Latent Print Section
Standard Operating Procedures
Forensic Analysis Division
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Latent Print Section
Handling of Evidence & Documentation Procedures
Forensic Analysis Division
1. Handling of Evidence & Documentation Procedures

1.1 Scope
1.1.1 This procedure establishes the requirements to receive, handle, document, protect, store, and transfer physical evidence in the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure
1.2.1 Chain of Custody
1.2.1.1 A chain of custody is maintained for all items of evidence submitted to the Latent Print Section. This is accomplished through written signatures, initials, or electronic equivalent.
1.2.1.2 Intra-section transfers, or items transferred from another section within the Houston Forensic Science Center (HFSC), and items transferred between examiners/technicians/clerical staff/storage locations shall be documented with a chain of custody record as stated above in 1.2.1.1.

1.2.2 Evidence Security
1.2.2.1 The Latent Print Section is located within a security/electronic badge controlled limited access building.
1.2.2.2 The Latent Print Section and its processing laboratory are secure limited access areas. Access is controlled by electronic badge readers. Additionally, there is an outside monitored alarm system on all entry doors that is PIN activated when the last person leaves for the day. The processing area is monitored by an outside alarm system that is separate from the main alarm system in the Latent Print Section.
1.2.2.3 Non-HFSC staff members and visitors must be escorted at all times while in the Latent Print Section.
1.2.2.4 The evidence storage vault located within the processing lab has a separate electronic badge scanner.
1.2.2.5 All physical evidence received by the Latent Print Section shall be stored inside the evidence vault if the case has not been assigned to a latent print examiner or latent print technician.
1.2.2.6 Physical evidence to be returned to the submitting agency after completion of analysis shall be stored in the evidence vault.
   - Exceptions can be made in the case of large, bulky items that cannot be stored inside the vault. Since the processing lab has a separate, monitored alarm and is a limited access area, these items can be temporarily stored there pending return to the submitting agency.
1.2.2.7 Multiple, lockable steel cages are located in the Latent Print Processing Area that are designated secure storage locations for evidence that is currently assigned and/or is in the process of being analyzed by a latent print examiner or latent print technician.
1.2.2.8 When an examiner/technician ends their shift, all evidence currently being analyzed in the Latent Print Processing Area will be secured either in the Evidence Storage Vault or a lockable steel cage. For large bulky items that cannot be secured in the vault or a cage, the item can be left in the processing area.

1.2.2.9 Physical evidence being transferred to temporary storage locations within the Latent Print Section for AFIS entry, technical review, administrative review, verifications, etc. has to be secured in a manner that prevents loss or degradation of the evidence, but does not have to have a permanent seal affixed. For latent lift cards and physical photographs in envelopes, this is generally accomplished by placing a piece of tape over the opening of the envelope in a manner that prevents the contents from being lost.

1.2.3 Receiving Outside Submissions of Evidence

1.2.3.1 Upon submission to the Latent Print Section, evidence packaging should be inspected to ensure it is appropriate for the items said to be contained inside.

1.2.3.2 Evidence seals are inspected to ensure they protect evidence from loss, cross-transfer, contamination, or deleterious change.

1.2.3.3 If packaging is not suitable or there is a chance the test items’ integrity could be compromised, a rejection of testing report may be issued. The technician/examiner should consult with a supervisor/Section Manager to determine the course of action to be taken.

1.2.3.4 The evidence packaging will be labeled with a HFSC Laboratory Information Management System (LIMS) barcode. A barcode will be affixed to the outside packaging upon initial receipt by the Latent Print Section, if there is not a barcode already affixed.

1.2.3.5 All evidence packaging received by the initial examiner/technician will have the following clearly marked on the outside of the packaging:

- Forensic Case Number – Item Number – Examiner Initials – Date Received
  (Example: 2014-00001 Item 1 TJS 6/17/14)

1.2.3.6 If the evidence packaging has a LIMS decal clearly displaying the Forensic Case Number and Item number, then the examiner/technician will just initial and date the packaging.

