Codes of Practice and Conduct

Fingerprint Comparison
FSR-C-128

ISSUE 2

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1. **INTRODUCTION**

1.1.1 The purpose of this appendix to the Forensic Science Regulator’s Codes of Practice (Codes) [A] is to establish the specific requirements for friction ridge (fingerprint) detail examination within the context of accreditation to ISO/IEC 17025 [B] and the Codes.

1.1.2 Adherence to these requirements will enable the fingerprint profession to continue to provide a robust and reliable service to the criminal justice system and provide confidence and assurance to the public.

1.1.3 The general working requirements for friction ridge detail practitioners, trainees or technicians who are employed by organisations in England and Wales should promote a culture of excellence based on procedural transparency.

2. **SCOPE**

2.1.1 This appendix covers: identity confirmation; evidence processing; comparison of friction ridge detail; case documentation; report writing and communication. All comparison procedures herein referred to as palm and fingerprints apply equally to friction ridge detail from the soles of the feet and toes.

3. **IMPLEMENTATION**

3.1.1 This appendix is available for incorporation into a forensic provider’s quality management system from the date of publication. The Regulator requires that the Codes and the requirements for identity confirmation and manual comparison set out in this appendix are included in a provider’s schedule of accreditation by October 2018.

4. **MODIFICATION**

4.1.1 This is the second issue of this document. Significant amendments and additions are denoted by shaded text (annexes 1 and 2 are new additions and are not shaded).
5. TERMS AND DEFINITIONS

5.1.1 The terms and definitions set out in the Codes [A] apply to this appendix. Terms and definition employed in this appendix are listed in the Glossary where terms are linked (underlined) and additional terminology can be found in FSR-C-126 [D].

5.1.2 The word ‘shall’ has been used in this document where there is a corresponding requirement in ISO/IEC 17025 or the Forensic Science Regulator’s Codes of Practice and Conduct; the word ‘should’ has been used to indicate generally accepted practice in fingerprint examinations.

6. ORGANISATIONAL RESPONSIBILITY (ISO/IEC 17025)

6.1.1 A nominated senior responsible person shall be identified, in terms of top management as specified in ISO/IEC 17025, to support a quality standards environment for friction ridge detail examination and be accountable for ensuring that the requirements set out in the appendix are met. This individual shall be at executive board or chief officer level within the organisation.

6.1.2 Organisations shall recognise that practitioners may be influenced in their decisions by contextual information. Processes and procedures shall be put in place to safeguard against the risk of cognitive bias and influence, for example, the use of blind verification. Further guidance can be found in Cognitive bias effects relevant to forensic science examinations, FSR-G-217 [E]. This may include a level of training in cognitive bias that is proportional to the practitioner’s level of responsibility and exposure to situations that may be prone to bias.

6.1.3 The organisation shall recognise that friction ridge detail analysis and comparison activities are part of the fingerprint examination workflow (recovery to final report) and should not operate in isolation, and are reliant on the quality of the product from upstream processes. Therefore, procedures shall cover the provision of guidance and feedback to the fingermark visualisation practitioners on what and how to prepare the friction ridge detail (lift, photograph or digital image) for subsequent downstream processes of analysis, search and comparison.
6.2 Communication and Collaborative Working

6.2.1 The organisation should take a collaborative approach with respect to the recovery of friction ridge detail and the search/comparison activities; acknowledging that the laboratory work is part of the fingerprint examination workflow. It is important that those recovering fingermarks and those using them for identification (assuming these are differently skilled practitioners) should have an understanding of each stage in the fingerprint examination workflow in order to use any information about potential evidence to its best advantage.

6.3 Professional Responsibility

6.3.1 All personnel have a legal duty to the court; part of this duty is defined in the Criminal Procedures Rules:¹

   a. to assist the court by giving objective, unbiased opinion on matters within their expertise;
   b. this duty overrides any obligation to the person from whom the practitioner receives instructions or by whom they are paid; and
   c. this duty includes an obligation to inform all parties and the court if the practitioner’s opinion changes from that contained in a report served as evidence or given in a statement.

6.3.2 The basic explanation of fingerprint examination carried out within the United Kingdom (UK) that can be provided to the court is set out in

¹ The Criminal Procedure Rules Part 19 as in force.
6.3.4 **ANNEX 1**

Practitioners shall understand the implications of work undertaken as it relates to current law [G], the organisation’s policies, operating procedures and guidelines relevant to:

a. the analysis and comparison of forensic materials within their area of examination;
b. health and safety, information and data handling, other related legislative requirements and requirements of the criminal justice system;
c. the level of authority to access information, and where additional authority may be needed; and
d. maintaining effective communications with others.

6.4 **Fingerprint Evidence and its Place in the Criminal Justice System**

6.4.1 The **comparison** of fingerprints is a cognitive process that relies on the **competence** of the practitioners to perform examinations and form **conclusions** based on their findings. The conclusions drawn will be made based on their skill and experience; however, the basis for these conclusions shall be traceable and justifiable.

