

Consultation draft of FSA Specific Requirements to support FSA-MTP101-Friction Ridge Detail: Comparison

106. Friction ridge detail: comparison

106.1 Scope

- 106.1.1 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 throughout life and are accepted as a reliable means of human identification.
- 106.1.2 Friction ridge detail is an area comprising the combination of friction ridge flow, friction ridge characteristics, and friction ridge structure to include other features such as creases. It is the examination of these characteristics and features that form the basis of the forensic science activity of friction ridge detail comparison defined in this Code. The undertaking of friction ridge detail comparison shall include all areas of friction ridge detail on the human body and take an holistic approach.
- 106.1.3 The method is the end to end process for each activity. ACE is the technical framework (test) that facilitates the activity.
- 106.1.4 These FSA specific requirements establish the specific requirements for friction ridge detail examination within the context of accreditation to ISO/IEC 17025 and the Code and ILAC G19:06/2022. They set out the basis on which accreditation is achieved for undertaking this FSA. The Regulator will produce guidance to support effective regulation of this FSA including terminology used in friction ridge detail comparison
- 106.1.5 The forensic unit shall recognise that friction ridge detail analysis and comparison activities are part of the friction ridge detail end-to-end workflow (recovery to final report) and are reliant on the quality of the product from upstream processes.

106.2 Defining the Scope of Accreditation

106.2.1 The scope of accreditation for organisations which undertake friction ridge detail comparison should be defined on the basis that material tested is friction ridge detail. The type of activity in which ACE is used should be described as;

- a. Searching
- b. identity check
- c. scene linking
- d. direct comparison

106.2.2 The activities undertaken shall reference documented in house methods that have been validated in line with the requirements of the Code.

106.3 Personnel ISO/IEC 17025:2017 Clause 6.2, ILAC-G19:06/2022 Clauses 3.3 and 4.8.3

Practitioner competence

106.3.1 The forensic unit shall have practitioners, recognising the different areas of competence required for a range of tasks within the workflow, and shall establish a competency assessment framework for new (including those with previous experience) and existing practitioners. This framework shall include:

- a. the ongoing process of training, assessment and review to ensure the maintenance of practitioner competence; and
- b. the process for managing and supporting practitioners whose competence has lapsed.

106.3.2 The details of a structured training programme to attain initial competence and a programme of assessment to demonstrate ongoing competence shall be documented.

106.3.3 Competency assessment shall include all comparison activities and the use of any automated fingerprint identification system (AFIS). Assessment of initial and ongoing competence shall be objective and therefore include items

of known outcomes from all areas of friction ridge detail, utilising ground truth data.

106.4 Technical records ISO/IEC 17025:2017 Clause 7.5, ILAC-G19:06/2022 Clause 3.5

- 106.4.1 The forensic unit shall have procedures for the production of technical records, including recording examination notes contemporaneously in a format and with a level of detail that is clear and auditable.
- 106.4.2 Procedures shall define and reference the documentation (also referred to as case notes) associated with the friction ridge detail workflow process.
- 106.4.3 All records shall include the date they were made and the identity of the individual responsible for each entry. Technical records shall, as a minimum, demonstrate the examination sequence and include:
- a. a unique reference number;
 - b. records of materials used in the course of the analysis and examination;
 - c. records of the analysis and examination;
 - d. sequence of recording contemporaneous notes;
 - e. results/outputs;
 - f. reporting outcomes of the fingerprint examinations; and
 - g. records of communication.

106.5 Accommodation and environmental conditions ISO/IEC 17025:2017 Clause 6.3, ILAC-G19:06/2022 Clauses 3.11 and 3.12

- 106.5.1 The workspace and equipment used for fingerprint comparison shall be fit for the effective carrying out of the FSA. This should include an appropriate environment with suitable lighting.

Equipment

- 106.5.2 The requirements for computers and automated equipment are set out in the Code at section 32.1.

106.5.3 The forensic unit shall have procedures for the control, maintenance, and performance checking of critical equipment. Maintenance and performance checks shall be recorded.

106.6 Methods and method validation ISO/IEC 17025:2017 Clause 7.2.2, ILAC-G19:06/2022 Clause 3.10

General considerations

106.6.1 The forensic unit shall have documented procedures describing the FSA sub-activities of FSA-MTP101 it undertakes encompassing the workflow from receipt to reporting.

106.6.2 The examination process shall consist of the stages referred to as analysis, comparison and evaluation (ACE) and apply to all sources of friction ridge detail. All sources shall be included in the validation exercises.

106.6.3 ACE can be followed by a verification stage (ACE-V). This process provides a structure for the verification of friction ridge detail examination results. Verification requires an independent examination of the original material; it is an independent application of ACE.

106.6.4 The process for verification shall also be documented in the forensic unit's procedures.

106.6.5 Verification can be blind or open, and the circumstances where these options are used shall be clearly defined in the forensic unit's procedures.

106.6.6 The forensic unit shall clearly define and document a procedure for the management of circumstances where a variance in practitioner opinion has arisen.

