components including amino acids and salts.

Edgeoscopy: Study of the contour or shape of the edges of friction ridges.

Elasticity: The ability of skin to stretch, compress or distort and be able to return to its natural appearance.

ElectroStatic Detection: A physical process that uses the electrical properties of the fingermark to bring about its visualisation. It is traditionally used for detecting indented writing during document analysis.

Elimination Prints: The controlled recording of friction ridge detail of person(s) (subjects) known to have had legitimate access to an object or location. See control prints, known prints, reference sample and tenprints.

Elongated Whorl: An elongated whorl's ridge flow is elliptical at the core.

Enhancement [1]: A subset of visualisation where a fingermark that is latent or already visible to some extent is improved by the application of additional process(es) that either reveals additional ridge detail or makes that which is already visible more readily distinguishable from the background.

Enhancement [2]: Any process that serves to improve the overall image quality.

Enhancement [3]: Intermediate processing of a biometric sample with the aim of improving the presentation of the biometrics feature.

Enlargements: The mark, print or both are magnified so that the detail can be easily seen. Generally the enlargements are made to a known scale, either using photography or electronically. It can be especially useful in cases involving complex marks/comparisons, to show clearly the findings of the practitioner. Enlargements are widely used in evidence presentation.

Epidermis: The outermost layer of the skin.

Equalised: A function of the Automated Fingerprint Identification System (AFIS) where a temporary enhancement can be made to the friction ridge detail. The computer tries to adjust the different levels of colour of the friction ridges produced by the variance of the deposition pressure and other factors to the same level, so that the detail can be more easily analysed.

Erroneous Identification: Mistaken evaluation of a conclusive association between a mark and a print from a known source.

Error: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Error Rate: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Evaluation: The third step of the ACE test process, see FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Examination: Act or process of observing, searching, detecting, recording, prioritizing, collecting, analyzing, measuring, comparing and/or interpreting. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Examination Strategy: Plan used prior to and during the examination (3.10) phase of a forensic process. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Exclusion/Excluded: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Exhibit: An item, object or document presented or identified as evidence in a court of law.

Exhibit Movement: The traceability of exhibits within the forensic process and the criminal justice system.

Explainable Differences: These are differences between the appearance of the mark and print that may not interfere with the identification process. These differences can include such things as size, thickness of ridges, distortion and some of the microscopic detail (pores and ridge shapes) being absent in one impression. They can all be explained, which can be annotated on the photographs and/or on the practitioner's notes.

Faint: The lack of visual definition and subsequent difficulty in examining the friction ridge flow.

False Match [1]: Comparison decision of a 'match' for biometric samples that are from different subjects. Also see ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

False Match [2]: See False Positive.

False Negative: A positive test sample has not been associated to the correct contributor, for example, a fingermark from a known contributor has not been associated with that known subject by the method(s) used. See False Non-Match and Missed Match.

False Non-Match [1]: Comparison decision of 'non-match' for biometric samples that are from the same subject . Also see ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

False Non-Match [2]: See False Negative and Missed Match.

False Positive: A negative test sample has been positively associated to a non-contributor, for example, a known fingerprint has been identified to the wrong subject's prints by the method(s) used. See False Match.

Fault Ridges: The friction ridges at the tips of the thumbs deviate from the normal semicircular flow and take on a diagonal sloping appearance towards an ulnar direction. These friction ridges are known as fault ridges. When they slope downwards to the right, the impression will be of a right thumb; when they slope downwards towards the left the impression will be of a left thumb.

Features: These are any notable and distinctive morphological aspects/traits that form part of the friction ridge detail. All morphological traits used in a comparison and assisting with establishing the identification of an area of friction ridge detail can be termed as 'features'. Some distinctive features are made up of a combination of characteristics, for example, a spur or a short independent ridge is a feature. Features may also include scars, creases or non-permanent traits such as warts (and other skin conditions that can be observed in two impressions). The following features are defined separately within this document:

- d. bifurcation;
- e. creases;
- f. crossover;
- g. dot;
- h. lake;
- i. ridge ending;
- j. scar;
- k. short independent ridge; and
- l. spur.

Finding: Information concluded as a result of an examination. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Fingermark: An impression of friction ridge detail left as a result of the uncontrolled contact from the digits of the hand with a substrate. Often abbreviated to 'mark'; see also latent fingermark.

Fingermark Evidence Recovery Plan: A subset of the forensic evidence recovery plan produced with the specific objective of maximising fingermark recovery, taking into account any constraints associated with the case. A Fingermark Evidence Recovery Plan consists of a sequence of fingermark preparation and visualisation processes to be applied to an item or surface. See preparation process and visualisation process.

Fingerprint: An impression of the friction ridges of all or any part of the finger from a known source. See print.

Fingerprint Examination Workflow: The end-to-end process of fingerprint examination, including all stages from location and recovery of marks from scenes through laboratory and comparison processes to final conclusion and evidence presentation.

First Level Detail: First level detail refers to the friction ridge flow and/or pattern type and overall morphological information.

Flat Fingerprint: A fingerprint image resulting from the touching of a single finger to a livescan platen or paper fingerprint card without any rolling motion. Also known as a single finger plain impression. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Flexion Crease: These are creases that are formed during friction ridge formation, completely lacking any ridge detail. These creases allow for movement in the surface of the hand and foot. The flexion creases can be useful for orientating a mark and with digit/palm/plantar determination. See Crease.

Fluorescence Examination: An optical process that utilises differences in the fluorescent properties between the fingermark and the background to produce fingermarks visible to either the eye or an imaging system.

Forensic: Methods, techniques and processes used to establish conclusions and/or opinions, facts and findings that can be used for legal proceedings.

[Source: Adapted from ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Forensic Evidence Recovery Plan: A plan developed to meet the objectives outlined in the forensic evidence recovery strategy, integrating the recovery of different forensic evidence classes. An evidence recovery plan should include the sequences of evidence recovery processes to be applied and the classes of forensic evidence being targeted at each stage.

Forensic Evidence Recovery Strategy: A strategy developed to maximise the recovery of forensic evidence for an investigation, taking into account types and priorities of different forensic evidence classes and any constraints associated with the case.

