



Document #10
Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint)

1. Preamble

- 1.1. Friction ridge impression examinations are conducted by examiners using the Analysis, Comparison, Evaluation, and Verification (ACE-V) methodology, which include both qualitative and quantitative aspects. ACE is not generally applied as a strictly linear process because it may include a return to any previous phase. Application of ACE includes observations, measurements, assessments, decision-making, and documentation, which are enabled by the education, training, skill, and experience of the examiner.
- 1.2. The examination of friction ridge impressions and the resulting conclusions are based on ridge flow and ridge paths; the location, direction, and spatial relationships of minutiae; and ridge structure. The analysis phase leads to the determination of *suitability*. Following comparison, the evaluation phase leads to the following conclusions: *individualization*, *exclusion*, or *inconclusive*. These conclusions are based on the following premises [1] [2]:
 - 1.2.1. Friction ridge skin bears an extremely complex, unique, and persistent morphological structure.
 - 1.2.2. Notwithstanding the pliability of friction ridge skin, the contingencies of touching a surface, and the nature of the matrix, an impression of friction ridge skin structure may be left following contact with a surface.
 - 1.2.3. This impression may display features of varying quality (clarity of ridge features) and specificity (weighted values and rarity).
 - 1.2.4. Notwithstanding variations in clarity and specificity, the unique aspects of friction ridge skin may be represented as highly discriminative features in impressions.
 - 1.2.5. An impression that contains sufficient quality and quantity of friction ridge features can be individualized to, or excluded from, a source.
 - 1.2.6. The use of a fixed number of friction ridge features as a threshold for the establishment of an individualization is not scientifically supported.

2. Scope

- 2.1. The ACE-V methodology of friction ridge impression examination utilizes a qualitative and quantitative assessment of Level 1, Level 2, and Level 3 details.

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- 2.2. The ACE-V methodology is applied to examinations and comparisons of friction ridge impressions. This document illustrates the case of unknown to known comparisons but is applicable to other comparisons (e.g., known to known).
- 2.3. The application of the ACE-V methodology to casework requires examiner competency as established through training and testing [3].

3. Factors Affecting Examinations

- 3.1. The following factors affect the qualitative and quantitative aspects of friction ridge impressions. A competent examiner [3] will understand these factors, recognize that they occur in friction ridge impressions, and understand how they influence friction ridge impression reproducibility. These factors may cause an apparent dissimilarity between impressions from the same source. Failure to properly assess the occurrence and influence of these factors could result in misinterpretation. When applicable, the following factors must be considered in all steps of the ACE-V methodology:
 - 3.1.1. Anatomical aspects include the condition of the skin (e.g., scars and warts) and the morphology of the hand and foot relative to the shape and contour of the substrate.
 - 3.1.2. Transfer conditions include pressure applied during transfer, slippage or twisting, sequence of deposition (i.e., double taps and overlays), and an understanding of the limitations of friction ridge pliability.
 - 3.1.3. Matrix includes bodily secretions and contaminants (e.g., sweat, blood, paint, dirt, oil, grease).
 - 3.1.4. Detection techniques that can be one or more of the following: optical (i.e., light sources and illumination techniques), physical, or chemical processing techniques.
 - 3.1.5. Recording or preservation techniques, such as photography, lifting, live-scan, and ink.
 - 3.1.6. Substrate (e.g., porous, non-porous, semi-porous, smooth, rough, corrugated, pliable, or textured surfaces).
 - 3.1.7. Environmental conditions (e.g., protected, unprotected, wet, dry, cold, or hot).

4. Levels of Friction Ridge Impression Detail For Examinations

Level 1 detail refers to the overall ridge flow. Level 2 detail refers to individual friction ridge paths, friction ridge events (e.g., bifurcations, ending ridges, dots, and continuous ridges), and their relative arrangements. Level 3 detail refers to ridge structures (edge shapes and pores), and their relative arrangements. Creases, scars, warts, incipient ridges, and other features may be reflected in all three levels of details¹.

5. Procedure for Friction Ridge Impression Examinations (ACE-V Methodology)

5.1. Analysis

- 5.1.1. Analysis includes the assessment of the impression to determine its value based on Level 1, 2, and 3 detail. This assessment is affected by other relevant information as described in section 2, as well as possible anatomical origin and orientation. Analysis determines if the impression is suitable for comparison. If the impression is not suitable, the examination will stop at the analysis phase and will be reported as such². If the impression is suitable, the analysis further indicates the features and their tolerances to be used in the comparison.
- 5.1.2. In the analysis phase, the examiner assesses the friction ridge skin features and determines the tolerances assigned to the impressions (unknown and known). Tolerance is the allowance of variation in appearance of friction ridge features (due to the factors listed in section 3) that will be accepted during comparison, should the corresponding print be available.