1.2.3.7 If the evidence has been previously marked by the initial examiner and another examiner takes possession of it, then the receiving examiner must initial the packaging. If evidence has previously been analyzed by another section and has the HFSC bar code on it, then a new one is not necessary.

1.2.3.8 During the examination process, evidence may be transferred within the section to temporary locations, such as AFIS Entry or Verification, and does not have to be sealed with evidence tape. The container/envelope must be secured in such a way as to preserve the contents from becoming lost or falling out. A piece of tape will be placed over the opening on the packaging to sufficiently create a temporary seal.

1.2.4 Physical Evidence Created within the Latent Print Section
1.2.4.1 Physical evidence created within the Latent Print Section, such as but not limited to, latent lifts, printed photographs, and record finger and palm print cards, shall be packaged as to prevent the items from loss, cross-transfer, contamination, or deleterious change.

1.2.4.2 Upon completion of analysis or when evidence created needs to be transferred, the evidence packaging will be sealed and clearly identified with the following:
- Forensic Case Number/LIMS barcode
- Item Number
- Examiner/Technician’s initials

1.2.5 Evidence Inventory
1.2.5.1 All latent lift cards/physical evidence received must be inventoried to ensure the contents received match the chain of custody document (currently residing in LIMS). If a discrepancy is discovered, the initial examiner/technician shall contact the submitter to inquire about the circumstances immediately so that steps can be taken to correct the error.

1.2.5.2 The examiner/technician will document their inventory by filling out the Exhibit List area in the case record. Any discrepancies will be documented in the case record.

1.2.6 Sub-Itemization of Latent Lift Card Evidence
1.2.6.1 Evidence received may contain more than one item within the outer packaging. The entire package is considered an item.

1.2.6.2 The contents of the package will be sub-itemized within LIMS and this sub-itemization number will be written on the respective lift card.

1.2.6.3 Each latent print card contained within evidence packaging will have the following written on the front and back of the card in permanent ink by the initial examiner:
- Forensic Case Number – Item Number or Sub-item Number – Examiner Initials – Date Received

(Example: 2014-00001 Item 1.6 TJS 6/17/14)

1.2.7 Sub-Itemization of Evidence to be Processed
1.2.7.1 Evidence received may contain more than one item within the outer packaging. The entire package is considered an item.

1.2.7.2 The contents of the package will be sub-itemized within LIMS. This sub-itemization number will be written on the evidence if the area permits without possible destruction of undeveloped latent impressions.

1.2.8 Record Finger and Palm Prints
1.2.8.1 When a record finger or palm print card is retrieved from the in-house databases or obtained by physically recording a person’s friction ridge skin, it must be added to the case as an item of evidence through LIMS.

1.2.8.2 Record finger and palm prints must have the same information written as the latent lift cards.
1.2.9 Documenting the Analysis of Latent Impressions

1.2.9.1 The analysis definitions and guidelines outlined in the ACE-V Methodology SOP will be followed when determining suitability of latent print evidence.

1.2.9.2 Anytime latent prints are marked electronically the record must be saved in LIMS or a digital image management system (e.g. Mideo).

1.2.9.3 When an examiner determines that a latent lift or image of a latent print is suitable for comparison, the following will be marked on the image or lift near the latent impression:

- Latent fingerprints with known orientation - will be identified as being suitable by drawing a half circle around the top of a finger indicating distal orientation of the print.
- The proximal and medial phalanges of the finger with known orientation – will be identified as being suitable by drawing vertical lines on both sides of the print with a small arrow indicating distal orientation of the print.
- Latent palm prints with known orientation – will be identified by drawing an open bracket around the bottom of a palm print with the bracket opening towards the top indicating distal orientation of the print.
- Latent prints where origin (finger or palm) cannot be determined – will be identified by drawing a circle around the entire print.

*Note: Latent impressions developed during processing will have circles as much as possible drawn around the possible suitable latent impressions. These indicate the areas where latent impressions were developed and do not indicate any type of orientation.

- Latent prints that are known fingers or palms but orientation cannot be determined– will be identified by drawing a question mark to the side of the latent print.