Use of an automated fingerprint identification system in friction ridge detail examination

106.6.7 Where an AFIS is used the forensic unit shall have good practice guidance in order to achieve optimal performance. This guidance shall, as a minimum:

- a. Understand the model/basis of the search method employed;

- b. Understand the performance of the system's friction ridge detail auto encode function against manual encoding by practitioners;
- c. Understand the efficiency (i.e. success rate) of the search method to return the appropriate respondent ;
- d. Understand the type (quality/sufficiency) of friction ridge detail where the appropriate respondent is not returned from one-to-many searches;
- e. Determine the re-launch strategies (manual and/or automated) for negative outcomes to address the incidence of false negative outputs;
- f. Determine the number of respondents for conducting manual comparisons to manage the risk of not identifying the appropriate candidate if different from the AFIS default;
- g. Process relevant results from an AFIS search in accordance with the established verification procedures. On-screen verification is acceptable providing that a documented audit trail is available; and
- h. Controls for managing the risk presented by updates to software for AFIS; and
- i. Understand the limitations of the system

106.7 Validation ISO/IEC 17025:2017 Clause 7.2.2, ILAC-G19:06/2022 Clause 3.10

- 106.7.1 The forensic unit shall ensure that it has staff that are competent to develop appropriate validation plans to include the specific activities undertaken and completion of an appropriate validation with further validation and/or periodic validation review as required.
- 106.7.2 Validation shall be reviewed at least once within an accreditation cycle to evidence that methods remain fit for purpose and shall be reviewed when elements of the process are subject to change.
- 106.7.3 Significant changes to procedures, or equipment, shall be considered in a validation review and subject to validation or verification.
- 106.7.4 Validation shall be undertaken by the forensic unit to ensure the reliability of reported outcomes.

106.7.5 The validation exercise shall incorporate impressions of known source friction ridge detail, including photographs of friction ridge skin where appropriate. In addition to the process detailed in section 28 of the Code, it shall include:

- a. samples representative of the quality and variability of friction ridge detail typically encountered within each activity;
- b. procedures to ensure that the system delivers expected results;
- c. some form of measure of uncertainty;
- d. determination of the performance and limitations of the practitioner and equipment; and

106.7.6 Where digital images are relied on, the validation shall consider optimum capture and transfer parameters and manage the risk of any compromise in quality.

106.7.7 Where an AFIS is used, the forensic unit shall either validate or verify the performance by using ground truth data of varying quality and representative of the range of friction ridge detail typically encountered in casework.

106.8 Estimation of uncertainty of measurement ISO/IEC 17025:2017 Clause 7.6,

106.8.1 Procedures shall be in place to estimate the uncertainty in the method under consideration. This could include, but not be limited to consideration of:

- a. human factors;
- b. procedures;
- c. application of digital tools used within the ACE process; and
- d. equipment for digital and manual processes.

106.8.2 Error rates can be determined initially from the validation of the methods and processes to assess consistency and variances of opinion.

106.8.3 The uncertainty of measurement shall be reviewed using data from scheduled dip sampling, quality control, and competence and proficiency tests.

106.9 Control of data ISO/IEC 17025:2017 Clause 7.11

106.9.1 Procedures shall be in place to protect, secure, control, review and retain the data generated by the forensic unit; these may relate to:

- a. case management systems;
- b. AFIS;
- c. digital image transfer and storage systems; and
- d. digital comparison software.

106.9.2 The forensic unit shall have policies and procedures in place for the digital capture, storage, retrieval, display and transmission of images used as evidence. The method(s) used shall maintain the identity, security, integrity and continuity of the data.

106.9.3 An audit trail shall be created upon receipt and maintained with the image(s). The original image shall be retained securely, and any image processing and enhancement shall be carried out on a duplicate.

106.10 Sampling ISO/IEC 17025:2017 Clause 7.3, ILAC-G19:06/2022 Clause 4.3.3

106.10.1 Sampling in this context relates to case assessment leading to the appropriate selection and targeting of comparisons to facilitate reporting of results based on risk and the needs of the investigation.

106.10.2 The criteria for the selection of the friction ridge detail shall be determined by the relevance of the item/exhibit and consideration given to the quality of the friction ridge detail. This shall be recorded within the contemporaneous notes.

106.10.3 If any friction ridge detail is not subject to analysis, the reason for this shall be documented.

106.11 Handling of items ISO/IEC 17025:2017 Clause 7.4 ILAC-G19:06/2022 Clauses 3.5 and 4.7.7.2

- 106.11.1 The forensic unit shall have a documented item acceptance and rejection policy as set out in the Code.
- 106.11.2 Procedures detailing the storage and preservation of the media on which the friction ridge detail is recorded shall be documented.
- 106.11.3 The forensic unit shall have a documented procedure setting out how the continuity of the item is established and recorded.
- 106.11.4 Any adjustments made to optimise the appearance of the friction ridge detail shall be made to a working copy of it. The friction ridge detail shall be retained in the format in which it was originally retrieved.
- 106.11.5 An audit trail shall be available to track the continuity of all case-related items/exhibits.