6.4.2 Regardless of the certainty in the mind of a fingerprint practitioner once a **conclusion** is reached; the evidence presented should be considered as an **opinion**, not a statement of fact.

6.4.3 Any **report** or statement should disclose whether practitioners involved in the examination are in **disagreement** with the **reporting outcome**.

6.4.4 Differences of **opinion** in the **reporting outcomes** should be noted and documented in the case file and disclosed in line with the Criminal Procedure and Investigations Act 1996 as amended by the Justice Act 2003 and the revised Code of Practice [FFFF]. General guidance is given in the Association of Chief Police Officers (ACPO)/Crown Prosecution Service (CPS) Guide Booklet for Experts [G].
7. CONTROL OF NON-CONFORMING FORMING TESTING AND/OR CALIBRATION WORK (ISO/IEC 17025)

7.1.1 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.

7.1.2 The organisation shall determine when the internal peer review process is unable to deal with differences of opinion; then an external review shall be considered. An example of an external review process is set out in Annex 2.

8. TECHNICAL RECORDS (ISO/IEC 17025)

8.1.1 The organisation shall have procedures for the production of technical records. The records system need not necessarily be paper based, but if electronic record keeping is used, such as case management systems, then they shall be capable of recording examination notes contemporaneously in a format that is clear and auditable.

8.1.2 Documented procedures shall define and reference the documentation (also referred to as case notes) associated with the fingerprint examination process.

8.1.3 The level of detail recorded shall be clear and sufficient to allow for an appropriate audit trail.

8.1.4 All records shall include the date they were made and the identity of the person responsible for each entry. Technical records shall as a minimum include:

a. a unique reference number;

b. record of materials used in course of examination;

c. results of examination;

d. record of communication.
9. **PERSONNEL (ISO/IEC 17025)**

9.1 **Practitioner Competence**

9.1.1 The organisation shall establish, own and sign off a competency testing framework for all fingerprint practitioners. This framework shall include the ongoing process of training, assessment and review to ensure the maintenance of practitioner competence. This framework shall also include the process for managing individuals whose competence has lapsed.

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

9.1.3 The organisation shall provide feedback on the quality of discarded fingermarks or friction ridge detail submitted that are unsuitable for comparison. The information shall be used as part of developing and monitoring practitioner decision making competence for identifying suitable friction ridge detail for comparison purposes.

10. **ACCOMMODATION AND ENVIRONMENTAL CONDITIONS (ISO/IEC 17025)**

10.1.1 The workspace and equipment used for fingerprint comparison should be fit for purpose for the practitioner's needs and conducive to fingerprint examination. For example, consideration should be given regarding lighting and magnification tools.

11. **TEST AND CALIBRATION METHODS AND METHOD VALIDATION (ISO/IEC 17025)**

11.1 **Examining Friction Ridge Detail – General Considerations**

11.1.1 The fingerprint examination process used in relation to crime scene marks (unknown friction ridge detail) shall consist of the stages referred to as analysis, comparison and evaluation (ACE). These terms provide useful descriptors of the cognitive process undertaken by the practitioner in arriving at their final opinion. Although this process sets out the stages sequentially it is important to note that it is not strictly linear in practice. The analysis and
comparison stages are not mutually exclusive throughout the examination process.

11.1.2 **ACE** can be followed by a **verification** stage (V). This process provides a structure for the verification of fingerprint examination results. Verification is a review of the original **conclusion** made by another practitioner using the examination process.

11.1.3 The process for **verification** of **marks** defined as **complex** shall also be documented in the organisational procedures.

11.1.4 **Verification** can be **blind** or **open** and the circumstances where these options are used shall be clearly defined in the organisation’s procedures.

11.1.5 The organisation shall clearly define and document a procedure for the management of circumstances where a variance in practitioner **opinion** has arisen.

11.2 **Examining Friction Ridge Detail Results – Reporting Outcomes**

11.2.1 The test method (**ACE**) will deliver one of the following outcomes:

- a. **Identified**;
- b. **Excluded**;
- c. **Insufficient**; or
- d. **Inconclusive**.

11.2.2 When reporting an **inconclusive** outcome consideration should be given to including an explanation as to why the outcome is inconclusive.

11.2.3 Some reports could include the ‘**mark status**’ following an action, for example, ‘**searched** with a negative response and remains **unidentified**’.

11.2.4 As the **reporting outcome** is an **opinion** then the requirements set out in LAB 13 *Guidance on the Application of ISO/IEC 17025 Dealing with Expressions of Opinions and Interpretations* [H] apply.
11.3 Use of Automated Fingerprint Identification System in Friction Ridge Detail Examination

11.3.1 Where an automated fingerprint identification system (AFIS) is used for comparison activities (one to many and/or one to one) the organisation shall validate their process through in house testing to demonstrate their understanding of the performance and limitations of the outputs from the comparison system as used by them. As a minimum, using the full range of fingermarks and prints encountered, the organisation shall:

a. understand the model/basis of the search method employed;

b. understand the performance of friction ridge detail auto mark up function of the system against manual mark up by competent practitioners;

c. understand the efficiency (i.e. success rate) of the comparison search method to nominate the appropriate candidate for single and multiple candidate lists (i.e. true positive);

d. understand the type (quality/sufficiency) of friction ridge detail and therefore the rate where the appropriate candidate is not nominated from one to many searches (i.e. false negative);

e. determine the re-launch strategies (manual and/or automated) for negative outcomes to address the incidence of false negative outputs; and

f. determine the cut off point on the candidate list for conducting manual comparisons to minimise the risk of not identifying the appropriate candidate.