1.2.9.4 The latent prints determined potentially suitable for identification will have a latent number assigned to them beginning with L1 and each latent after will be labelled in ascending numerical order (i.e. L1, L2, and L3).

1.2.9.5 All final analysis conclusions of latent prints will be documented in the case record.

1.2.10 Documenting Identifications

1.2.10.1 If an identification is effected, the examiner will write the finger number and finger abbreviation or palm abbreviation (Ex. LM, RR, RM, LP), the name on the record finger or palm print card (Last Name, First Name), the examiner’s initials, and the date. In cases where the first and last name are the same on more than one person compared, i.e. family members, include the middle initial with the first and last name. In cases where there is not a middle initial or it is the same, use a unique identifier.
1.2.10.2 The examiner will also initial and date beside the area of the record finger or palm print card used to make the identification.

1.2.11 Documenting Verifications
   1.2.11.1 After the verifier has reached a conclusion of identification, they will write under or near the primary examiner’s annotation, the abbreviation (VER), the verifier’s initials, and date. For each latent print identified, the verifier will write the above information beside or near the latent print verified.
   1.2.11.2 The verifier will also initial and date beside the area of the record finger or palm print card used to make the identification.
   1.2.11.3 The verifier will also complete the Verification Worksheet and include it in the case record.

1.2.12 Documenting Exclusions and Inconclusive Results
   1.2.12.1 All non-identifications and inconclusive results will be documented in the case record.

1.3 Quality Assurance/Quality Control
   1.3.1 A technical and administrative review is performed on all casework before a final report is released.

1.4 Records
   1.4.1 Case records and reports will be maintained within the HFSC LIMS, digital image management system, and/or case record folders.

1.5 References

   SWGFAST, Document #8 Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) 9/11/12 Ver 2.0

   SWGFAST, Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint) 3/13/13 Ver. 2.0

   SWGFAST, Document #5 Standards for Reporting Friction Ridge Examinations (Latent/Tenprint) 9/14/12 Ver. 2.0

   HFSC Latent Print Section, Reporting Results and Interpretations, October 26, 2015.

   HFSC Latent Print Section, Analysis, Comparison, Evaluation and Verification Methodology, September 24, 2015.
Latent Print Section
Analysis, Comparison, Evaluation and Verification
Methodology
Forensic Analysis Division
1. Analysis, Comparison, Evaluation, and Verification

1.1 Scope

1.1.1 This procedure details the examination of friction ridge skin impressions and applies to all Latent Print Examiners assigned to the Latent Print Unit of the Houston Forensic Science Center (HFSC).

1.1.2 The two basic scientific premises forming the foundation of the use of friction ridge impressions as a means of identification are permanence and individuality. That is, that the fingerprints of no two individuals are the same and they remain unchanged, barring any damage to the dermal layer of skin, from after embryonic development until after death. The fundamental principles of persistence and uniqueness have been founded through the study of the biological sciences for over a century.

1.2 Methodology

1.2.1 Friction ridge impression examinations are conducted by examiners, trained to competency, using the Analysis, Comparison, Evaluation, and Verification (ACE-V) methodology, which includes both qualitative and quantitative aspects. Application of ACE includes observations, measurements, assessments, decision-making, and documentation, which are enabled by the training, skill, and experience of the examiner. The application of “V” or Verification phase requires a second trained examiner to apply the ACE process in order to agree or disagree with the original examiner’s conclusion.

1.2.2 There are three levels of detail that may be present within the friction ridge impressions that are used for the application of ACE:

   1.2.2.1 Level 1 Detail:
     • Overall ridge flow that includes the pattern type (loop, arch, whorl).
     • Major creases.
     • Anatomical source such as finger, palm, foot.
     • Orientation.
     • Cannot be used alone for identification.

   1.2.2.2 Level 2 Detail:
     • Individual characteristics or ridge path deviation to include formations defined as ridge endings, bifurcations, dots or combinations thereof.
     • Absence of ridge path deviations (i.e. continuous ridge).
     • Used in conjunction with Level 1 detail can be used for identification as well as exclusion.