Forensic Process: Set of interrelated or interacting forensic activities, from initial request for service to courtroom.

Note 1 to entry: Includes scene investigation, item handling and control, analysis, interpretation, reporting and testimony. [Source: Adapted from ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Forensic Unit: A forensic unit is a legal entity or a defined part of a legal entity that performs any part of the forensic science process. [SOURCE: ILAC-G19:08/2014 Modules in a Forensic Science Process.]

Fragmented: This is where the friction ridge flow of the mark appears to be broken up, making it difficult to interpret the detail present. This can be a result of chemical processing and/or the surface that the mark was left on. See Broken up.

Friction Ridge(S): The friction ridges flow across the surface of the hands and feet to form friction ridge detail. The friction ridges may deviate instead of flowing constantly. See Deviation. The friction ridges have sweat pores along their summit.

Friction Ridge Detail: An area comprising the combination of friction ridge flow, friction ridge characteristics, and friction ridge structure to include other features such as creases.

Friction Ridge Flow: The path and arrangement of the friction ridges across the inner surface of the hands, the fingers, the soles of the feet and toes. The friction ridge flow on the top joint of the digits and toes form patterns. See First level detail.

Friction Ridge Image: An image of an impression from the palmar surfaces of the hands or fingers, or from the plantar (sole) surfaces of the feet or toes. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Friction Ridge Movement: The disruption to the friction ridge flow or friction ridge detail within the impression due to movement of the finger/phalange/palm at the time of the deposition of the impression. Movement may make the friction ridge details appear blurred or distorted.

Friction Ridge Skin: The fingers, palms of the hand, toes and the soles of the feet comprise an intricate system of friction ridges and furrows, which are known as friction ridge skin. The arrangement and sequencing of characteristics within friction ridge skin are extremely variable between individuals, persist well throughout life and are accepted as a reliable means of human identification. This type of skin is present to aid grip, assist touch and elevate the pores to aid temperature control.

Full Finger View: A full finger view is a rolled or plain image of a full-length finger showing all joints. An entire joint image includes four full finger view images: one rolled; left, centre, and right plain. [Source: Adapted from ANSI/NIST (2015) Information Technology Laboratory Standard]

Furrows: These are valleys or depressions between friction ridges.

Gel Lift: A smooth, low tack gelatin layer on a suitable carrier layer used to lift and transfer friction ridge detail from a surface (substrate) to a piece of transparent flexible plastic.

Gentian Violet: See Basic Violet 3.

Granular Powder: A collective term for a class of powder that consists of one or more granular components. It is typically used on smooth surfaces. See black granular powder.

Granulated: The impression may have friction ridges that have a dotted appearance, where the friction ridges are broken up. See Dotted.

Ground Truth: A data set made from known source material, such as marks and prints produced by known donors, used for validation, proficiency and competency testing purposes.

Henry Classification: A manual fingerprint classification system historically used for filing, searching and retrieving tenprint forms.

Hypothenar: The friction ridge detail below the triradiate inter-digital area on the ulnar side of the palm between the little finger and wrist.

Identified/Identification (Ident): See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Identity Confirmation: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Image: A permanent record that provides a visual reproduction of the original fingermark or object being viewed under the relevant visualisation conditions. The image may be a reproduction of what is either directly observed by the eye, or displayed from an imaging system. Images may exist in electronic (digital) form or as physical records, for example, negatives or printed material.

Image Enhancement: Processes applied to an image post-capture with the objective of producing an image that improves the ability of a practitioner to distinguish ridge detail from the background or to more clearly define fine detail within fingermarks. The term now generally applies to digital adjustments performed on electronic (digital) images.

Image Processing: See visualisation process and image enhancement.

Immutability: This refers to the persistence of friction ridge details as they are not subject or susceptible to change unless injured at the basal/dermal layer.

Impression: Friction ridge detail deposited on a surface. This can refer to a mark or print.

Incipient Ridge: An immature friction ridge that will appear as a thinner and shallower ridge than those surrounding it. The incipient ridge may or may not

contain pores. Due to deposition pressure the incipient ridges may not appear in every impression, but they can be used when making comparisons. They are also known as nascent ridges, rudimentary ridges, subsidiary ridges or ghost ridges.

Inconclusive: See FSR-C-128 Appendix to the Codes – **Friction Ridge Detail** (Fingerprint) Comparison .

Indandione: A chemical process that reacts with amino acids in latent fingermarks to give a fluorescent product. It also reacts with amine-containing compounds (mainly proteins) in blood. See also DFO and Ninhydrin.

Indented Impression: The outcome of a contact between friction ridge detail and a substrate where the substrate has deformed during contact, leaving indentations that reproduce the ridge detail where the ridges become furrows and vice versa. An example of the matrix could be putty, dust or blood.

Independent Ridge: These are small ridges situated between, but divorced from, the ridges on either side, where the length is greater than the width.

Indeterminate Comparison Decision: The outcome from a comparison where the reporting outcome is determined to be inconclusive or the biometric comparison decision meets neither the positive nor the negative thresholds set for the algorithm(s) used in the automated system.

Infrared Reflection: An optical process used to enhance fingermarks that are already visible in situations where the fingermark is obscured by coloured, patterned backgrounds or where the surface has significantly darkened due to the action of heat. The process utilises differences in the infrared reflectivity of the mark and surface to provide additional contrast between them.

Inked Print: The finger and palm prints of a person (subject), associated with a known or claimed identity, and recorded in ink under controlled conditions on a fingerprint form. See controlled print, known print, print, and reference sample.

Inner Tracing: See ridge tracing. A tracing is classified as an inner tracing when the friction ridge being traced from the left delta passes inside the right delta and there are at least three friction ridges intervening between the point on the friction ridge where the tracing stops and the delta ridge.

Insufficient: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Intermediate Biometric Sample: Biometric sample that is obtained by modifying an acquired biometric sample to allow better feature extraction, and that is not suitable as yet for automated matching in the biometric system under consideration. Examples of modifications include cropping, down-sampling, compression, conversion to data interchange formats standard and image enhancement. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data]

Interpretation: Use of professional judgement to provide opinions and/or conclusions on hypotheses, based on findings and information gathered through the forensic process. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Island: See Short Independent Ridge.