106.12 Assuring the quality of results ISO/IEC 17025:2017 Clause 8.1.1 Option A

- 106.12.1 Forensic units shall have documented procedures for verification.
- 106.12.2 Forensic units shall have a documented procedure for the application of critical findings checks relevant to each of the activities set out at 106.2.1. and shall include an element of blind checking.
- 106.12.3 In recognising that practitioners may be influenced in their decisions by contextual information, forensic units shall have processes and procedures in place to safeguard against the risk of cognitive bias and influence. Such processes could include, but not necessarily be limited to:
- a. use of blind examination/verification; and
 - b. training and awareness
- 106.12.4 Forensic units shall participate in suitable ILC, collaborative exercises and/or PT programmes. A plan for the level and frequency of participation, and for

assessing the resulting outcomes and opportunities for learning and development, shall be documented.

106.12.5 The forensic unit shall determine a quality control process for reviewing decisions of insufficient detail for search or comparison.

106.12.6 The forensic unit shall determine a quality control process for where nominated candidates have been entirely excluded as the source of any of the friction ridge detail.

106.12.7 Procedures shall cover the provision of guidance and feedback to the friction ridge detail recovery and visualisation practitioners based on the quality of the submissions received; this might include what and how to prepare the friction ridge detail (lift, photograph or digital image) for subsequent processing.

106.12.8 The forensic unit shall have a monitoring process to identify trends and issues amongst practitioners.

Variance of opinion

106.12.9 The forensic unit shall have a policy and procedure to deal with differences of opinion amongst practitioners, including a feedback mechanism for individuals involved.

106.12.10 Where there is an external challenge, a potential error, or conflicting opinions, the process shall include, as a minimum, a fully documented :

- a. linear ACE report, which shall record all observations at the analysis stage and interpretation of the friction ridge detail by all practitioners involved in the examination;
- b. findings and conclusions reached by all practitioners involved in the examination; and
- c. process used to reach a consensus on an agreed outcome.

106.12.11 An error should not be confused with a difference of opinion. When an error has been established, either technical or administrative, a non-conformance shall be raised.

106.13 Reporting the results ISO/IEC 17025:2017 Clause 7.8, ILAC-G19:06/2022 Clause 4.9

Reporting outcomes

106.13.1 The comparison of friction ridge detail is a cognitive process that relies on the competence of the practitioners to perform examinations and analyses, and form conclusions based on the outcomes. The conclusions drawn shall be made based on their training, skill and experience; the basis for these conclusions shall be traceable and clearly evidenced.

106.13.2 Regardless of the certainty in the mind of a practitioner once a conclusion is reached, the evidence presented shall be considered as an opinion, not a statement of fact.

106.13.3 The existence of any documentation or communications regarding differences of opinion, shall be declared in any reports or statements of evidence. This issue was specifically highlighted in the Court of Appeal judgement in R v Smith [2011] England and Wales Court of Appeal (EWCA) Crim 1296 where the judgment states, "The presentation to the jury must be done in such a way that enables the jury to determine the disputed issues."

106.13.4 The test method (ACE-V) will deliver one of the following outcomes:

- a. Identified: A term used to describe the mark as being attributed to a particular individual/person. There is sufficient quality and quantity of ridge flow, ridge characteristics and/or detail in agreement with no unexplainable differences that, in the opinion of the practitioner, two areas of friction ridge detail were made by the same individual.

- b. Excluded: There are sufficient features in disagreement to conclude that two areas of friction ridge detail did not originate from the same individual.
 - c. Insufficient: The ridge flow and/or ridge characteristics revealed in the area of friction ridge detail (mark) are of such low quantity and/or poor quality that a reliable comparison cannot be made. The area of ridge detail contains insufficient clarity of ridges and characteristics or has been severely compromised by extraneous forces (e.g. superimposition, movement) to render the detail present as unreliable and not suitable to proffer any other decision.
 - d. Inconclusive: A determination that the level of agreement and/or disagreement is such that it is not possible either to conclude that the areas of friction ridge detail originated from the same person or to exclude the particular individual as a source for the friction ridge detail.
- 106.13.5 When reporting an inconclusive outcome, the rationale for this should be recorded and reported.
- 106.13.6 The forensic unit shall meet the requirements of LAB 13 [88] in relation to the provision of opinions and interpretations related to friction ridge detail comparison and have this included in their ISO/IEC 17025 scope of accreditation.
- 106.13.7 The forensic unit shall have a policy that clearly defines the process for the provision, amendment and retention of both written reports and any verbal communication.
- 106.13.8 Reports shall be subject to a defined quality check, including a critical findings review, of the examination/analysis prior to being communicated to the recipient. If there is a need to provide results prior to the production of this quality-checked final report, then the provisional status of the results shall be made clear to the recipient through the use of appropriate caveats.