   1.2.2.3 Level 3 Detail:
     • The unique shape, size, and position of pores (Poroscopy).
• Edges of the ridges (Edgeoscopy) to include dimensional attributes of a ridge, such as ridge path, deviation, width, and shape.
• Any fine creases.
• Incipient ridges.
• Scars.
• **Cannot be used exclusively for identification but can be used in conjunction with Level 1 and Level 2 details for identification and exclusion.**

1.3. Procedure

1.3.1. Analysis

1.3.1.1. During the Analysis phase, the overall latent print is analyzed to determine if it is suitable for comparison. The following factors are considered when performing analysis and suitability:

1.3.1.1.1. The quantity of the latent print present is observed to determine how much of the friction ridge area is reproduced.

1.3.1.1.2. The quality of the latent print is analyzed by looking at factors such as clarity, contrast, downward pressure, lateral pressure, slippage, background noise, and focal points.

1.3.1.1.3. Orientation of the latent print is determined if possible.

1.3.1.1.4. A determination of “suitable” by an examiner indicates that there is sufficient quality and quantity of unique details present in the impression such that, when compared to another impression, a conclusion can be reached.

1.3.1.1.5. If the impression lacks sufficient detail to reach the conclusion of suitable for comparison, the print is determined to be of no value for comparison purposes.

1.3.1.1.6. Analysis is conducted on all friction ridge impressions regardless of whether comparisons will be made.

1.3.1.1.7. **In order for a HFSC Latent Print Examiner to determine a friction ridge impression is suitable for comparison, the impression MUST contain a minimum of eight (8) level two characteristics, positioned in sequence with no unexplainable breaks or vacant areas that prevents a continuous transition to the next characteristic.**

1.3.2. Comparison
1.3.2.1. During the comparison phase, a direct side-by-side comparison is conducted of two or more impressions to determine the existence of discrepancies, dissimilarities, or similarities.

1.3.2.2. This phase progresses systematically and sequentially until all available ridge detail has been compared, events shared by both impressions are accounted for, characteristics occupy the same relative spatial relationship, and any differences can be explained, i.e. distortion, slippage, background noise.

1.3.3. Evaluation

1.3.3.1 The evaluation phase is the formulation of a conclusion based on the analysis and comparison. It must be determined whether the information observed in the phases above is sufficient to form one of the three conclusions or return to the analysis phase and reassess suitability. It is during the evaluation phase that the examiner assesses the value of the ridge detail observed during the analysis and the comparison steps and reaches a conclusion. There are four possible conclusions Latent Print Examiners of the Latent Print Section of HFSC can reach:

1.3.3.1.1 Identification - An identification is the determination by a qualified examiner that two friction ridge impressions originated from the same source due to sufficient quality and quantity of corresponding information such that the examiner would not expect to see that same arrangement of features repeated in a print from another source.

1.3.3.1.2 Exclusion - The conclusion of exclusion is the decision by the examiner that the impressions compared had sufficient features in disagreement to conclude that the impressions did not originate from the same source.

1.3.3.1.3 Inconclusive - The conclusion of inconclusive can be used under two (2) circumstances based on observations from the examiner:

1.3.3.1.3.1 A result of incomplete or unclear record finger, palm, or foot prints (lack of area of detail needed in the records to compare to the latent print or record prints are of poor quality such as over inking, distortion, etc.)

1.3.3.1.3.2 Conclusion reached when the latent print has corresponding features, in sequence, but lacks sufficiency to identify. Can also apply in conjunction with the previous having dissimilar features but not enough to exclude as being from the same source.
1.3.3.1.4 **High Degree of Association** – This conclusion is used only as a result of a Preliminary AFIS Association. (See FAD-LP-AFIS Operations)

1.3.3.1.4.1 A Preliminary AFIS Association is the result of searching a latent print impression in AFIS and applying ACE methodology where the conclusion is reached that the two friction ridge impressions have a high degree of association based on corresponding characteristics contained within the latent image and record image on the computer screen that was returned from the search in AFIS.