¹ For example, a crease could exhibit Level 1 crease flow, Level 2 crease path, and Level 3 crease shape.

² It will not be reported as inconclusive, but may be submitted to verification.

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- 5.1.3. The analysis may also provide anatomical information to prioritize the potential corresponding areas and limit unnecessary comparisons. Certain orientation indicators such as recurves, deltas, creases, and scars may provide specific guidance where to begin the comparison.
- 5.1.4. Determination of suitability
 - 5.1.4.1. The determination of suitability is based on the assessment of the discriminating strengths of the features and their arrangements. Suitability is the determination that there is adequate quality and quantity of friction ridge features in an impression for some further process step. The assessment is made based on the quality of features (clarity of the observed features), the quantity of features (amount of features and area), the specificity of features, and their relationships (see section 5).
 - 5.1.4.2. There are commonly two approaches to the determination of suitability often adopted as agency policy:
 - 5.1.4.2.1. Approach #1 (commonly referred to as “of value for identification”): Only impressions of *value for individualization* are compared. *Value for individualization* indicates an impression that is deemed to be identifiable. When adopting this approach, impressions lacking value for individualization are not further compared.
 - 5.1.4.2.2. Approach #2 (commonly referred to as “of value for comparison”): Impressions of value for individualization and impressions only of value for exclusion are compared.
 - 5.1.4.2.3. Conclusions in the evaluation phase following both approaches are: individualization, exclusion, or inconclusive.

5.2. Comparison

- 5.2.1. If the analysis phase provides indicators as to the probable anatomical area, a side-by-side comparison with the appropriate area of the known print is initially conducted. In the absence of indicators, all areas of available known impressions must be compared.
- 5.2.2. Comparison is accomplished through the side-by-side observation of all levels of details to determine whether the two impressions are in agreement or disagreement based upon features, sequences, and spatial relationships within the tolerances of clarity and distortion.
- 5.2.3. Comparison begins with the determination of dissimilarity or similarity between two impressions at Level 1. If similarity is determined within tolerance at Level 1, a target group is selected from the features observed during the analysis phase and is then searched within the selected area of the other impression. When similarity with the target group exists, additional contiguous arrangements of features are compared between impressions in a cyclical or recurring process from the unknown to the known impression to evaluate disagreement or agreement between the impressions. The process can be extended to comparing features in the known with features in the unknown that were reanalyzed during the comparison phase. If the initial target group is not found, alternative target groups may be selected and compared.
- 5.2.4. Observation of agreement or disagreement between the impressions initiates the evaluation phase.

5.3. Evaluation

- 5.3.1. Once the examination progresses from the comparison phase into the evaluation phase, it is determined whether the information is sufficient (see section 6) to form one of the three conclusions or return to the analysis phase and reassess suitability³.

³ This would not be necessary under approach 2.

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5.3.2. In the evaluation phase, the examiner will ultimately decide whether the unknown impression is from a different source or the same source as the compared impression, or is inconclusive. These conclusions are defined below.

5.3.2.1. Exclusion

Exclusion is the decision by an examiner that there are sufficient features in disagreement to conclude that two areas of friction ridge impressions did not originate from the same source. Source refers to the area of friction skin. Exclusion of a subject can only be reached if all relevant comparable anatomical areas are represented and legible in the known exemplars. Notes and reports shall clearly state if the exclusion refers only to the source or the subject.

5.3.2.2. Individualization

Individualization is the decision by an examiner that there are sufficient features in agreement to conclude that two areas of friction ridge impressions originated from the same source. Individualization of an impression to one source is the decision that the likelihood the impression was made by another (different) source is so remote that it is considered as a practical impossibility.

5.3.2.3. Inconclusive

5.3.2.3.1. An inconclusive conclusion resulting from a suitability decision as described in approach #1 in section 5.1.4.2.1 occurs when an examiner is unable to individualize or exclude due to an absence of complete and legible known prints (e.g., poor quality fingerprints and lack of comparable areas). In such an instance, the inconclusive conclusion means that the impression needs to be reexamined using clearly and completely recorded known impressions.

5.3.2.3.2. An inconclusive conclusion resulting from a suitability decision as described in approach #2 in section 5.1.4.2.1 can occur either as in approach #1 or when corresponding features are observed but not sufficient to individualize. Likewise dissimilar features may be observed but not sufficient to exclude. In either case, the inconclusive conclusion means that the unknown impression was neither individualized nor excluded as originating from the same source.