Item: A general term used to describe an object, substance or material that is collected or sampled for examination in a laboratory (for example, plastic bags, knives, documents), as opposed to non-removable parts of a scene (for example, walls, ceilings).

Interference: A factor affecting the appearance and resultant interpretation of the friction ridge flow or ridge details. See Background disturbance.

Intervening Ridges: The number of friction ridges between two characteristics. The intervening ridge count is used when creating a coincident sequence.

Joint(s) (Of The Finger): The hinged area(s) that divide the sections of the finger. There is a flexure on the surface of the hand in front of each joint.

Known Print: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison , control prints, elimination print, inked print, palm print, plantar print, reference sample and tenprint.

Laboratory Treatment: The application of processes within an environment where all relevant processing parameters (for example, temperature, humidity,

extraction of flammable vapours, lighting) can generally be controlled so that process effectiveness is optimised.

Note: items may be processed in a laboratory under non-optimised conditions, for example where they will not fit within a treatment chamber.

Lake: A lake is formed when a single ridge bifurcates into two ridges and then these two ridges reform into a single ridge again, thus forming a generally small, elliptical shape (or lake) within the ridge.

Latent Fingermark:-An impression of friction ridge detail from the digits of the hand that have come into contact with a receptive surface, which may not be readily visible. Marks of this type, which may be composed of eccrine sweat, sebaceous sweat and contaminants, will require the application of visualisation processes before they can be detected. (Also see Palm mark).

Lateral Pocket: A lateral pocket possesses two loops that have the same directional slope, the uppermost loop being nutant, forming a pocket that is filled by the ridges of the underlying loop. There are two deltas, both of which must be on the same side of the underlying loop. In some patterns, the pocket formed by the nutant loop is filled by ridges conforming to the tented arch pattern.

Lateral Reversal: See mirrored mark

Lift/Lift Exhibit: An adhesive tape or other medium (for example, gel) is used to transfer friction ridge detail from a surface (substrate) to a piece of flexible clear plastic. The lift is endorsed with details from the scene, the date of examination and information from the practitioner including signature. The lift is allocated an exhibit number, which is referred to in all subsequent documentation. See Marking up.

Lifting: A general term for the physical process that involves transferring marks from a surface to a lifting medium, for example, by recovering powdered marks from a surface onto clear adhesive tape, then placing the tape onto a transparent plastic sheet to produce an item. See Lift/Lift Exhibit.

Likelihood Ratio: The likelihood ratio is the ratio of the answers to two questions (hypotheses or propositions):

- a. What is the probability of the observations (findings) if the prosecution proposition was true?
- b. What is the probability of the observations (findings) if the defence proposition was true?

A likelihood ratio of one (1) is neutral; a large likelihood ratio (greater than one) means that the observations support the prosecution proposition; conversely, a small (less than one) likelihood ratio means that the observations support the defence proposition.

Lipid Dyes: A collective term for a class of chemical process used to stain the lipid, water insoluble, component of fingermarks and also some types of greasy contaminant. See Basic Violet 3, Natural Yellow 3 and Solvent Black 3.

Livescan: 'Livescan' is an electronic biometric platform for capturing and transmitting friction ridge detail. See biometric capture device, biometric enrolment and biometric registration.

Livescan Distortion: Blurring or distortion of the images of the friction ridges of the fingers and palms taken on the Livescan system. The system continually captures the friction ridge detail as it is rolled across the glass plate of the Livescan terminal. Any jolting during the rolling process, as well as dirt, grease, etc., on the donor's hand or Livescan plate could affect the appearance of the impressions generated, giving the ridges a straight, angular or even wavy appearance. As the technique relies on digital capture technology the final image may also appear pixelated or blurred. See spurious minutiae.

Livescan Print: Images of digits and palms that are produced by scanning or imaging a digit or palm to generate an image of the friction ridges. [Source: Adapted from ISO/IEC 19794-2:2011 Information technology – Biometric data interchange formats – Part 2: Finger minutiae data]

Lossless Compression: Data compression and decompression allows the original data to be reconstructed from the compressed data.

Lossy Compression: Data compression and decompression retrieves data that may be different from the original; these data may be close enough to be useful in some way.

Magnetic Flake Powder: A collective term for a class of powder that consists of single component magnetic flake particles that serve as both the carrier and developing medium and can be applied with a magnetic applicator.

Magnetic Granular Powder: A collective term for a class of powder consisting of at least two components, one of which is magnetic that enables them to be applied with a magnetic applicator.

Manual Match: A practitioner reaching a biometric comparison decision when comparing one or many submitted biometric sample(s) of interest against one or many biometric samples of known origin. See Identified/Identification.

Mark: An abbreviation for fingerprint. The term may also be used as a general description for a mark left by the contact of any region of friction ridge skin, which includes palms, toes and the soles of the feet. See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Marking Up: The process by which visible or visualised fingerprints considered to be of sufficient value are labelled with relevant information to uniquely associate them to a particular incident and to aid subsequent identification. See Lift/Lift Exhibit.

Mark Status: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Match (Noun): The comparison decision claiming that two biometric samples are from the same source (i.e. the same person). [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics] See Identified/Identification.

Match(ing) Score: See Biometric Comparison Score.

Matrix: A complex, three-dimensional, emulsion of sweat components and contaminants that make up the fingerprint.

Measurement Of Uncertainty: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Medial/Middle: The centre or middle, for example, the medial section of phalange.

Meeting Tracing: The friction ridge being traced from the left delta either meets the right delta or there are no more than two friction ridges intervening between the point on the friction ridge where tracing stops and the delta ridge. See ridge tracing.

Metadata: Information relating to the image data, either automatically generated by the capture device or the application, for example, camera number, software version, date and time. Metadata may be stored with the image file or separately. Metadata can be considered as part of the audit trail.

Metal Flake Powder: A collective term for a class of powder consisting of single component metal flake particles which are applied with a brush. They are typically used on clean, smooth surfaces and are generally suitable for lifting. See Aluminium powder and Brass Alloy powder.