1.3.3.1.4.2 Official identifications are **NEVER** reported from Preliminary AFIS Association results alone.

### 1.3.4. Verification

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

1.3.3.3 All identifications, exclusions, inconclusive, and high degree of association conclusions declared by the original examiner will be confirmed or refuted by a second examiner.

1.3.3.4 The Latent Print Examiner will submit the original image and record prints to the verifying examiner through proper transfer of custody when dealing with physical evidence (i.e. latent lifts) or through secure electronic means when verifying identifications that are documented utilizing digital imaging.

1.3.3.5 Verifications of Preliminary AFIS Associations are conducted as outlined in the FAD-LP-AFIS Operations SOP.

1.3.3.6 All verifications must be conducted prior to sending the case to Technical/Administrative review. Additionally, verifications must be conducted prior to issuing any conclusions of identifications to a submitter as part of a preliminary report.

### 1.4. Consultation between Examiners

1.4.1. During normal casework, examiners may consult with other examiners when applying the ACE methodology. Refer to the **FAD-LP-Conflict Resolution and Consultation** for further information.

### 1.5. Conflict Resolution

1.5.1. Conflict resolution will be initiated if the verifying examiner contests the examiner’s conclusion. This procedure is outlined in **FAD-LP- Conflict Resolution and Consultation**.
1.6. Erroneous Conclusions in Friction Skin ACE

1.6.1. Erroneous Identification
1.6.1.1. An Erroneous Identification occurs when an identification has been declared and it is determined that the friction ridge impression did not originate from the same source.
1.6.1.2. An Erroneous Identification is considered the most serious error a latent print examiner can make.
1.6.1.3. An erroneous verification of an Erroneous Identification is considered an Erroneous Identification.
1.6.1.4. When an Erroneous Identification occurs, the primary concern is to conduct an immediate assessment to determine the extent of the situation and impact on the customer.
1.6.1.5. Immediate action must be taken to ensure corrections are made and the comparisons in question are completely re-examined. A corrected report will be issued and the customer/affected parties notified of the correction if a final report has been issued.
1.6.1.6. If an Erroneous Identification occurs, the Quality Director will be notified, regardless if a final report has been issued.

1.6.2. Missed Identifications
1.6.2.1. If a laboratory report is issued and it is determined that an examiner has failed to make an identification when in fact both friction ridge impressions are from the same source then a Missed Identification has occurred.
1.6.2.2. Missed Identifications are an inevitable aspect of latent print examinations. Limiting Missed Identifications is part of the quality assurance/quality control program through full re-analysis of designated cases as determined by the Section Manager and monthly QA/QC checks of examiner casework.
1.6.2.3. When a Missed Identification occurs, the primary concern is to conduct an immediate assessment to determine the extent of the situation and impact on the customer. Immediate action must be taken to ensure corrections are made, a corrected report is generated and the customer/affected parties are notified of the correction if a final report has been issued.
1.6.2.4. If a Missed Identification occurs, the Quality Director will be notified if a final report has been issued.

1.6.3. Erroneous Exclusions
1.6.3.1. An Erroneous Exclusion occurs when an examiner incorrectly determines that two impressions of friction skin did not originate from the same source and it is later determined that the impressions are from the same source.
1.6.3.2 An Erroneous Exclusion is more serious than a Missed Identification but less serious than an Erroneous Identification.

1.6.3.3 Eliminating Erroneous Exclusions is part of the quality assurance/quality control program through full re-analysis of designated cases as determined by the Section Manager and monthly QA/QC checks of examiner casework.

1.6.3.4 When an Erroneous Exclusion occurs, the primary concern is to conduct an immediate assessment to determine the extent of the situation and impact on the customer.

1.6.3.5 Immediate action must be taken to ensure corrections are made, a corrected report is generated and the customer/affected parties are notified of the correction if a final report has been issued.

1.6.3.6 If an Erroneous Exclusion occurs, the Quality Director will be notified if a final report has been generated.

1.6.4. **Erroneous Preliminary AFIS Associations**

1.6.4.1. An Erroneous Preliminary AFIS Association occurs when a high degree of association has been declared and it is determined that the friction ridge impression did not originate from the same source upon performing an official confirmatory examination.