5.3.2.3.3. There may be other instances where agencies have adopted procedures to report inconclusive conclusions. These are left to the administrative policies and procedures of the individual agency. However, these policies and reporting procedures must be clearly defined by the agency.

5.3.3. Reporting Conclusions

The conclusions of individualization and exclusion will be documented in notes and in reports; however, the determining factors need not be included in reports. Reasons for reaching inconclusive conclusions must be documented in notes and included in reports.

5.4. Verification

5.4.1. The independent application of the ACE process is utilized by a subsequent examiner to either support or refute the conclusions of the original examiner.

5.4.2. Suitability determinations may be verified by another examiner trained to competency [3]. A conclusion of individualization shall be verified. All other conclusions resulting from the evaluation phase should be verified.

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5.4.3. Conflict resolution shall take place if the original conclusion is contested and cannot be resolved through consultation [5].

5.5. The flowchart in Appendix A details the major steps of ACE-V. The chart has been adapted from the NIST (National Institute of Standards and Technology) Expert Working Group on Human Factors in Latent Print Analysis. It is offered here as supporting documentation and applies to both tenprint and latent print examination.

6. Sufficiency for Conclusions

6.1. Sufficiency is a product of the quality and quantity of the objective data under observation (e.g., friction ridge, crease, and scar features). As the quality of an impression increases the need for quantity of friction ridge features decreases, as well as the inverse.

6.2. Quality

6.2.1. Quality is the assessment of the clarity of ridge features. Generally as quality increases so does the discernability and reliability⁴ of the ridge features. It is recognized that quality is not necessarily constant throughout an impression. The assessment of quality may represent just the areas of highest quality, a range of qualities, or a map or rating system of quality of various regions in a single impression.

6.2.2. Table 1 shall be used for categorizing the levels of quality of the features in an impression (unknown or known). The level of quality determines the degree of tolerances that will be used during the comparison process. High quality will lead to low tolerances and conversely low quality will require high tolerances⁵.

| Quality | |
|-------------|---|
| High | Level 1 is distinct; Level 2 details are distinct; There are abundant distinct Level 3 details. |
| Medium High | Level 1 is distinct; Most of the Level 2 details are distinct; There are minimal distinct Level 3 details. |
| Medium Low | Level 1 is distinct; Few of the Level 2 details are distinct; There are minimal distinct Level 3 details. |
| Low | Level 1 may not be distinct; Most of the Level 2 details are indistinct; There are no distinct Level 3 details. |

Table 1: Categories of quality defined as a function of levels of details observed.

⁴ Reliability refers to the confidence assigned by the examiner to the observed ridge features in terms of existence, location, and shape he or she would expect to be reproduced on the corresponding print, should it be made available.

⁵ High tolerances: generous allowances for variations in appearance and spatial relationships.

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6.2.3. The above quality metric was designed to allow for a range of quality assessment as opposed to a narrow categorization. Table 1 provides four ranked categories for the quality metric. There are subjective as well as objective elements to this categorization, but the descriptions provided in the table should allow a meaningful quality description to be made with reference to the categories.

6.3. Quantity

6.3.1. Quantity, as applied in this section, is the number of ridge endings, bifurcations, and dots (minutiae) in contiguous ridges, determined without any reference to known impressions. All minutiae are considered here including indistinct minutiae for which type or exact location cannot be established⁶. Overall quantity of all features in the impression is not part of this measure.

6.3.2. It is recognized that this is an incomplete measure of the overall quantity of detail in a print. Level 2 detail encompasses more than minutia counts (including the ridge path, areas with open fields, and selectivity of minutiae). Minutia counts remain, however, as a discrete, measurable aspect of all prints and their enumeration is part of the systematic, formal consideration of quantity.

6.3.3. The utility of the number of minutiae as applied in this section is to assist in the analysis of suitability and the recognition of alternative levels of case complexity as they relate to sufficiency, evaluation, and verification. This use of the number of minutiae should not be considered as suggesting or endorsing the use of minutia counts as the sole criteria for a decision threshold.