11.3.2 All identifications that result from an Automated Fingerprint Identification System (AFIS) search shall be processed in accordance with the established verification procedures. On-screen verification is acceptable providing that a documented audit trail is available.

12. VALIDATION

12.1.1 The organisation shall demonstrate competency and understanding of the requirements for validating its processes for friction ridge detail analysis and
comparison. This will be evidenced through the design and development of its validation plan and completion of an appropriate validation exercise.

12.1.2 Validation shall be undertaken by the organisation to ensure the reliability of examination outcomes. Further detail is contained in the Codes [A] and guidance can be found in Validation, FSR-G-201 [J].

12.1.3 The validation exercise shall incorporate materials with known source friction ridge detail. In addition to the process detailed in the Codes [A], it shall include:

a. all materials typically encountered, including complex marks;
b. all practitioner functions and activities;
c. procedures to ensure that the system delivers expected results;
d. some form of measure of uncertainty/known error rate; and
e. determination of the performance and limitations of the visual examination and low power magnification used for analysis and comparison.

12.1.4 The method used for the electronic capture [K], storage and transfer of fingerprint images shall be validated including appropriate calibration.

13. ESTIMATION OF UNCERTAINTY OF MEASUREMENT (ISO/IEC 17025)

13.1.1 Procedures under ISO/IEC 17025 [B] shall be put in place to establish the uncertainty of a given process. For example, practitioner, technical equipment and procedural error rates can be determined initially from the validation of the methods and processes to assess consistency and variances of opinion.

13.1.2 The uncertainty of measurement shall be continuously reviewed using data from dip sampling, quality control, competency and proficiency tests.

14. CONTROL OF DATA (ISO/IEC 17025)

14.1.1 Procedures shall be in place to protect and secure the data generated by the organisation, these may relate to:

a. case management systems;
b. the Automated Fingerprint Identification System (AFIS); and
c. digital image transfer and storage systems.

14.1.2 Also see the Codes [A] section 20.19.

14.2 **Use of Digital Images and Processing Tools**

14.2.1 Policies and procedures shall be 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 and integrity of the data.

14.2.2 Further requirements are detailed in *Fingermark Visualisation and Imaging*, FSR-C-127 [K] section 10.2 and the Codes [A] section 21.

15. **SAMPLING**

15.1.1 Sampling in this context relates to case assessment leading to the appropriate selection and targeting of comparisons to facilitate rapid disclosure of results based on the needs of the investigation.

15.1.2 The criteria for choosing the friction ridge detail shall be determined by the relevance of the exhibit and consideration given to the quality of the friction ridge detail. This shall be documented.

15.1.3 If any friction ridge detail is not subject to a final evaluation and/or verification the reason for this shall be documented.

16. **HANDLING OF TEST AND CALIBRATION ITEMS (ISO/IEC 17025)**

16.1.1 Procedures detailing the storage and preservation of marks and known prints shall be documented.

16.1.2 Exhibits shall be properly sealed where required and continuity recorded. If marks are electronically transmitted to fingerprint organisations, the digital capture and transmission device shall ensure that all movements and enhancements are recorded and available for audit should the need arise.

16.1.3 An audit trail shall be available to track the continuity of all case-related items.
17. ASSURING THE QUALITY OF TEST AND CALIBRATION RESULTS (ISO/IEC 17025)

17.1.1 Organisations shall have documented procedures for verification that will manage the process of checking critical findings for fingerprint examination.

17.1.2 Organisations shall participate in suitable inter-laboratory comparisons (ILCs) and/or proficiency test (PT) programmes. A plan for the level and frequency of participation, and the resulting outcomes, shall be documented.

17.1.3 The organisation shall have documented procedures for quality assuring any friction ridge detail received for comparison or search, whether the product is recorded digitally or manually.

17.1.4 The organisation shall determine a process for monitoring the systems (including AFIS) and processes of their friction ridge detail analysis and comparison outcomes. For example, through a proportional and representative schedule of dip sampling, this shall also include cases where the friction ridge detail has not progressed to comparison and where nominated candidates have been excluded as the source of the friction ridge detail.

18. REPORTING THE RESULTS (ISO/IEC 17025)

18.1.1 The outcomes of fingerprint examinations shall be recorded.

18.1.2 Where reports contain opinions that rely on results obtained from data or tests performed by the fingermark enhancement laboratory, for example, orientation of the fingermark or ridge detail formed by blood, these shall be recorded [H].