Minutiae: See Characteristics.

Mirrored Mark: A mark that due to a range of factors (such as the transference of a mark from one surface to another, or the incorrect labelling and photography of a mark from the opposite side of the exhibit) may be visualised as a mirror image of the correct orientation. Also known as a reverse-oriented mark or a reverse-direction mark.

Missed Match: Failure of the method(s) used to correctly associate biometric data that originates from the same subject. See False Negative and False Non-Match.

Monochromatic Illumination: An optical process used to enhance fingermarks that are already visible in situations where the fingermark, the background, or both are coloured. The process utilises the colour characteristics of the mark and/or surface and involves the use of a filter capable of giving narrow band illumination from any portion of the visible spectrum that is adjusted to alter the contrast of the mark relative to the background.

Multi-Metal Deposition: A two-stage chemical process related to physical developer. The first solution contains gold nanoparticles, which preferentially bind to proteins and some peptides in fingermark ridges. The second developer solution deposits silver onto the gold resulting in dark grey marks, which may appear gold at certain angles.

Multi-Spectral Imaging: An optical process that is used to enhance fingerprints that are already visible in situations where the fingerprint, the background, or both are coloured. The process utilises the colour characteristics of the mark and/or surface. Colour spectra are obtained for each region of interest and software used to discriminate the characteristic spectrum of the mark from that of the background.

Natural Yellow 3: A chemical process that stains grease- and oil-contaminated fingerprints, and the fatty constituents of sebaceous sweat in latent fingerprints to produce highly fluorescent yellow marks.

Negative Mark: Visualisation term used where the outcome of a contact between a finger and a substrate results in material (for example, dust) being transferred from the surface to the finger, i.e. material has been selectively removed from the surface at the points of contact.

Ninhydrin: A chemical process that reacts with amino acids and possibly other components in latent fingerprints to give a purple product. It also reacts with amine-containing compounds (mainly proteins) in blood. See also DFO, Indandione.

Nominal Resolution: The number of pixels per unit distance (ppmm or ppi) of the image. The nominal resolution may be the same as the scanning resolution for a particular image. On the other hand, the nominal resolution may be less than the scanning resolution if the scanned image was sub-sampled, scaled, or interpolated down. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Non-Porous Substrate: A surface that is not permeable to water, other liquids or air. Examples are glass, many hard and soft plastics, metals, ceramics and painted metals.

Note Taking: See FSR-C-128 Appendix to the Codes – **Friction Ridge Detail (Fingerprint) Comparison** .

Number Plate Splitting: A preparation process that is used to split vehicle registration number plates consisting of printed, flexible, polymer-backed adhesive surfaces stuck to a rigid polymeric plate to reveal previously inaccessible surfaces for subsequent fingerprint visualisation.

Nutant Loop: A nutant loop has the same basic attributes of a loop but in addition at least one of the staples at the core bends, turns down or loops towards the delta. In the 'pocket' formed by the loop, there is the appearance of a plain arch.

Objective: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Open Delta: The delta is formed when two ridges running side by side then diverge and open out, trying to enclose the core area.

Open Verification: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Opinion: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Optical Process: A visualisation process that exploits the optical properties of the item or surface when illuminated or irradiated with a suitable light source. This description also includes processes operating outside the visible region of the electromagnetic spectrum.

Original Image: An accurate and complete replica of the primary image; the primary image is the original image. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary]

Outcome: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison. See reporting outcome

Outer Tracing: The friction ridge being traced from the left delta passes outside the right delta and there are at least three friction ridges intervening between the point on the friction ridge where tracing stops and the delta. See ridge tracing.

Palmar: The friction ridge detail on the palm area of the hand.

Palm Mark: An impression left as a result of the uncontrolled contact of an area of friction ridge detail of the palm of the hand with a receptive substrate. See fingermark and mark.

Palm Print: An impression of the friction ridges of all or any part of the palmar surface of the hand, taken under controlled conditions. See Print, and ANSI/NIST (2015) Information Technology Laboratory Standard and ISO/IEC 19794-4:2011 Information technology – Biometric data interchange formats – Part 4: Finger image data.

Pattern: The arrangement of friction ridges formed during foetal growth. The pattern is classified into one of a number of types of pattern as follows, with each term having a specific definition within this document:

- a. accidental;
- b. approximating arch;
- c. arch (plain);
- d. central pocket;
- e. composite;
- f. converging loop;
- g. elongated whorl;
- h. lateral pocket;
- i. loop (plain);
- j. nutant loop;
- k. tented arch;
- l. twinned loop; and
- m. whorl (plain).

PEDb: The abbreviation for the Police Elimination Database. This is a database of finger and palm prints of police officers and members of police staff. See reference data and reference sample.

Peer Review: Evaluation of the reports, examinations, notes, data and findings by others competent in the same field to assess that there is an appropriate and sufficient basis for the opinions and/or conclusions. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Persistence: The continuous production of new friction ridge cells results in friction ridge skin and patterns being unchanged at a macroscopic level throughout life. The fact that the friction ridge detail does not change is one of

the principles behind why fingerprints are a reliable method of human identification.

Phalange (Phalanx): Any bone in a finger (or toe) is referred to as a phalanx or phalange. The fingers have three:

- a. distal phalange – the portion of finger containing the 'pattern';
- b. medial or middle phalange – the central or middle portion of finger;
- c. proximal phalange – the portion of finger immediately above the palm.

The thumb has two:

- d. distal phalanx; and
- e. proximal phalanx.

Physical Developer: A chemical process that works by preferentially depositing silver metal particles onto fingerprint ridges resulting in grey/silver-coloured fingerprints. It is believed to detect the presence of eccrine constituents contained within a water-insoluble matrix.

Physical Developer Enhancement: A chemical process that converts the grey-coloured fingerprints visualised using physical developer to a colour that provides greater contrast between the developed mark and the background.

Physical Process: A visualisation process where the principal interaction is physical in nature, for example, the adhesive properties influencing powder adhesion during powdering, nucleation and growth of metal films during Vacuum Metal Deposition (VMD).