6.4. Decision-Making

6.4.1. Sufficiency graph

6.4.1.1. The sufficiency graph (Figure 1) reflects the interplay between quality (defined in Table 1) and quantity of minutiae (as discussed in section 6.3) and its relation to the decision thresholds and levels of complexity based on a consensus of collective experience. It broadly represents how the amount of available information in an impression directly impacts the decision-making process. The sufficiency graph was developed to illustrate the intellectual process involved with the examination of friction ridge detail and the ensuing decisions. It represents the examiner's understanding of the aggregate relationship of details. Its purpose is to illustrate a part of the process dealing with the analysis of the impression for sufficient quality and quantity of detail to proceed with the comparison effort. It also illustrates certain thresholds wherein examiners should recognize the need for, and provide, enhanced documentation supporting their conclusions.

6.4.1.2. The axes used to plot the decision of the examiner, the positions of the curves, and the underlying regions, were created based on a consensus of experienced examiners (SWGFAST). Considerations in establishing the graph are related to actual casework and include international practices, general awareness of longstanding, as well as current literature and trends in ongoing research.

6.4.1.3. Level 2 detail in this graph is represented on the horizontal axis by numbers of minutiae. The limitations and rationale for using this metric for quantity are discussed in section 6.3. It is re-emphasized here that this should not be considered as suggesting or endorsing the use of minutiae counts as the sole criteria for a decision threshold.

⁶ For example when a single ridge flows into a visually obscured area and two ridges emerge from the same area.

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- 6.4.1.4. The four categories of quality represented on the vertical axis are given in Table 1 and discussed in section 6.2.
- 6.4.1.5. In Figure 1, the solid curve in the graph defines the lower limit of the sufficiency of friction ridge details below which, in area marked **A**, an individualization decision is not warranted. The dotted curve indicates the boundary between levels of complexity (complex versus non-complex). In area marked **B** in Figure 1, the examination is considered as complex and an individualization may be warranted. In area marked **C** in Figure 1, the examination is considered as non-complex and an individualization is warranted.
- 6.4.1.6. Quantity is meaningless in the absence of quality. Individualization cannot be achieved on quantitative considerations alone. It is recognized that in the absence of any minutiae, an individualization may be possible in such complex cases if the impression displays very high quality.

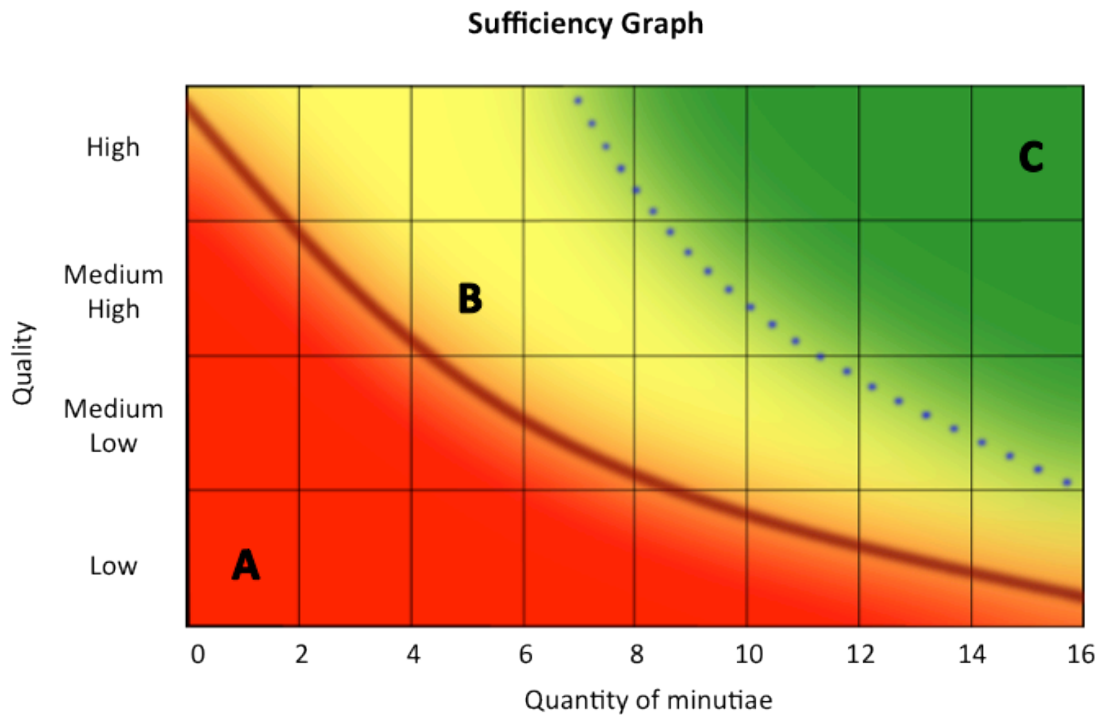


Figure 1: Sufficiency Graph

This graph does not suggest or endorse the use of minutiae counts as the sole criteria for a decision threshold.