18.1.3 All reports of the examination results that are produced shall be subject to a defined quality check 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, for example, a verbal report, then the provisional status of the results shall be made clear to the recipient through the use of appropriate caveats.
19. **REVIEW**

19.1.1 This document is subject to review in accordance with the Codes [A] and other appendices.

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

20. **REFERENCES**


B  BS EN ISO/IEC 17025 *General Requirements for the Competence of Testing and Calibration Laboratories*.


### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>ACE</td>
<td>Analysis, Comparison and Evaluation</td>
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<tr>
<td>ACPO</td>
<td>Association of Chief Police Officers, replaced by the National Police Chiefs’ Council (NPCC)</td>
</tr>
<tr>
<td>AFIS</td>
<td>Automated Fingerprint Identification System</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard</td>
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<tr>
<td>CPS</td>
<td>Crown Prosecution Service</td>
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22. GLOSSARY

ACE: The acronym used to describe the main elements that comprise the fingerprint examination test process – Analysis, Comparison and Evaluation. Although this is a process with defined steps, when making a ‘comparison’ it becomes a cyclic or iterative process, rather than a linear process.

ADMINISTRATIVE ERROR: Incorrect data or information is recorded or assigned.

ANALYSIS: The first step of the ACE test process. This is the assessment of an impression to determine suitability for comparison. The practitioner examines and analyses all variables influencing the friction ridge detail in question. When examining friction ridge detail, several factors must be taken into account. Some of these factors are:
a. the material upon which the impression has been deposited;

b. the enhancement process or processes involved;

c. deposition pressure when the impression was left;

d. clarity; and

e. if the impression reaches the practitioner’s threshold.

This list is not exhaustive but will be dependent on the impression being analysed. The quantity and quality of the friction ridges are also analysed and the practitioner decides whether the impression has sufficient information to proceed to the next phase – comparison.

**BLIND VERIFICATION**: The independent application of the ACE process conducted by another practitioner who has no prior knowledge of:

a. the findings of previous practitioners;

b. the information on which any previous conclusions have been based;

or

c. any further information relating to case context or stakeholder communications.

Blind verification can form part of a risk management approach adopted to mitigate risks associated with cognitive bias.

**COGNITIVE BIAS**: A pattern of deviation in judgement whereby inferences about other people and situations may be drawn in an illogical fashion.

**COMPARISON**: The second step of the ACE test process. It is when two or more impressions are compared to determine the level of agreement between two areas of friction ridge skin and to establish the existence of discrepancies or similarities. The comparison can be either manual (using hard copy images) or computer based (using electronic/digital/on-screen images).

**COMPETENCE**: The skills, knowledge and understanding required to carry out tasks within a role, evidenced and assessed consistently over time through performance in the workplace.
COMPLEX MARK: A mark is classed as ‘complex’ if there are any difficult or unusual aspects to it. Complexity is subjective and dependent on individual practitioner opinion. Examples of types of marks that could be considered as ‘complex’ could include but are not limited to:

a. a mark that has previously been deemed 'insufficient' and then subsequently identified;

b. a mark that has previously been compared to the identified person with a negative result;

c. a mark that is compared even though there are very few clear ridge characteristics and the prospects of a potential identification may be considered low;

d. a mark in blood; or

e. the only mark identified in the case.

CONCLUSION: A result stemming from the examination and assessment of all available data within an impression whilst removing and/or limiting bias as much as is possible. The practitioner will weigh up of all of the available information and come to their final opinion about the origin or otherwise of the unknown mark. See reporting outcome.

CONTEMPORANEOUS NOTES: This is defined as an accurate record, made at the time, or as soon after the event as practicable. It is a record of relevant evidence that is seen, heard or done by the maker of the note(s).

CRITICAL FINDINGS: An outcome that meets one or more of the following criteria:

a. has a significant impact on the conclusion reached and the interpretation and opinion provided;

b. cannot be repeated or checked in the absence of the exhibit or sample; or

c. could be interpreted differently.

ERROR: An outcome that is unexpected or wrong when the true answer is known. Errors can be categorised into various types, such as technical and
administrative errors. If an error occurs then it can have a detrimental effect on the outcome of a comparison or search. There are various processes that can be used to minimise the different types of errors occurring, but these processes may vary from organisation to organisation.

**ERROR RATE**: The rate at which errors occur. The error rate of fingerprint conclusions will vary depending on the methods, processes and quality assurance measures used. See measurement of uncertainty.

**EVALUATION**: The third step of the ACE test process. This is where a practitioner assesses the value of the details observed during the analysis and the comparison steps and reaches a conclusion resulting in a reporting outcome.

**EXCLUSION/EXCLUDED**: There are sufficient features in disagreement to conclude that two areas of friction ridge impressions did not originate from the same donor or person.

**EXTERNAL PROFICIENCY TEST**: A test conducted by an agency independent of the practitioners (analysts) or laboratory being tested.

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

**FRICTION RIDGE DETAIL**: An area comprising the combination of friction ridge flow, friction ridge characteristics, and friction ridge structure to include creases. See Fingerprint Examination – Terminology, Definitions and Acronyms, FSR-C-126 [D].

**IDENTIFIED/IDENTIFICATION (IDENT)** [This term is used in fingerprint comparison evidence and its use is familiar to the criminal justice system] A practitioner 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 person.