1.6.4.2. It is recognized that performing on-screen comparisons utilizing AFIS search software does not offer the examiner nor the verifying examiner the full capacity to declare that an official identification has been effected. Potential loss of quality due to compression of the image(s), monitor resolutions, capture resolutions, limited enhancement tools, etc. are all possible utilizing various AFIS software comparison tools.

1.6.4.3. As a presumptive examination, it is recognized that due to the factors stated above, although rare, false positive AFIS Associations may be discovered upon performing an official confirmatory examination with the original latent images and record finger and/or palm prints.

1.6.4.4. An erroneous verification of an Erroneous Preliminary AFIS Association is considered an Erroneous Preliminary AFIS Association.

1.6.4.5. If an Erroneous Preliminary AFIS Association occurs, the Quality Director will be notified if a final report has been issued.

1.6.5. **Administrative Errors**

1.6.5.1. Administrative Errors are considered non-technical and include transcription and typographical errors. (Example: Improper spelling of names of individuals in final reports; improper reporting of fingers(s) identified i.e. Right Middle instead of Left Middle).
1.6.5.2. When an Administrative Error occurs, the primary concern is to conduct an immediate assessment to determine the extent of the situation and impact on the customer. Immediate action must be taken to ensure corrections are made, a corrected report is generated and the customer/affected parties are notified of the correction if a final report has been issued.

1.7. Quality Assurance/Quality Control

1.7.1. Technical Review/Administrative Review (TR/AR)

1.7.1.1. A TR/AR will be performed on all casework before the final report is released. Procedures and documentation are found in FAD-LP-TR/AR Technical/Administrative Review Standard Operating Procedures.

1.7.2. Quality Control/Quality Assurance Review

1.7.2.1. Random sampling (a minimum of one completed case per examiner) of the Latent Print Section’s overall case output will be reviewed on a monthly basis by the Section Manager or his/her designee to ensure Technical Review/Administrative Review procedures are being followed.

1.8. References

SWGFAST, Document #16 Standard for the Technical Review of Friction Ridge Examinations (Latent/Tenprint) 11/16/12 Ver. 2.0

SWGFAST, Document #7 Standard for a Quality Assurance Program in Friction Ridge Examinations (Latent/Tenprint) 9/11/12 Ver. 5.0

SWGFAST, Document #8 Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) 9/11/12 Ver 2.0

SWGFAST, Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint) 3/13/13 Ver. 2.0

Defense Forensic Science Center, CILA LP 11.0 Analysis, Comparison, Evaluation and Verification Methodology 11 March 2014


SWGFAST, *Document #12 Standard Friction Ridge Automation Training (Latent/Tenprint)* 11/14/12 Ver 2.0

SWGFAST, *Document #101 Limited Examination Considerations for Latent Print Sections (Latent) Position Statement* 09/11/12 Ver 1.0
Latent Print Section
Conflict Resolution and Consultation Procedures
Forensic Analysis Division
1. Conflict Resolution and Consultation Procedures

1.1 Scope
1.1.1 This procedure details the consultation and conflict resolution policy when two latent print examiners arrive at different conclusions. This procedure applies to all Latent Print Examiners (LPEs) assigned to the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.1.2 Although rare, a conflict could generally occur under the following circumstances:
   1.1.2.1 The case examiner and verifier disagree on the suitability of a latent impression.
   1.1.2.2 The case examiner and the verifier reach different conclusions, i.e. Identification, Inconclusive or Exclusion.

1.2 Overview
1.2.1 During casework, a case examiner may consult with another examiner on various aspects of a latent impression to determine orientation, anatomical origin, and which target group to search. Target groups are clusters of characteristics used as reference points to begin a search against record prints to be compared. This type of interaction between examiners does not rise to the level of consultation.

1.2.2 A consultation is defined as a significant interaction between examiners regarding one or more latent impressions. A significant interaction is when the consulting examiner conducts an analysis or comparison of the questioned latent impression.

1.2.3 A conflict arises when two examiners arrive at two different conclusions in which a consultation has not been successful.