6.4.2. Analysis phase

- 6.4.2.1. In the analysis phase, the assessment of the impression based on quality and quantity (as defined above) is positioned on the graph to determine its suitability for individualization. If the impression falls below the solid curve, then an individualization is not warranted. If positioned above the curve, then it may allow an individualization.
- 6.4.2.2. Minimum quality assurance measures are associated with each level of complexity according to the following table (Table 2):

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| Documentation [4] and verification procedures [5] | |
|---|---|
| Non-complex | Limited documentation of the relevant features used as a basis for a conclusion. Standard verification. |
| Complex | Extensive documentation of the relevant features used as a basis for a conclusion. Should consider the possibility of an enhanced verification and review procedure (e.g., a blind verification and multiple verifiers). |

Table 2: Documentation and verification procedures.

- 6.4.2.3. A non-complex impression may be classified as complex if the following modifying factors are present: low specificity of features, significant distortion (e.g., multiple tap, superimposed impression, extreme pressure leading to tonal reversal, and slippage), high tolerances, or the original conclusion is contested during verification.
- 6.4.2.4. An impression categorized initially as complex may be classified as non-complex if modifying factors are present such as high specificity of features, presence of creases, scars, and open fields.
- 6.4.2.5. Justification for reassignment of complexity shall be documented.
- 6.4.3. Evaluation phase
 - 6.4.3.1. In the evaluation phase, the sufficiency graph is used as a guide that broadly delineates the boundaries between individualization and inconclusive decisions.
 - 6.4.3.2. In the evaluation phase, the decision process starts with an attempt at exclusion followed by an assessment of the potential correspondence observed between the impressions.
 - 6.4.3.2.1. Exclusion (See Appendix B)
 - 6.4.3.2.1.1. An exclusion decision can be based solely on Level 1 when sufficient pattern area and orientation indicators (e.g., recurves, cores, deltas, and creases) are available and when disagreement has been observed absent any significant distortion such as: double tap, overlaid impressions, or twisting. If significant distortion is observed, an exclusion decision can only be reached by considering both Level 1 and Level 2 details. If available, Level 3 detail may also be considered in conjunction with Level 2 detail.
 - 6.4.3.2.1.2. An exclusion decision can be based on Level 2 detail when sufficient disagreement has been observed.
 - 6.4.3.2.1.3. Level 3 details cannot be the sole factor in exclusion decisions. Level 3 details have to be considered in conjunction with Level 1 and Level 2 details.
 - 6.4.3.2.2. Individualization
 - 6.4.3.2.2.1. If the impressions originated from the same source, the examiner should observe correspondence, within

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tolerances, of all features. It is the degree of correspondence of features that is weighed.

6.4.3.2.2.2. For an individualization conclusion, sufficient agreement of information must exist so that the likelihood the impression was made by a different source is so remote that it is considered as a practical impossibility.

6.4.3.2.2.3. Level 3 details cannot be the sole factor in individualization decisions. Level 3 details have to be considered in conjunction with Level 1 and Level 2 details.

6.4.3.2.3. If the examiner did not reach a conclusion of individualization or exclusion, the conclusion will be reported as inconclusive.

7. References

[1] IAI 2010-18 resolution.

[2] Polski, J.; Smith, R.; Garrett, R. The Report of the International Association for Identification, Standardization II Committee. Grant no. 2006-DN-BX-K249 awarded by the U.S. Department of Justice, Washington, DC, March 2011.

[3] SWGFAST Document #18 (2010), Standards for Minimum Qualifications and Training to Competency for Friction Ridge Examiner Trainees (Latent/Tenprint), Ver. 2.0.

[4] SWGFAST Document #8 (2012), Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) (Latent), Ver. 2.0.