**IDENTITY CONFIRMATION**: The comparison of a full set of fingerprints against a previously taken set of known prints to determine the identity of the
person based on the personal data previously recorded, i.e. tenprint to
tenprint comparisons.

**INCONCLUSIVE**: The 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 donor, or to exclude the
particular individual as a source for the unknown impression/mark.

The outcome may be inconclusive for a number of reasons; these reasons
should always be made clear as part of reporting the final outcome.

**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 (for example, superimposition,
movement) to render the detail present as unreliable and not suitable to
proffer any other decision.

**KNOWN PRINT**: The prints of a person, associated with a known or claimed
identity, and recorded either electronically, by ink, or by another medium
under controlled conditions.

**MARK**: The term used to refer to an area of friction ridge detail from an
unknown donor/person. Usually recovered, enhanced or imaged from a
crime-related item, or directly retrieved from a crime scene. See also
Fingerprint Examination – Terminology, Definitions and Acronyms, FSR-C-126 [D].

**MARK STATUS**: This is the description or standing of an area of friction
ridge detail following comparison and/or searching. It describes the status of
an area of ridge detail when all actions have been completed. The mark may
be identified, unidentified or insufficient. Where a mark is unidentified it may
be excluded for certain individuals.

**MEASUREMENT OF UNCERTAINTY**: The estimation of the uncertainty of
measurement is an ISO/IEC17025 requirement and is based upon the
principle that all measurements are subject to uncertainty and that a value is
incomplete without a statement of accuracy. Sources of uncertainty can
include unrepresentative samples, rounding errors, approximations and inadequate knowledge of the effect of external factors. See error rate.

**NOTE TAKING:** A contemporaneous record of the practitioner’s observations and findings when undertaking certain aspects of their work, for example, noting areas with information such as ‘movement’ or ‘background interference’.

**OBJECTIVE:** Undistorted by emotion or personal bias; based on impartial, transparent, observable phenomena.

**OPEN VERIFICATION:** Verification conducted by another practitioner who has knowledge of the conclusions proffered by the original practitioner in the previous examination.

**OPINION:** The matter of an opinion is the conclusion of the practitioner, who by study or experience has specialist knowledge and would be able to form a sound judgement on that subject matter to render an opinion of value.

The opinion forms part of a body of knowledge or experience that is sufficiently organised or recognised to be accepted as a reliable body of knowledge or experience.

The opinion is the conclusion of the practitioner established at the evaluation stage of the ACE process. If necessary the opinion will be supported and evidenced by demonstrating their decision making process by the use of working notes.

**PROFICIENCY TEST (PT):** The determination of the testing performance of a laboratory by means of inter-laboratory comparison, i.e. tests to evaluate the competence of practitioners (analysts) and the quality performance of a laboratory.

These tests can vary:

a. **external proficiency test:** a test conducted by an agency independent of the practitioners (analysts) or laboratory being tested;

b. **blind** or **undeclared proficiency test:** a test in which the practitioners (analysts) are not aware that they are being tested; and
c. **open or declared proficiency test**: a test in which the practitioners (analysts) are aware that they are being tested.

**REPORT:** Any media used to communicate the examination results. These include but are not limited to:

a. streamlined forensic reports (SFRs);

b. section 9 statements (Criminal Justice Act 1967);

c. interim reports;

d. email; or

e. oral communication.

**REPORTING OUTCOME:** The **conclusion** reached after the **analysis** and **comparison** of **marks** in a case has been completed. This is the decision that is communicated to the investigator or officer in the case 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**.

**SEARCH:** A **comparison** of **friction ridge detail** against other friction ridge detail held in files or databases. Searches can be manual or automated.

**SUBJECTIVE:** The opposite of **objective** – activity taking place within the mind that is modified by an individual’s personal experiences and bias.

**TECHNICAL ERROR:** The incorrect result or **reported outcome** derived by the practitioner’s judgement and **opinion** from the examination of the **mark** and **print**, for example, a false inclusion/exclusion.

**UNIDENTIFIED:** The **status of a mark** after it has been compared with the **known print** of a nominated individual (elimination or suspect) or has been
searched on a database and has not been attributed to any individual person.

**VALIDATION**: The process of providing *objective* evidence that a method, process or device is fit for the specific purpose intended. It is a method to check the reliability of a process and the outcomes of that process. The validation should demonstrate that the same result should be obtained to show that the process works.

**VERIFICATION**: In fingerprint examination it is the final step of the ACE-Verification process. It can be defined as the independent application of the ACE process, utilised by a subsequent practitioner to either support or refute the conclusions of the original practitioner. This independent examination by another practitioner or practitioners, using the ACE process provides a cross-check to ensure that the outcome decision is not based on a *subjective* judgement of one individual but acceptance as the consensus conclusion of more than one practitioner.

23. **FURTHER READING**


ANNEX 1

24. **BASIC FINGERPRINT EXAMINATION EXPLANATORY NOTE**

The text below is intended for the use by practitioners and reflects current practice within the United Kingdom (UK).

