

Codes of Practice and Conduct

Fingerprint Comparison

Appendix : FSR-C-128

This is a consultation issued to allow comments from interested parties; all comments will be given consideration when finalising the fingerprint comparison Appendix FSR-C-128 prior to publication. Comments should be sent to FSRConsultation1@homeoffice.gsi.gov.uk and should be submitted by **20 January 2014**. This mailbox is not for general correspondence and is not routinely monitored so no acknowledgement will normally be sent.

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1. INTRODUCTION

1.1.1 The purpose of this appendix to the Codes [A] is to establish the requirements and provide a quality framework for friction ridge detail examination within the context of accreditation to BS EN ISO/IEC 17025:2005 and The Forensic Regulators Codes of Practice.

1.1.2 Adherence to the requirements of this framework will enable the fingerprint profession to continue to provide a robust and reliable service to the Criminal Justice System and the public.

1.1.1 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 validation](#); 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 Accreditation to the Codes and this appendix will take effect from 31 October 2017.

4. MODIFICATION

4.1.1 This is the first issue of this document. The document will form part of the Forensic Regulator's review cycle.

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-I-402 [D].

6. PROVISIONS

6.1 Organisational Responsibility (ISO 17025:2005 ref. 4.1)

- 6.1.1 There must be a nominated senior responsible person identified, in terms of top management as specified in ISO 17025 this shall be at chief executive or chief officer level within an organisation to support a quality standards environment for friction ridge detail examination.
- 6.1.2 Organisations should recognize that practitioners may be influenced in their decisions by contextual information. Processes and procedures must be put in place to safeguard against the risk of cognitive [bias](#) and influence, e.g. the use of [blind verification](#).

Professional Responsibility

- 6.1.3 All personnel have a legal duty to the court; part of this duty is defined in the Criminal Procedures Rules¹:
- 6.1.4 Assist the court by giving [objective](#), unbiased opinion on matters within their expertise;
- 6.1.5 This duty overrides any obligation to the person from whom he/she receives instructions or by whom they are paid; and
- 6.1.6 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.

¹ The Criminal Procedure Rules 2012 Part 33 as in force on 1 October 2012, <http://www.justice.gov.uk/courts/procedure-rules/criminal/docs/crim-proc-rules-2012-part-33.pdf>

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- 6.1.7 Practitioners should understand the implications of work undertaken as it relates to current law[C], policies, operating procedures and guidelines relevant to:
- 6.1.8 The analysis and comparison of forensic materials within their area of examination;
- 6.1.9 Health and safety, information and data handling, other related legislative requirements and the Criminal Justice System;
- 6.1.10 The level of authority to access information, and where additional authority may be needed; and
- 6.1.11 Maintaining effective communications with others.

Fingerprint Evidence and its Place in the Criminal Justice System

- 6.1.12 The comparison of fingerprints 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 must be traceable and justifiable.
 - 6.1.13 Practitioners make observations and form opinions that are subjective, regardless of the certainty in the mind of a fingerprint examiner once a conclusion is reached; the evidence is always an opinion, not a statement of fact.
 - 6.1.14 Any report or statement should disclose from the outset whether practitioners involved in the examination have been consistent in their interpretation of the evidence or whether differences of opinion have been noted and documented in compiling the evidence for court.
- 6.2 Control of Nonconforming Testing and/or Calibration Work (ISO 17025:2005 ref. 4.9)**
- 6.2.1 An [error](#) should not be confused with a difference of opinion. When an error has been established, either [technical](#) or [administrative](#), a non conformance should be raised.

6.3 Technical Records (ISO 17025:2005 ref. 4.13.2)

6.3.1 The organisation shall have procedures for the production of technical records. This documentation need not necessarily be paper based, but if electronic record keeping is used then such case management systems must be capable of recording examination notes [contemporaneously](#) in a format that is clear and auditable.

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

6.3.3 The level of detail of the documentation should be proportionate to the circumstances of the task, must be documented and allow for full audit trail.

6.3.4 All documentation must be dated and signed. Routinely, technical records shall as a minimum include:

- a. Unique reference number
- b. Record of materials used in course of examination
- c. Results of examination
- d. Record of communication
- e. The name of the practitioners involved.

6.4 Personnel (ISO 17025:2005 ref. 5.2)

Practitioner [Competence](#)

6.4.1 Ensuring individual fingerprint practitioner competency is the responsibility of the organisation, who must establish, own and sign off a competency testing regime for all practitioners. An ongoing process of training, assessment and review will ensure continued maintenance of practitioner competence. This regime must include the process for managing individuals whose competence has lapsed.

6.4.2 The details of a structured training programme to attain initial competence and continuous program of assessment must be documented.

6.5 Accommodation and Environmental Conditions (ISO 17025:2005 ref. 5.3)

6.5.1 The workspace and equipment should be fit for purpose for the fingerprint practitioner's needs and conducive to fingerprint examination, e.g. consideration should be given regarding suitable lighting and magnification tools.