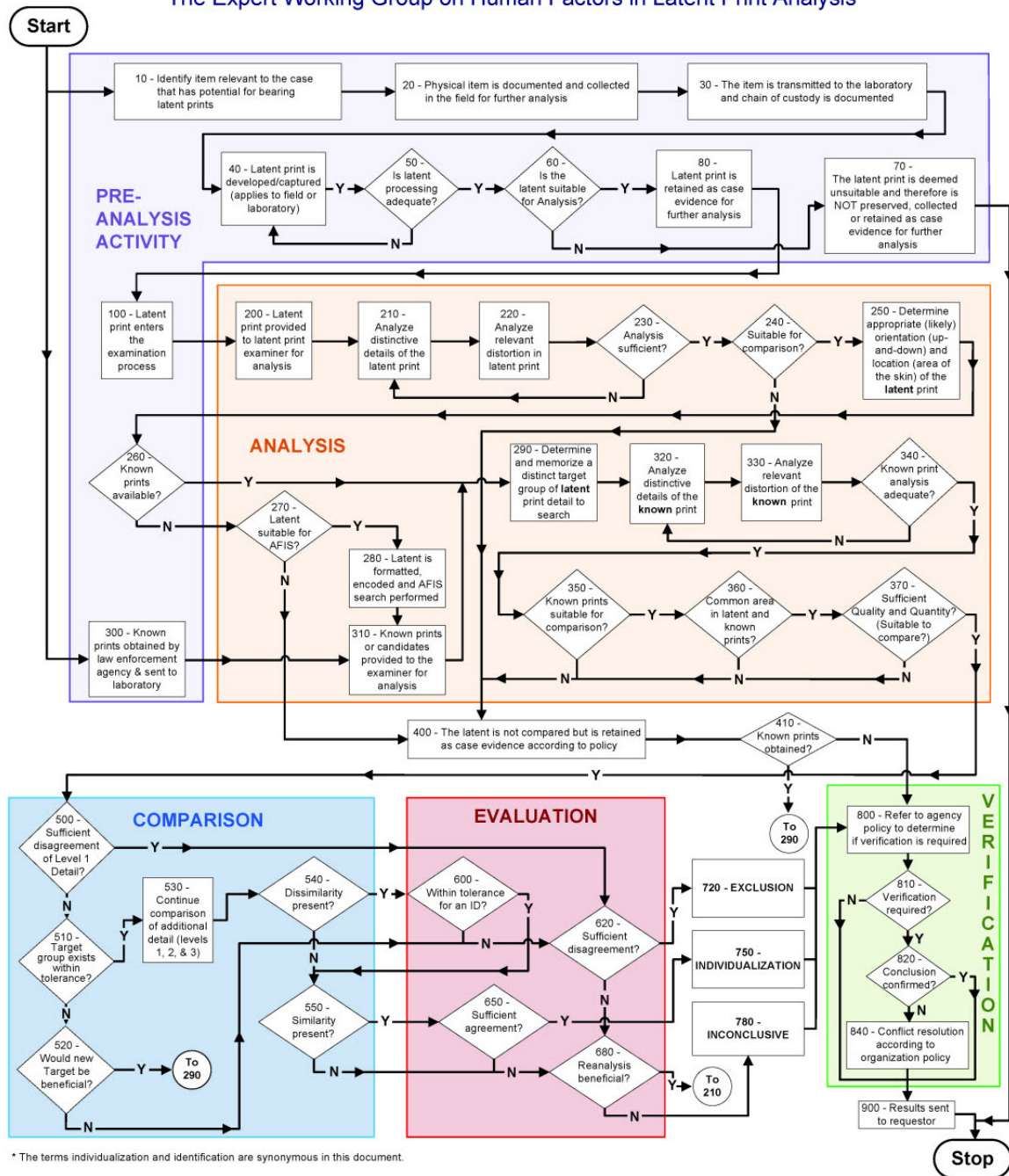
[5] SWGFAST Document #7 (2012), Standard for a Quality Assurance Program in Friction Ridge Examinations (Latent/Tenprint), Ver. 5.0.

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Appendix A

The Latent Print Examination Process Map

The Expert Working Group on Human Factors in Latent Print Analysis



* The terms individualization and identification are synonymous in this document.

This diagram documents the steps of the ACE-V process as currently practiced by the latent print examination community. The numbers in each of the boxes correspond to "steps" that are more fully described in the report. The purpose of this process map is to facilitate discussion about key decision points in the ACE-V process.

Expert Working Group on Human Factors in Latent Print Analysis. *Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach*. U.S. Department of Commerce, National Institute of Standards and Technology, 2012



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Appendix B

8. Exclusion of Source or Subject

- 8.1. Exclusion is the decision by an examiner that there are sufficient features in disagreement to conclude that two friction ridge impressions originated from different sources. Exclusion implies that the likelihood of observing these features in disagreement, if the impressions are coming from the same source, is so remote that it is considered as a practical impossibility.
- 8.2. Excluding a known friction ridge impression as the source of an unknown impression requires that the examiner has determined that the anatomical region indicated in the unknown impression is fully represented in the exemplar. Exclusion of a subject as the origin of the unknown impression can only be reached if all relevant comparable anatomical areas are represented and legible in the known exemplars. Notes and reports shall clearly state if the exclusion refers only to the source or the subject.
- 8.3. When the impressions are determined to be non-complex, as determined in the analysis phase, exclusion can be simple. For example when the fingerprint is an impression of an arch pattern and the specific known impression under consideration is a whorl pattern the exclusion of that source is warranted (Figure B1).