24.1 **Introduction**

24.1.1 The Forensic Science Regulator has set out the standard for fingerprint visualisation and image capture (FSR-C-127) and fingerprint comparison (FSR-C-128) in appendices to the Codes of Practice and Conduct (the Codes) and the terminology, definitions and acronyms currently applicable to fingerprint examination in England and Wales (FSR-C-126).

24.1.2 The purpose of this annex is to provide the basis of fingerprint examination to aid the courts.

24.2 **Fingerprints**

24.2.1 Fingerprint examination is a long established forensic discipline and has been used within the Criminal Justice System in Britain since 1902. It is based on the comparison of friction ridge detail of the skin from fingers and palms.

24.2.2 The comparison of fingerprints is a cognitive process that relies on the competence, skill and experience of the practitioner to form an opinion based on their findings; the evidence presented should be considered as opinion and not a statement of fact.

24.3 **What is Friction Ridge Detail?**

24.3.1 The skin surface found on the underside of the fingers, palms of the hands and soles of the feet is different to skin on any other part of the body. It is made up of a series of lines known as ridges and furrows and this is called friction ridge detail.

24.3.2 The ridges and furrows are created during foetal development in the womb and even in identical siblings (twins, triplets) the friction ridge development is different for each sibling. It is generally accepted that given sufficient friction
24.3.3 The analysis of friction ridge detail is commonly known as fingerprint examination.

24.4 Basis for Fingerprint Examination

24.4.1 Friction ridge detail persists throughout the life of the individual without change, unless affected by an injury causing permanent damage to the regenerative layer of the skin (dermis) for example, a scar. The high degree of variability between individuals coupled with the persistence of the friction ridge detail throughout life allows for the confirmation of identity and provides a basis for fingerprint comparison as evidence.

24.5 Fingerprint Examination

24.5.1 The purpose of fingerprint examination is to compare two areas of friction ridge detail to determine whether they were made by the same person or not.

24.5.2 Friction ridge detail recovered from the scene of a crime is known as a mark and friction ridge detail obtained from a known individual is known as a print.

24.5.3 A print is usually of good quality as it is obtained under controlled conditions, whereas, a recovered crime scene mark will vary in quality dependent on the circumstances under which it was deposited.

24.5.4 The comparison process is subjective in nature and the declared outcomes are based on the knowledge, training and experience of the fingerprint practitioner. The qualified practitioner gives an opinion based on their observations, it is not a statement of fact, nor is it dependent upon the number of matching ridge characteristics.

24.6 Examination Process

24.6.1 A process of analysis, comparison and evaluation is undertaken by the fingerprint practitioner, known as ACE this is followed by an independent verification process (ACE-V). The process is described sequentially, but fingerprint practitioners will often go back and repeat parts of the process in order to reach their conclusion.
24.6.2 There are four possible outcomes that will be reported from a fingerprint examination *Insufficient, Identified, Excluded or Inconclusive.*

![Image of fingerprint detail](image-courtesy-of-lisa-j-hall-metropolitan-police-forensic-science-services-permission-to-reproduce-granted)

**Figure 1:** Friction ridge detail observable at the top of a finger. The black lines are the ridges and the white spaces are the furrows. The ridges flow to form shapes or patterns. This is an example of a loop pattern exiting to the left. There are natural deviations within the ridge flow known as characteristics such as ridge endings or forks/bifurcation. There are white spots along the tops of the ridges known as pores and there are other features present for example creases, which are normally observed as white lines.

24.7 **Analysis**

24.7.1 The practitioner establishes the quality and quantity of detail visible within the mark to determine its suitability for further examination by looking at ridge flow and the way ridges form shapes or patterns and how the ridges naturally deviate from their ridge paths to form characteristics such as ridge endings or forks/bifurcations. The practitioner takes into account a number of variables, for example, the surface on which the mark was left, any apparent distortion, etc.

24.8 **Comparison**

24.8.1 The practitioner will systematically compare two areas of friction ridge detail, for example in a print or mark with that of a print. This process consists of a side-by-side comparison to determine whether there is agreement or
disagreement based upon features, in particular the sequence of ridge characteristics and spatial relationships within the tolerances of clarity and distortion. The practitioner will establish an opinion as to the level of agreement or disagreement between the sequences of ridge characteristics and features visible in both.

24.9 **Evaluation**

24.9.1 The practitioner will review all of their previous observations and come to a final opinion and conclusion about the outcome of the examination process undertaken.

24.10 **The outcomes determined from the examination will be one of the following:**

24.10.1 Identified to an individual: A practitioner term used to describe the mark as being attributed to a particular individual. 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 person.

24.10.2 Excluded for an individual: There are sufficient features in disagreement to conclude that two areas of friction ridge detail did not originate from the same person.

24.10.3 Inconclusive: The practitioner determines that the level of agreement and / or disagreement is such that, it is not possible to conclude that the areas of friction ridge detail originated from the same donor, or exclude that particular individual as a source for the unknown friction ridge detail. The outcome may be inconclusive for a number of reasons; those reasons are documented in the practitioners report.