Pixel: Abbreviation for 'picture element' a pixel is the smallest element of a digital image to which attributes such as colour and intensity can be assigned. For biometric data formats it is a point in an image that is represented by an 'n' by 'm' matrix of points, where 'n' is the number of horizontal rows and 'm' is the number of vertical columns. [Source: ISO/IEC 19794-1:2011 Information technology – Biometric data interchange formats – Part 1: Framework]

Plain Fingerprint Image: Image captured from a finger placed on a platen without any rolling movement. [Source: ISO/IEC 19794-4:2011 Information technology – Biometric data interchange formats – Part 4: Finger image data]

Plain Impression: The friction ridge detail is recorded by being placed straight down onto a surface, without any rolling. See Plain Fingerprint Image.

Plain Loop: In the loop pattern, some of the ridges make a backward turn. The ridges about the centre appear to form a 'hairpin' or narrow 'staple' that may or may not enclose other ridges, or have other ridges attached to it. There is a ridge count of at least one, i.e. there is one delta.

Plantar: The friction ridge detail on the underside of the foot.

Plantar Mark: An impression from the foot left under non-controlled conditions – also see mark.

Plantar Print: An impression of the friction ridges of all or any part of the foot taken under controlled conditions.

Polydactylism: The hand or foot has more than five digits.

Pores: Small openings on the summit of friction ridges through which sweat is released. See sweat pores.

Poroscopy: A study of the size, shape, and arrangement of pores on the friction ridges.

Porous Substrate: Surface that is composed of materials that absorb water and other liquids. Examples are paper, card, cardboard, untreated wood and matt-painted surfaces.

Positive Mark: Describes the outcome of a contact between a finger and a substrate results in material being transferred from the finger to the surface.

Post Mortem Set: The controlled recording of the friction ridge detail from a cadaver that is also referred to as a dead set.

Powders: Particles used as part of a physical process that develops fingermarks by the preferential adhesion of fine particles to the deposited ridge detail. The adhesion of the particles is influenced by the presence of aqueous and/or fatty components in sweat, or by 'sticky' contaminants in the mark.

Powder Suspension: A chemical process that consists of a fine powder dispersed through a concentrated detergent and wetting agent solution.

Preparation Processes: A process used to bring the item or surface to a condition where the effectiveness of subsequent visualisation processes will be maximised, for example, by removing potentially interfering layers of contaminant or by separating surfaces to enable them to interact with the visualisation process.

Pressure Distortion: Pressure distortion may be described as deposition pressure (downward pressure on the object), directional pressure (vertical, horizontal, or twisting), or a combination of both deposition and directional pressure.

Primary Image: Refers to the first instance in which an image is recorded onto any media that is a separate, identifiable object. Examples include a digital image recorded on a flash card or a digital image downloaded from the Internet. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary] See Original Image.

Print: An impression of the friction ridges recorded under controlled conditions. See: elimination print, fingerprint, inked print, palm print, plantar print, tenprint and reference sample.

Process Category: A means of defining the wide range of processes available for fingerprint visualisation, taking into account their maturity, effectiveness and any health and safety issues associated with them. The scale used runs from category 'A' (mature, effective processes for routine use) to category 'F' (processes that should not be used for health and safety reasons). See The Fingerprint Visualisation Manual, 1st edition (2014).

Process (Visualisation): Term used to describe a series of related actions that can be applied to an item or surface to achieve fingerprint recovery, for example, removal of contaminants, visualisation of fingerprints and image capture.

Proficiency Tests: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Proposition: A proposal put forward to account for the anticipated or actual observations and the context in which those observations should be evaluated.

Propositions are generally determined by the opposing parties and, in the context of a source level fingerprint examination may be, for example:

- a. the impression was made by the same area of friction ridge detail that made the control print; or
- b. the impression was made by some unknown area of friction ridge detail.

Protein Stains: See Acid Dye.

Proximal: Situated at the closest point of attachment to the palmar or plantar area.

Proximal Segment: The segment of the finger or thumb closest to the palm. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Quality [1]: For fingerprint examination this applies to the clarity of information contained within an area of friction ridge detail.

Quality [2]: An ordinal estimate of the usefulness of biometric data for the purpose of automated recognition. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Quantitative–Qualitative Threshold: The quantitative–qualitative threshold (QQ) can be explained simply as the balance between the level of detail and the quality of the mark. This is a matter that has to be assessed on an individual basis of the number of characteristics versus quality of the mark. Sufficiency for same source determinations depends on a quality/quantity relationship.

Quantity: The amount of information contained within an area of friction ridge detail.

Radial: A loop pattern is radial if it slopes down to the right on the left hand or slopes down to the left on the right hand.

Reference Data: Data defined by a set of permissible values used by other data fields. Reference data gain in value when they are widely re-used and widely referenced. Examples are country codes or order statuses, such as 'cancelled'. Reference data are generally uniform, community-wide, and can be either created within the biometric service or defined by customers or standardisation bodies.

Reference Point: See anchor point.

Reference Sample/ Reference Specimen: Material from a known source used for comparison purposes in a forensic process [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]. Examples include biometric sample, control prints, ground truth data, known prints, Livescan, plantar prints, prints, and tenprints.

Regenerative Layer: See basal layer.

Repeatability: The ability to obtain consistent reporting outcomes when repeatedly undertaking the same task. This repeatability is required in order to validate a process. It should be possible for a process to be repeated with the same reporting outcome achieved each time.

Reporting Outcome: The conclusion reached after the analysis and comparison of marks in a case has been completed and is recorded as one of the four following possibilities:

- a. Identified;
- b. Excluded;
- c. Insufficient; and
- d. Inconclusive.

Where a mark is excluded the mark status is also given as either Unidentified or Insufficient. See FSR-C-128 Appendix to the Codes – **Friction Ridge Detail (Fingerprint) Comparison**.

Resolution [1]: Number of pixels per unit length.

Note: 1 pixel per cm (ppcm) equals 2.54 pixels per inch (ppi).

Resolution [2]: The agreed procedure or outcome following arbitration

Reverse Coloured Mark: See reverse-developed mark.