6.6 Test and Calibration Methods and Method Validation (ISO 17025:2005 ref. 5.4)

Examining Friction Ridge Detail and Resulting [Reporting Outcomes](#).

6.6.1 General considerations.

- a. The fingerprint examination process used in relation to crime scene [marks](#) (unknown friction ridge detail) must 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.
- b. 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. Verification can be [blind](#) or [open](#) and shall be defined in the organisations procedures.

6.6.2 Outcomes

- a. The test method (ACE) will deliver in the opinion of the practitioner one of the following outcomes.

[Identified](#)

[Excluded](#)

[Insufficient](#)

[Inconclusive](#)

- b. Some reports could include the 'status of mark' following an action i.e. searched with a negative response and remains unidentified.

6.6.3 Use of Automated Fingerprint Identification (AFIS) systems in friction ridge detail examination.

- a. All identifications effected from an AFIS search shall be processed in accordance with the established verification procedures. On-screen verification is acceptable providing an audit trail is available.

6.7 Validation

6.7.1 The organisation shall demonstrate competency and understanding of the requirements for validating their processes for friction ridge detail analysis and comparison, this will be evidenced through the design and development of their validation plan.

6.7.2 [Validation](#) must be undertaken by the organisation to ensure the reliability of examination outcomes.

6.7.3 It should encompass a validation study using known source friction ridge detail and must include:

- a. all materials typically encountered, including [complex marks](#),
- b. all practitioner functions and activities,
- c. procedures to ensure its system delivers expected results and
- d. some form of [measure of uncertainty](#)/ known error rate.

6.7.4 The method used for the electronic capture, storage and transfer of fingerprint images must be validated including appropriate calibration.

6.8 Estimation of Uncertainty of Measurement (ISO 17025:2005 ref. 5.4.6)

6.8.1 Procedures under ISO 17025 [\[B\]](#), should be put in place to measure uncertainty of a given process, for example, practitioner, technical equipment and proce-

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

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

6.9 Control of Data (ISO 17025:2005 ref. 5.2)

6.9.1 Procedures shall be in place to protect and secure the data generated by the organisation, these may relate to: Case Management Systems, Automated Fingerprint Identification Systems and Digital Image Transfer & Storage Systems.

6.9.2 Use of digital images and processing tools

6.9.3 Policies and procedures must be in place for the digital capture, storage, retrieval, display, and transmission of images used as evidence.

6.10 Sampling (ISO 17025:2005 ref. 5.7)

6.10.1 Sampling in this context means case assessment and should lead to the appropriate selection and targeting of comparisons to facilitate rapid disclosure of results based on the needs of the investigation.

6.10.2 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 should be documented.

6.10.3 Any friction ridge detail that is not subject to a final evaluation and/or verification should be documented.

6.11 Handling of Test and Calibration Items (ISO 17025:2005 ref. 5.8)

6.11.1 Procedures detailing the storage and preservation of marks and [known prints](#) shall be documented.

6.11.2 Exhibits shall be properly sealed where required and continuity recorded. If marks are electronically transmitted to fingerprint organisations then the digital

capture and transmission device must have all movements and enhancements available for audit should the need arise.

6.11.3 An audit trail must be available to track the continuity of all case related items.

6.12 **Assuring the Quality of Test and Calibration Results (ISO 17025:2005 ref. 5.9)**

6.12.1 Organisations shall have documented procedures for verification that will manage the process of checking [critical findings](#) for fingerprint examination.

6.12.2 There is a requirement to evidence proficiency by participating in a testing programme. Results of [proficiency tests](#) shall be documented.

6.13 **Reporting the Results (ISO 17025:2005 ref. 5.10)**

6.13.1 There is a requirement for all outcomes to be recorded.

6.13.2 All reports shall be peer reviewed prior to being communicated.

7. **REVIEW**

7.1.1 This document is subject to review in accordance with other appendices.

7.1.2 If you have any comments please send them to the address or e-mail set out on the Internet site at: <http://www.homeoffice.gov.uk/agencies-public-bodies/fsr/>.

8. **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.

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 the material upon which the impression has been depos-

ited, the enhancement process or processes involved, deposition pressure when the impression was left, clarity, if the impression reaches the practitioners 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.

BIAS: Influence based on preferences, dislikes and/or irrelevant information rather than objective data, such as extraneous contextual details surrounding an event.

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 dependant on individual practitioner opinion.

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 examiner will weigh up of all of the available information and come to their final conclusion about the origin or otherwise of the unknown mark. An evaluation decision will result in one of the following outcomes:

- ‘Identified’
- ‘Excluded’
- ‘Unidentified’
- ‘Inconclusive’

‘Insufficient’

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 which is seen, heard or done, by the maker of the note.

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;
- 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 bureau to bureau.

- a. **ADMINISTRATIVE ERROR:** The incorrect data or information is recorded or assigned.
- b. **TECHNICAL ERROR:** The incorrect result or reported outcome derived by the practitioner’s judgment and opinion from the examination of the mark and print, e.g. a false inclusion /exclusion.