24.10.4 Insufficient: The ridge flow and / or ridge characteristics revealed in the area of friction ridge detail 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 (superimposition, movement etc) to
render the detail present as unreliable and not suitable to proffer any other decision.

24.11 **Verification**

24.11.1 Is the process to demonstrate whether the same outcome is obtained by another qualified practitioner or practitioners who conduct an independent analysis, comparison and evaluation, therefore verifying the original outcome.

24.12 **Complex Comparisons**

24.12.1 Organisations should build on the basic information above to explain the issues of complexity encountered in specific individual cases for the judiciary and jury to understand the practitioner/experts' opinion.

24.12.2 When appropriate a more detailed explanation for an inconclusive outcome and the limitations that imposes on the findings should be provided in the report.
25. PROCESS FOR CRITICAL CONCLUSION/EXTERNAL REVIEW OF COMPLEX FINGERMARK COMPARISON

Figure 2: Review Panel Process
25.1 **Purpose**

25.1.1 The process described should be invoked when the internal review process of a difference of opinion is unable to reach an agreed outcome; this would include inconclusive outcomes due to conflicts with the sufficiency of the fingermark or when the reported result is challenged.

25.1.2 The organisation should have in place a list of organisations or individuals who they have evidence or assessed as competent and have agreed to conduct a review of a complex comparison.

25.1.3 The overall aim is to promote and maintain the overall quality of fingerprint comparison reported to the CJS, prior to the presentation of evidence in court.

25.1.4 Requests originating from parties outside England and Wales law enforcement agencies (for example, Scottish Police Authority, Criminal Case Review Commission and International law enforcement agencies) should be considered on an individual basis; acceptance should take into account the benefit to the CJS and/or the contribution to ongoing learning, knowledge and experience including, transparent objectivity of the fingerprint profession.

25.2 **Principles**

25.2.1 The process is intended to provide:

a. a professional organised external peer review;

b. transparent, unbiased, documented and open to independent review;

c. a safeguard to minimise against miscarriages of justice;

d. improve public confidence; and

e. support meeting Part 19 of the Criminal Procedures Rules.

25.3 **External Review**

25.3.1 To achieve the principles above an appropriate mechanism is to use a panel of with independent review panel members (practitioner/ experts) from the review organisation and different organisations willing to participate in the external review overseen by a lead/chair.
25.3.2 The review panel members independently analyse the fingermark and document this prior to receiving the prints of the person of interest. The expectation is the panel size shall be a minimum of three members in order to avoid an even split of opinion.

25.3.3 The expected responsibilities for the roles of the organisation, the panel lead/chair and the independent practitioners/experts are listed in section 25.4 below.

25.4 Roles/Responsibilities

Participating Organisations

25.4.1 Should follow the process as set out in figure 1, any deviations are agreed with the requestor organisation, clearly documented including the justification and confirmed in advance of commencing review.

25.4.2 Provide appropriate resource to deliver to the required turnaround time (for example, time and travel) to support the nominated individual.

25.4.3 Notify the Forensic Science Regulator when an external review is initiated and advise the Regulator on the outcome of the review.

25.4.4 Ensure each nominated individual is competent to carry out the designated role and the evidence of that competency should be available if requested.

25.4.5 Ensure the nominated individual understands and complies with the agreed process.

25.4.6 Understand their disclosure requirements, protect information appropriately and document all relevant information and report findings accurately.

25.4.7 Preserve confidentiality unless the law obliges (for example, a disclosure requirement), a court/tribunal orders, or a customer explicitly authorises disclosure.

25.4.8 Notify the requestor of changes to the nominated individuals and their capability to support this process.

25.4.9 Referrals should be accepted unless the organisation or panel lead/chair would be compromised and inform requestor to determine next step.
25.4.10  The outcome of the examination shall be recorded in the organisations quality management system.

Panel Lead/ Chair

25.4.11  Respect confidentiality and declare any conflict of interest

25.4.12  Ensure process is followed and any deviations clearly documented including the justification.

25.4.13  Maintain communication with the requestor.

25.4.14  Agree and determine with the requestor the most appropriate quality of the examination material for provision to the practitioners.

25.4.15  Inform organisational head that their staff member is involved in a panel.

25.4.16  Provide progress updates and advice on any slippage to delivery timescales.

25.4.17  Ensure detailed documentation and records are maintained that accurately reflect the individual components of the review, including all communications.

25.4.18  Facilitate the individual practitioners review without introducing personal opinion and bias.

25.4.19  Encourage observational opinion and arbitrate differences of opinion to arrive at a consensus view when required.

25.4.20  Quality checks that the practitioner’s conclusion /opinion is reflected by their documented observations and interpretation.

25.4.21  Provide the panel report potentially for use in court. (see example at section 25.6).

25.4.22  Ensure final report reflects the opinion of the panel.

25.4.23  Agree and sign the final report.

25.4.24  Suggest improvements to the process based on experience gained.

Practitioner

25.4.25  The practitioner shall:
25.5 Competence and Skills Requirements – Panel Lead/Chair

25.5.1 The external review panel members shall be drawn from competent fingerprint practitioners. Additional guidance for lead/chair is provided below.