Reverse Developed Mark: Also called reverse coloured mark. A visualisation process normally produces marks of a certain appearance (for example, dark ridges against a light background), but in this scenario it produces the opposite appearance to that expected (for example, light ridges against a dark background). Clarification may be required to confirm which areas are ridges and which are furrows during comparison, this is the opposite of a mark left

under controlled conditions, that is the ridges appear as white lines and the furrows as black lines.

Reverse Direction Mark: See mirrored mark.

Reverse Oriented Mark: See mirrored mark.

Ridge: A raised portion of the epidermis on the palmar or plantar skin, consisting of one or more connected ridge units of friction ridge skin. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Ridge Count: The number of friction ridges between the core of the impression and the delta in a straight line.

Ridge Detail: An area comprising the combination of friction ridge flow, friction ridge characteristics, and friction ridge structure to include creases. See friction ridge detail.

Ridge Ending: Where a ridge ends abruptly and the flanking ridges on either side converge to take its place.

Ridge Flow: See friction ridge flow.

Ridge Segment: A section of a ridge that connects two minutiae; a single non-intersecting portion of a skeletonized image. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Ridge Skeleton Endpoint: See ISO/IEC 19794-2:2011 Information technology – Biometric data interchange formats – Part 2: Finger minutiae data.

Ridge Tracing [1]: A method of mapping the flow of ridges that is also used when subdividing whorls. See inner tracing, meeting tracing and outer tracing.

Ridge Tracing [2]: See skeletonized image. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Rolled Fingerprint Image: Image captured that is located between the two edges of the fingernail.

Note 1 to entry: This type of image is typically acquired using a rolling motion from one edge of the fingernail to the other. [Source: ISO/IEC 19794-4:2011 Information technology – Biometric data interchange formats – Part 4: Finger image data]

Rolled Impression: Record of the friction ridge detail by rolling the digit to capture the maximum surface of the friction ridge skin. For example, when completing a rolled impression of a finger, the whole pad of the finger should be rolled across the surface, i.e. from nail edge to nail edge. See Rolled Fingerprint Image.

Rotated: A circular movement in an area of the friction ridge detail, seen when a point stays fixed and the impression moves in a circular movement. This could be due to the elasticity of the skin or movement by the surface. This may cause distortion/movement in the observed ridge flow.

Scanning Resolution: The number of pixels per unit distance at which an image is captured (ppmm or ppi). [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Scar: A scar is an area of fibrous tissue that replaces normal skin after injury.

Scene: Place or object that is subject to and/or requires forensic investigation.

Note 1 to entry: A crime scene is a common description of a scene where a presumed crime has been committed.

Note 2 to entry: The scene can be a person or an animal. [Source: ISO DIS 21043-1 Forensic Sciences – Terms, definitions and framework]

Search [1]: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Search [2]: The process of comparing existing biometric data electronically held against a biometric sample of interest to return either a biometric match candidate list or a biometric comparison decision.

Sebaceous Sweat: Secretion, produced by the sebaceous gland, which exits the body predominantly through hair follicles. The glands are found across the body but are not present on the palms, fingers and soles of the feet; secretion is transferred to these regions through contact. The secretion consists of water, insoluble (oily) components such as glycerides, fatty acids, wax esters and squalene.

Second Level Detail: Second level detail refers to the characteristics (such as bifurcations and ridge endings) and their relative arrangements. It also covers

features that are visible at the same level of magnification as the intricacies of the characteristics such as creases or scars.

Semantic Conformance: Conformance to ensure that the biometric transaction is a faithful representation of the parent biometric data and thereby ensuring that the requirements satisfied are not merely syntactic¹ or morphological. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Semi-Porous Substrate: A surface that exhibits neither truly porous nor non-porous properties in relation to its absorption of liquids. It is a broad category of surfaces that includes both materials of truly semi-porous nature, such as leather, silk- and satin-painted surfaces, and those with regions of porous nature interspersed with non-porous regions, such as heavily printed paper or cardboard.

Sequence/Simultaneous Impressions: A series of impressions appearing in the same relative order and position that would be expected to be seen on the hand or the foot.

Sequential Processing: The application of a sequence of visualisation processes to an item or surface with the objective of maximising fingerprint recovery. Sequential processing involves the selection of the processes in a logical sequence, beginning with non-destructive processes and then utilising processes with a progressively increasing impact on the fingerprint and substrate. See The Fingerprint Visualisation Manual, 1st edition (2014).

Short Independent Ridge: A characteristic of a short small friction ridge that is not connected to another friction ridge. It is also sometimes called an island.

Skeletonized Image: A representation of a friction skin image in which all pixels are white except for a 1-pixel-wide thinned black skeleton following the midpoint of each ridge. Also known as a ridge tracing. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

¹ The set of rules that defines the combinations of symbols considered to be correctly structured in computing languages.

Slap Image: Slap fingerprints (slaps) are taken by simultaneously pressing the fingers of one hand (i.e. without the thumb) onto a scanner or fingerprint card. Slaps are also known as four finger simultaneous plain impressions (although if the person has more than four fingers on a hand, all of the fingers may be included in the slap image). [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Slippage/Slipped: The interruption to friction ridge flow due to movement within a fluid matrix, for example, excessive sweat or blood. This may also be referred to as movement.

Small Particle Reagent (SPR): A chemical process consisting of a suspension of molybdenum disulphide particles in a detergent solution. The molybdenum disulphide particles adhere to the fatty constituents of sweat and/or some contaminants to produce a grey fingerprint.

Solvent Black 3: A chemical process that stains grease- and oil-contaminated fingerprints, and the fatty constituents of sebaceous sweat in latent fingerprints to produce blue-black coloured marks.

Soot Removal: A preparation process that physically removes/reduces layers of soot from surfaces in order to increase the effectiveness of subsequent fingerprint visualisation processes.

Specificity: Associated with friction ridge skin features, specificity refers to their capacity to discriminate among different sources.

Split Mark: The mark appears to split up due to either the surface where the mark was left or the development process. For example, the mark could be left on a plastic bag that was screwed up; when chemical processes have been used and the bag has been flattened for examination the mark is split into smaller sections.