Figure B1: High quality impressions with unambiguous features may be excluded as having a common source based on Level 1 detail.

- 8.4. The “One Discrepancy Rule” or the “One Dissimilarity Doctrine” as described by Thornton [Appendix B: 1], has been used to support exclusions of a source to an unknown impression. Although sometimes used synonymously and applied inconsistently, the terms “discrepancy” and “dissimilarity” refer to different concepts. Discrepancy refers to the presence of one or more friction ridge details in one impression that do not exist in the corresponding area of another impression [Appendix B: 2]. Discrepancies originate in the source skin. The term discrepancy is only used as a description of incompatibility between two impressions that has resulted in a conclusion of exclusion. It has long been recognized by latent print examiners that this “rule” should be critically applied with a detailed analysis of the remainder of the impression. Dissimilarity refers to a difference in appearance between two friction ridge impressions. For example, in the presence of overwhelming correspondence of features supporting the conclusion of individualization, an isolated dissimilarity may not be sufficient to exclude. Such a dissimilarity may be accepted as an artifact of distortion in the print or scarring in the skin without the examiner knowing the actual cause of the dissimilarity.

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- 8.5. The “One Discrepancy Rule” has been historically associated with minutiae and was applied only in cases with pattern similarity. It was often applied when a numerical threshold (typically eight to twelve minutiae) was required before deciding source attribution.
- 8.6. In assessing dissimilarities, the examiner must scrutinize the impression concentrating on ridge morphology and specifically considering factors such as distortion, multiple overlapping impressions, compression, and scarring (Figures B2 & B3). Skin creases, which may have diminished or become more prominent over time, could also account for the appearance of misaligned ridges. It is incumbent on the examiner to acknowledge the differences, when present, and fully document the data used in the decision-making process.

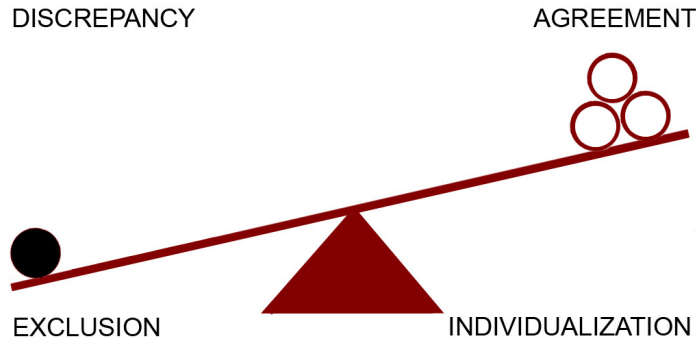


Figure B2: In this instance an exclusion decision has been made because few features supporting individualization and an un-reconciled dissimilarity has been observed and determined by the examiner to be a discrepancy.⁷

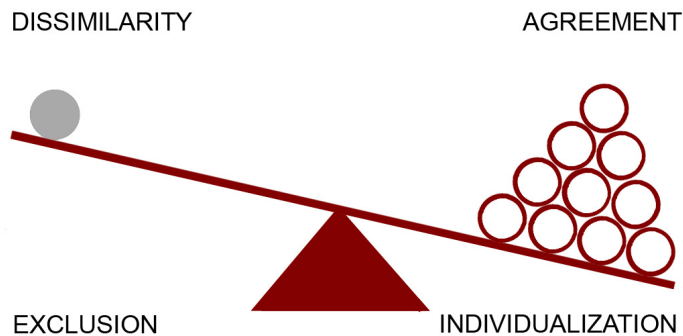


Figure B3: In this instance an individualization conclusion has been reached because the abundance of features supporting individualization outweighs the presence of dissimilarities even though some may be of indeterminate origin.⁸

⁷ Illustrations are intended to represent concepts of decision-making and not a numerical standard on which to base those decisions.

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- 8.7. There are instances where, for example, due to accident, disease or intentional disfigurement, fingerprint patterns, or ridge flow may change and take on the appearance of a different pattern or ridge configuration. Examiners making exclusions based on Level 1 detail must be aware of these phenomena and account for their influence as part of the decision making process (Figure B4).