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: Is the opinion of a practitioner that there are sufficient features in disagreement to conclude that two areas of friction ridge impressions did not originate from the same donor or person.

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

FRICITION RIDGE DETAIL: An area comprised of the combination of friction ridge flow, friction ridge characteristics, and friction ridge structure to include creases.

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

INCONCLUSIVE: The determination by a practitioner 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 impression.

The outcome may be inconclusive for a number of reasons:

The quantity and quality of the ridge flow, ridge characteristics and / or the detail present in the two areas of friction ridge detail is not sufficient to conclude that they were made by the same person, but there is nothing in disagreement to conclude that they were not made by the same person. The practitioner is unable to exclude an individual because some similarity exists;

or

The quantity and quality of the ridge flow, ridge characteristics and / or the detail present in two areas of friction ridge detail is not sufficient to conclude that they were made by the same person or sufficient disagreement to conclude that they were not made by the same person. There may be some

disagreement that maybe difficult to rationalize and therefore the person cannot be excluded;

or

The area of ridge detail cannot be compared as the corresponding area of ridge detail on the known impressions (print) is not revealed or not fully revealed.

INSUFFICIENT: The opinion that 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 (superimposition, movement etc) to render the detail present as unreliable and not suitable to proffer any other decision.

IDENTITY VALIDATION: 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. ten print to ten print comparison.

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. Usually recovered, enhanced or imaged from a crime related item, or directly retrieved from a crime scene.

MARK STATUS: This is the description or standing of an area of ridge detail following comparisons 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 a BS EN ISO/IEC 17025:2005 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.

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 his/her opinion of value.

The opinion forms part of a body of knowledge or experience which is sufficiently organized or recognized 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): Is the determination of the calibration or testing performance of a laboratory by means of inter laboratory comparison, i.e., tests to evaluate the competence of analysts and the quality performance of a laboratory.

Open or declared proficiency test: a test in which the analysts are aware that they are being tested.

Blind or undeclared proficiency test: a test in which the analysts are not aware that they are being tested.

External proficiency test: a test conducted by an agency independent of the analysts or laboratory being tested.

REPORT: Any media used to communicate the examination results these include but is not limited to, streamlined forensic reports (SFR), section 9 statements, interim reports, e-mail or 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 currently recorded as one of the four following possibilities - See: [Identified](#), [Excluded](#), [Insufficient](#) and [Inconclusive](#). Where a mark is excluded the [Mark's 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.

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

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-V process. It can be defined as the independent application of the ACE process, utilised by a subsequent examiner to either support or refute the conclusions of

the original examiner. This independent examination by another examiner or examiners, using the ACE process provides a cross check to ensure that the outcome decision is not based on a subjective judgment of one individual but acceptance as the consensus conclusion of more than one examiner.

Blind verification: Is the independent application of the ACE process conducted by another examiner who has no prior knowledge of the findings of previous examiners, the information on which any previous conclusions have been based and 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.

Open verification: Is conducted by another examiner who has knowledge of the conclusions proffered by the original examiner in the previous examination.

9. REFERENCES

- A The Forensic Science Regulator, Codes of Practice and Conduct for Forensic Science Providers and Practitioners in the Criminal Justice System.
- B ISO/IEC 17025:2005, General Requirements for the Competence of Testing and Calibration Laboratories.
- C The Forensic Science Regulator, Legal Obligations, FSR-I-400.
- D FSR-I-402 Glossary of Terminology, Definitions and Acronyms - Fingerprint Examination.

10. FURTHER READING

Developing a Quality Standard for Fingerprint Examination, 2011, <https://www.gov.uk/government/publications/fingerprint-examination-developing-a-quality-standard>.

SWGFAST Document #8 Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V), Ver. 2.0, http://www.swgfast.org/documents/documentation/121124_Standard-Documentation-ACE-V_2.0.pdf

SWGFAST Document #10 Standard for Examining Friction Ridge Impressions and Resulting Conclusions, DRAFT FOR COMMENT, Ver. 2.0, http://www.swgfast.org/documents/examinations-conclusions/121124_Examinations-Conclusions_2.0.pdf

SWGFAST Document #11 A Model Policy for Friction Ridge Examiner Professional Conduct, Ver. 2.0, http://www.swgfast.org/documents/conduct/121124_Model-Policy-Professional-Conduct_2.0.pdf

The Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST), et al. The Fingerprint Sourcebook, Washington DC: National Institute of Justice, 2011, <http://www.nij.gov/pubs-sum/225320.htm>

Expert Working Group on Human Factors in Latent Print Analysis, Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach. Washington DC: U.S. Department of Commerce, National Institute of Standards and Technology, 2012, <http://www.nist.gov/oles/upload/latent.pdf>

Sir A. Campbell, The Fingerprint Inquiry Report. Edinburgh: APS Group Scotland, 2011. <http://www.thefingerprintinquiryScotland.org.uk/inquiry/3127-2.html>