Spur: Is created when a single ridge bifurcates into two ridges; after a short distance one of the ridges stops to become a ridge ending, while the other continues on.

Spurious Minutiae: A situation that can occur in a friction ridge impression where additional friction ridges and/or characteristics can appear but are not a

true copy of the digit leaving the impression. It usually occurs in a tenprint that is captured either by the Livescan system or digitally.

Staple: Cores of loops consist basically of a staple or 'hairpin', which may or may not enclose other friction ridges, may be plain or may have other friction ridges branching from it. To be construed as a staple, the backward turning friction ridge must be rounded at the top.

Stitched Image: A friction ridge image created by combining images that were separately captured. [Source: ANSI/NIST (2015) Information Technology Laboratory Standard]

Subjective: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Subject: The individual person from whom the biometric sample was obtained.

Subsidiary Ridge(s): Subsidiary ridges, also called incipient ridges, appear in some areas of friction ridge detail as smaller, finer, fragmented ridges – the summits of which lie below and between the summits of the primary ridges. These are undeveloped, immature ridges with pore formations that may also have remained undeveloped. See Incipient Ridge.

Substrate [1]: The material with which the finger makes contact during generation of the fingermark that includes both the surface (which is important during initial contact) and the bulk of the material (which may subsequently interact with the constituents of the mark).

Substrate [2]: The material with which a dye interacts.

Substantivity: The attraction between a substrate and a dye or other substance under the precise conditions of the test whereby the latter is selectively extracted from the application medium by the substrate. [Source: 1988, The Society of Dyers and Colourists, Colour Terms and Definitions]

Sufficient/Sufficiency: The quantity and quality of characteristics and/or detail present in an area of friction ridge detail reaches the practitioner's threshold and a conclusion / outcome can be made.

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

Superglue Fluorescent Dye Staining: A chemical process that further enhances fingermarks developed using superglue fuming by staining the polycyanoacrylate fibres to produce highly fluorescent marks. See Basic Red 14 and Basic Yellow 40.

Superglue Fuming: A chemical process that polymerises cyanoacrylate (also known as CNA, ECA or Superglue) on some latent fingermarks to produce a white deposit.

Superimposition: The overlapping of two or more areas of ridge detail.

Surface: A term used to refer specifically to the outermost layer of a substrate, particularly where it differs from the bulk properties or where a particular property of it (for example, texture) is important.

Sweat: Liquid secreted from glands located across the body in the dermis layer of skin. There are three main types of secretory gland: eccrine, apocrine and sebaceous. Sweat, as found in latent fingermarks, may contain constituents from multiple types of gland. See Eccrine Sweat and Sebaceous Sweat.

Sweat Pore: The surface opening of the duct of a sweat gland. On friction ridge skin this refers to the eccrine gland opening located along the summit of the ridges. See Eccrine Sweat and ISO/IEC19794-8:2011 Information technology – Biometric data interchange formats – Part 8: Finger pattern skeletal data.

System Threshold: This is a limitation imposed by a system in order to search a mark on the electronic database; a minimum number of characteristics may be required.

Tenprint: Generic reference to a controlled recording of a person's(subject's) fingers and palms using ink, electronic imaging, or other medium. See control prints, inked prints, prints and reference sample.

Tented Arch: The ridges near the centre have an upward thrust, arranged on both sides of a vertical ridge or axis towards which adjoining ridges may converge, not necessarily in equal proportions, appearing as a tent in outline.

Texture: A description of the surface topography of a substrate, referring to the difference in height between the peaks and troughs of any surface features present. Surfaces with minimal height difference are often described as

'smooth' and those with a noticeable height difference described as 'textured' or 'rough'.

Thenar: The large cushion of the palm located at the base of the thumb.

Thermal Coating Removal: A preparation process that uses solvents to remove the active thermal layer in some papers (such as till receipts) that would otherwise darken during the application of some fingerprint visualisation processes, in particular amino acid reagents.

Third Level Detail: Third level detail refers to the individual friction ridge structures, i.e. the shape of ridge edges, occurrence of pores, their relative location, and ridge width.

Threshold (Noun): Numerical value (or set of values) at which a decision boundary exists. [Source: ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Threshold (Verb) / Filter (Verb): Eliminate biometric samples that have failed to attain a level of any type of score such as quality score, comparison score. [Adapted from ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics]

Tolerance: The acceptance of dissimilarity caused by distortion, usually involving identification; it is generally expressed as 'within tolerance' or 'out of tolerance' for the level of clarity that is present in both impressions.

Transference: The action of an area of friction ridge detail being transferred from one surface to another by touch.

Transitional Features: A reference to features that can appear as another feature type, for example, sometimes a bifurcation may appear as a ridge ending and vice versa. This can be due to deposition, matrix or substrate effects and fingerprint practitioners should consider ridge events rather than specific features in the comparison and evaluation processes.

Triradiate: A delta is a triradiate. The area on the palm towards the top underneath the fingers, which contains a number of deltas, is also called the triradiate area.

Twinned Loop: A twinned loop possesses two well-defined loops, one super incumbent upon, surrounding or embracing the other. Where both loops are formed by a continuous unbroken ridge, (an 'S' formation), a single ridge must appear in the core of at least one of the loops.

Typeline: Two innermost ridges that start parallel, diverge and surround or tend to surround the pattern area. [Source: ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data] See Open Delta.

Ulnar: An ulnar loop pattern slopes down to the left on the left hand or slopes down to the right on the right hand.

Ultraviolet (UVC) Reflection: An optical process that utilises differences in the level of absorption and/or scattering of UVC radiation between the mark and the surface to visualise fingermarks.

Uncertainty Of Measurement: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Unexplainable Differences: Dissimilarities which cannot be accounted for by factors external to the mark or print such as either being disrupted or on an unusual substrate.

Unidentified: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

User: A person (practitioner) who interacts with the biometric service on behalf of the operating system provider/owner.

Vacuum Metal Deposition (VMD): A physical process that utilises vacuum coating technology for the thermal evaporation of metals and deposition of thin metal films. Disturbances in the physical and chemical nature of the surface, including those associated with the presence of the fingermark, are revealed by different rates of growth of the metal films.