25.5.2 Established fingerprint professional should be nominated provided it can be demonstrated that they fulfil the competence requirements for the panel lead below.

25.5.3 Competence to carry out the role for panel leads should be by peer review from the nominated established fingerprint professionals.

Knowledge

25.5.4 Shall have a sound knowledge of fingerprint examination, and good technical interpretation skills.

25.5.5 Shall have knowledge of the criminal procedure rules.

25.5.6 Shall have a sound understanding of the panel procedure.

Skills and attributes

25.5.7 It is essential that the panel lead has strong interpersonal skills, leadership and negotiation skills.

25.5.8 The panel lead should:

a. maintain confidentiality unless the law obliges, a court/tribunal orders, or a customer explicitly authorises disclosure and declare any conflict of interest;

b. make accurate detailed notes of their observations;

c. provide a cogent explanation for any opinion interpretation;

d. be able to demonstrate findings to others;

e. be open to the opinions of other practitioners and able to reflect on their opinion in light of additional information;

f. communicate with panel lead/chair;

g. follow the agreed defined process (figure 1);

h. contribute to the final report;

i. review and sign the final report (see example at section 25.6; and

j. work within the agreed timeframe.
a. have excellent communication skills, both written and oral;
b. recognise and deal with bias and is able to be objective;
c. have the ability to encourage and extract interpretations and opinions from practitioners, challenging and clarifying such opinions when required;
d. engender an open discussion amongst the panel members and encourage each practitioner to fully participate, ensuring everyone has their say;
e. be tactful, respectful, understanding and supportive to the practitioners on the panel;
f. cope and work under pressure;
g. be able to determine the issues, focus on the salient matters, extract where agreement or disagreement occurs and drive the panel to an objective cogent conclusion;
h. be able to proffer advice to the panel members without introducing personal opinion;
i. remain calm and professional at all times; and
j. be able to draw together the individual panel members observations and opinions into one report that reflects the final conclusion of the panel. This conclusion shall be objective and supported by a cogent explanation.
25.6 **Fingerprint Comparison Panel Report Template**

A similar report or sections of the report should be produced by the panel lead/chair and panel members as appropriate.

<table>
<thead>
<tr>
<th>Reference number:</th>
<th></th>
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<tbody>
<tr>
<td>Name of panel lead:</td>
<td></td>
</tr>
<tr>
<td>Organisation details:</td>
<td></td>
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</table>

**Details of request**

| Requesting organisation: |  |
| Date received: |  |

**Background Information provided by requestor**

|  |
|  |

**Information provided to the panel members**

|  |
|  |

The original instruction provided to the panel members is detailed below

|  |
|  |

**Additional instruction provided, is detailed below**

|  |
|  |

**Summary of the analysis of the areas of ridge detail** Delete as appropriate

<table>
<thead>
<tr>
<th>Does the mark/s have sufficient detail to conduct a comparison?</th>
<th>Yes / No / N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there sufficient detail to exclude?</td>
<td>Yes / No / N/A</td>
</tr>
<tr>
<td>Is the mark or one of the marks complex?</td>
<td>Yes / No / N/A</td>
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<tr>
<td>Question</td>
<td>Options</td>
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<td>------------------------------------------------------------------------</td>
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<td>Are there any signs of distortion?</td>
<td>Yes / No / N/A</td>
</tr>
<tr>
<td>Does this impact on the mark?</td>
<td>Yes / No / N/A</td>
</tr>
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</table>

**Summary of the observations of the mark**

Include any detail observed to conduct a comparison, comment upon where the panel concur and where they differ.

**Summary of the analysis of the reference impressions**

Include whether the panel considered the impressions supplied are of sufficient quality to undertake a comparison. List any concerns or particular issues with the quality of the impressions that may impact on their decision.

**Summary of comparison**

If comparing one mark, can all other areas of the print impressions be excluded? Yes / No / N/A Delete as appropriate

**Summary of the characteristics and features in agreement against specified digit or area on the impressions**

**Summary of any differences observed**
Can the differences be explained? | Yes / No / N/A  
| Delete as appropriate  

**Detailed explanation of the differences**

**Evaluation**

*Provide a brief description of the evidence for explaining the views for and/or against each reporting outcome, giving due consideration to the allowances being made and whether the conclusion is tangible.*

**Conclusion**

Can an ‘identification’ be established? | Yes / No  
Can a person of interest be excluded? | Yes / No  

*Please state the opinion including the rational for decision.*  
*For final collective report, all panel members must be in agreement to conclude an identification or exclusion.*
### Declaration

I confirm that I have undertaken the review as detailed above, I support the information contained within and have signed this report to demonstrate that the conclusion stated reflects my opinion.

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<th>Panel member 1</th>
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<td>Panel member 2</td>
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<td>Panel member 3</td>
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<tr>
<td><strong>Print Name</strong></td>
<td><strong>Signature</strong></td>
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### Reports/notes received from all panel members

<table>
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### Date of panel discussion

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### Panel lead

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### The results of this panel report has been communicated to the following

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