1.3 Procedure for Documenting Consultations
1.3.1 Any interaction between examiners that rises to the level of consultation must be documented in the case examiner’s case notes. Documentation must include:
   - Name of consulting examiner
   - Date of consultation
   - Subject (Latent #) of the consultation
   - Outcome

1.3.2 In addition to above, when a consultation occurs during the verification phase the verifier must annotate the consultation on the appropriate verification worksheet.

1.4 Procedure for Differences Involving Suitability (Verification Phase)
1.4.1 The first step in resolving a difference of opinion of suitability is for the case examiner and the verifier to discuss the differences of opinion. If after the consultation, the examiners are in agreement regarding suitability then the matter is resolved.

1.4.2 The consultation (including the differing opinions and resolution) must be documented in the case examiner’s notes and on the Verification Worksheet.

1.4.3 If both the case examiner and the verifier cannot agree and still have differing opinions after the consultation, the case is moved into conflict resolution and the supervisor will be notified. The supervisor will perform an independent analysis of the latent
print to determine if it meets suitability requirements as outlined in FAD-LP-ACE-V Methodology.

1.4.4 Conflict Resolution Scenarios Involving Suitability

1.4.4.1 Case Examiner concludes suitable/Verifier concludes not suitable

If the supervisor determines the impression is not suitable, then the conclusion will be changed to not suitable and the matter is resolved. The verifier and the supervisor must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes and line through the suitability markings on the latent lift/photograph/digital image with initials and date.

1.4.4.2 Case Examiner concludes not suitable/Verifier concludes suitable

If the supervisor determines that the impression is suitable, then the conclusion will be changed to suitable. The verifier and the supervisor must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes.

1.4.4.2.1 When the case examiner had the opinion of not suitable and the latent is deemed suitable, the case examiner can no longer serve as the primary examiner and the case must be re-assigned by the supervisor to another examiner for completion.

1.4.5 The supervisor may elect to send an unmarked image of the latent impression to all LPEs not involved (with no reference to case information) and request an independent analysis from each in order to get a consensus. The supervisor will review the independent analysis results and may render a final opinion or bring the matter to the Section Manager. The Section Manager will analyze the latent impression and then review the opinions of all examiners. The Section Manager may then make the final decision of not suitable or suitable and the matter is resolved. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager will be placed in the case record.

1.5 Procedure for Differences Involving Inconclusive Conclusions (Verification Phase)

1.5.1 In rare instances, a latent print determined to be suitable for identification upon initial analysis may be determined to be inconclusive during the comparison phase of the ACE methodology. This occurs during the side by side comparison of the unknown impression to record finger, palm, or foot prints. Characteristics observed during the original analysis phase may in fact be the products of distortion or other factors present during the deposition of latent impressions that are only discovered during the comparison phase. Definition of Inconclusive Outlined in FAD-LP-ACE-V Methodology.

1.5.2 If the case examiner forms the conclusion of identification and the verifier forms the opinion of inconclusive, the first step in resolving the difference of opinion is for the case examiner and the verifier to discuss the differences of opinion. If the verifier, after consulting with the case examiner, changes his/her opinion of inconclusive to identification based on the examiner’s explanation and consultation, then the matter is resolved. The verifier must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and
resolution in his/her notes. If this occurs, it will be classified and documented as a consultation.

1.5.3 If the case examiner, after consulting with the verifier, changes his/her opinion of identification to inconclusive, based on the verifier’s explanation and consultation, then the matter is resolved. A line will be drawn through the annotations marked on the latent impression image or latent lift card and the record prints by the case examiner and the examiner will initial and date beside the correction. The verifier must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. If this occurs, it will be classified and documented as a consultation. The supervisor will be notified of the change and circumstances for documentation.

1.5.3.1 The supervisor may elect to do an independent analysis of the latent impression even though the case examiner and verifier have reached a mutual conclusion. The supervisor may also send an unmarked image of the latent impression and record print to the other LPEs for a consensus of opinion. The supervisor will review the independent analysis results and may render a final opinion or bring the matter to the Section Manager. The Section Manager will analyze the latent impression and record print and then review the opinions of all examiners. The Section Manager may then make the final decision of inconclusive or identification and the matter is resolved. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager will be placed in the case record.