Images courtesy of the Fingerprint Interest Group

Figure B4: The example above illustrates a situation where, due to an injury, the impression on the right has a substantially different Level 1 pattern appearance from the pre-injury impression on the left.

- 8.8. Extra ridges may appear in a friction ridge impression even though there is an abundance of corresponding features between two impressions. This may be caused by movement of the friction ridge skin or surface at the time of deposition. Examiners making exclusions based on Level 2 detail must be aware of this phenomenon and account for its influence as part of the decision making process (Figure B5).

⁸ Illustrations are intended to represent concepts of decision-making and not a numerical standard on which to base those decisions.

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Figure B5: In this example, extra ridges, attributed to slippage during recording, resulted in a double tap solely in that area, while the remaining friction ridge surface remained as a single touch.

8.9. When the impressions are complex, the decision requires more expertise, consideration, and documentation of factors such as distortion and multiple depositions. Friction ridge details are not always accurately replicated in low quality impressions and variations in appearance of ridge characteristics and their sequence may be present. It should be noted that variations may also appear in high quality prints. Caution is warranted in the determination of whether a variation is a dissimilarity rather than a discrepancy (Figures B6 and B7).



Figure B6: In the example above there is the potential of an erroneous exclusion based on Level 1 pattern. The impression contains red flags that would be cause to question the reliability of Level 1. Level 2 details should be considered prior to the exclusion conclusion.

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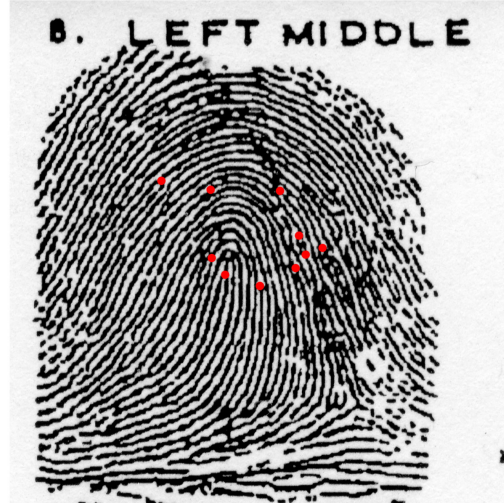
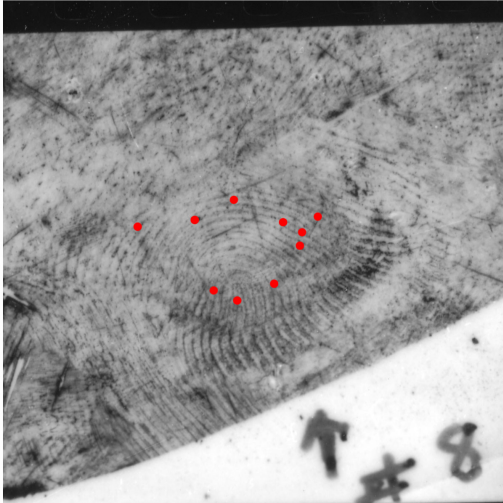


Figure B7: In the real case example above, multiple examiners erroneously excluded the source due to apparent Level 1 ridge flow difference.

9. Conditions Supporting Exclusion

- 9.1. Expert consensus and experience have determined that source exclusion may be reliably made using Level 1 and Level 2 details. Exclusion relying predominantly on Level 3 detail is problematic due to inconsistency in its recording.
- 9.2. In order to reach a decision to exclude a source, the examiner must weigh the discriminating value of the features present in the impression that support individualization against those which support exclusion.

10. References

[1] "One-Dissimilarity Doctrine in Fingerprint Identification," J.I. Thornton, International Criminal Police Review, March 1977, Issue 306 Pages 89-95.

[2] SWGFAST Document #19 (2013), Standard Terminology of Friction Ridge Examination (Latent/Tenprint), Ver. 4.0.

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11. Revision Table

| Version | Effective Start | Effective End | Posted | Archived | Change |
|---------|-----------------|---------------|----------|----------|---|
| 1.0 | 3/15/11 | 09/13/11 | | 09/13/11 | Original Issue |
| 1.1 | 09/13/11 | N/A | 10/26/11 | N/A | 1. Revised numbering 2. Updated Appendix with final reference source version |
| 2.0 | 03/13/13 | N/A | 04/27/13 | N/A | Added Appendix B Reformatted (start of new version number) |

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| Date of Last Review N/A | Date of Next Review 03-2018 | Appendix present/Letter Yes/A&B |