Validation: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Valley Bifurcation: Point at which a valley splits into two valleys or where two separate valleys combine into one. [Source: ISO/IEC 19794-2:2011 Information technology – Biometric data interchange formats – Part 2: Finger minutiae data]

Verification: See FSR-C-128 Appendix to the Codes – Friction Ridge Detail (Fingerprint) Comparison .

Vertical Rolls: Fingerprint images that have been captured by rolling a finger vertically from the slap position over the fingertip to the nail.

Note 1 to entry: This is in contrast to horizontal rolls, which are captured by horizontal rolling from the nail over the slap position to the other side of the nail as described in the definition for 'rolled fingerprint image'. [Source: ISO/IEC 19794-4:2011 Information technology – Biometric data interchange formats – Part 4: Finger image data]

Vestige: an unusual configuration of ridge flow that is most often found in the thenar area of palm. In the thenar the formation often includes two opposing 'square-nosed' loop patterns separated by ridges that run perpendicular to the prevailing ridge flow.

Vetting (Screening): A filtering process where a trained practitioner reviews the developed ridge detail and determines which areas reveal suitable/sufficient quality of detail for submission to the fingerprint bureau for examination and those areas to be discarded and not progressed further.

Visible Fingerprint: A fingerprint that has been formed on a substrate as a result of contact with a finger and is readily visible during a cursory visual examination. Where such marks have been deposited in visible contaminants such as dirt, ink, blood or paint they may occasionally be described as 'patent' fingerprints.

Visualisation: The conversion of a latent fingerprint into a readily visible one.

Visual Examination: A versatile optical process used to visualise fingerprints by illuminating the surface with light from different sources and angles of illumination. The process utilises differences in the optical properties between the fingerprint and the background to produce visible fingerprints.

Visualisation Process: A process applied to a fingerprint on a substrate to make it either readily visible to a human observer or readily detectable by an imaging system being used to examine the substrate. See physical process, and optical process.

Volar Pads: Foetal tissue growths/swellings that affect friction ridge skin development and patterns on both the ventral surfaces of the hands and soles of the feet. There are 11 volar pads on each hand of a foetus, upon which friction ridge units develop into friction ridges.

Wet Powder: See powder suspension.

Wet Set: A set of tenprints that has been taken using ink and rolled onto paper. See Inked Prints.

Wet/Wetted Marks: The friction ridges do not appear as distinct structures, but rather as wet impressions, often prevalent in blood marks. This can make the detail appear watery or have the appearance of feathering.

Whorl (Plain): In a whorl pattern, at least one circuit of ridge formation completing 360 degrees is to be found. The circuit may be formed from a continuously flowing ridge or comprise segments from several ridges. The circuit or recurve must be clearly presented but may take the shape of a circle, ellipse or spiral formation. There are two deltas.

Working Copy: A copy or duplicate of a recording or data that can be used for subsequent processing and/or analysis. [Source: SWGDE (2016) Digital and Multimedia Evidence Glossary]

7. Abbreviations And Acronymns

Abbreviation	Meaning
ACE	Analysis, Comparison and Evaluation
AFIS	Automated Fingerprint Identification System
ANSI	American National Standards Institute
ASCII	The American Standard Code for Information Interchange
BS	British Standards
BY40	Basic Yellow 40
CNA	Cyanoacrylate
CRO	Criminal Records Office
DFO	1, 8-Diazafluoren-9-one
DNA	Deoxyribonucleic acid
Dstl	Defence Science and Technology Laboratory (with which the Home Office Centre for Applied Science and Technology (CAST) was merged)
EFS	Extended Feature Set for mark up of friction ridge data
EN	European Standards
FQSSG	Fingerprint Quality Standard Specialist Group
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
NIST	National Institute of Standards and Technology
PEDB	Police elimination database
ppi	Pixels per inch
ppcm	Pixels per centimetre
QQ	Quantitative–qualitative threshold
SPR	Small particle reagent

Abbreviation	Meaning
SWGDE	Scientific Working Group on Digital Evidence
SWGFAST	Scientific Working Group on Friction Ridge Analysis, Study and Technology
VMD	Vacuum metal deposition

8. Review

This document is subject to review in accordance with the Codes and other appendices.

The Forensic Science Regulator welcomes comments. Please send them to the address as set out at: www.gov.uk/government/organisations/forensic-science-regulator, or email: FSREnquiries@homeoffice.gsi.gov.uk

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ISO/IEC 19794-3:2006 (Preview) Information technology – Biometric data interchange formats – Part 3: Finger pattern spectral data.

ISO/IEC 19794-1:2011 Information technology – Biometric data interchange formats – Part 1: Framework.

ISO/IEC 19794-2:2011 Information technology – Biometric data interchange formats – Part 2: Finger minutiae data.

ISO/IEC 19794-4:2011 Information technology – Biometric data interchange formats – Part 4: Finger image data.

ISO/IEC 19794-8:2011 Information technology – Biometric data interchange formats – Part 8: Finger pattern skeletal data.

ISO/IEC 2382-37:2017 Information technology – Vocabulary – Part 37: Biometrics.

SWGDE (2016) Digital and Multimedia Evidence Glossary, version: 3.0 (June 23, 2016). Available at: www.leva.org/wp-content/uploads/2019/10/SWGDE-Glossary.pdf [Accessed 16/07/2020].

SWGFAST (2011) Document #19 – Standard Terminology of Friction Ridge Examination (Latent/Tenprint). Available at: www.nist.gov/file/327861 [Accessed 16/07/2020].

11. Useful Websites

All web pages listed below were accessed on 16/07/2020.

Complete Latent Print Examination. www.clpex.com/

International Association for Identification (IAI). www.theiai.org/

ISO Online Browsing Platform (OBP). www.iso.org/obp/ui

Michele Triplett's Fingerprint Information. <http://fprints.nwlean.net/>

Onin. www.onin.com/fp/

The Chartered Society of Forensic Sciences, Fingerprint Division.
www.csofs.org/Fingerprint-Society.

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