1.5.4 Case Examiner concludes Identification/Verifier concludes Inconclusive

If the case examiner forms the opinion of identification and the verifier cannot agree and both still have differing opinions after the consultation, then the supervisor will be notified. The supervisor will perform an independent analysis of the latent print to form his/her own opinion and conclusion. The supervisor may also send an unmarked image of the latent impression and record print to the other LPEs for a consensus of opinion. The supervisor will review the independent analysis results and may render a final opinion or bring the matter to the Section Manager. The Section Manager will analyze the latent impression and record print and then review the opinions of all examiners. The Section Manager may then make the final decision of inconclusive or identification and the matter is resolved. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager will be placed in the case record.

1.5.4.1 If the opinion of identification is reached after review when the verifier has the opinion of inconclusive, the verifier can no longer serve as the primary verifier and the case must be re-assigned by the supervisor to another verifier for completion.

1.5.4.2 After review, if the opinion of the verifier and the supervisor is that the impression is inconclusive when the case examiner concluded it was an identification, then the latent impression will be changed to inconclusive and the matter is resolved. The verifier and the supervisor must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. A line will be
drawn through the annotations marked on the latent impression image or latent lift card and record prints used for comparison by the case examiner. The examiner will initial and date beside the correction.

1.5.5 Case Examiner concludes Inconclusive/Verifier concludes Identification
If the case examiner forms the opinion of inconclusive and the verifier cannot agree and both still have differing opinions after the consultation, then the supervisor will be notified. The supervisor will perform an independent analysis of the latent print to form his/her own opinion and conclusion. The supervisor may also send an unmarked image of the latent impression and record print to the other LPEs for a consensus of opinion. The supervisor will review the independent analysis results and may render a final opinion or bring the matter to the Section Manager. The Section Manager will analyze the latent impression and record print and then review the opinions of all examiners. The Section Manager may then make the final decision of inconclusive or identification and the matter is resolved. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager will be placed in the case record.

1.5.5.1 If the supervisor agrees with the case examiner that that the impression is inconclusive, then the latent impression will remain inconclusive and the matter is resolved. The verifier and the supervisor must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. This is documented as a Conflict Resolution.

1.5.5.2 If the supervisor agrees with the verifier that that the impression is an identification when the case examiner concluded it was inconclusive, the case examiner can no longer serve as the case examiner. The case must be assigned to another examiner for completion. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager (if applicable) will be placed in the case record.

1.5.6 Case Examiner concludes Exclusion/Verifier concludes Identification

1.5.6.1 A conflicting conclusion of exclusion occurs when the case examiner has excluded the record(s) as having been made by the same source as the latent print and the verifier has identified the latent print to the record(s) as having been made by the same source.

1.5.6.2 If the case examiner forms the conclusion of exclusion and the verifier forms the opinion of identification, the first step in resolving a difference in conclusions is for the case examiner and the verifier to discuss the differences of opinion. If the verifier or the case examiner changes their opinion, after consultation, then the matter is resolved. The verifier must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. If this occurs, it will be classified and documented as a consultation.

1.5.6.3 Even if the difference of opinion is resolved as a consultation, the supervisor must be informed of the erroneous exclusion opinion, regardless of where the difference of opinion originated. The supervisor will keep a log of erroneous exclusion opinions to review periodically with the Section Manager for Quality
Assurance/Quality Control reviews. At a minimum, the following information will be documented:

- Date of occurrence
- Case examiner involved
- Verifier involved
- Forensic case number
- Summary of events

1.5.6.4 If the case examiner forms the opinion of exclusion and the verifier cannot agree and both still have differing opinions after the consultation, then the supervisor and/or Section Manager will be notified of these opinions.

1.5.6.5 The case examiner and the verifier will provide charted copies of the images detailing his/her analysis and comparisons to arrive at his/her respective conclusions to the supervisor. The supervisor will perform an independent analysis of the latent print to form his/her own opinion and conclusion.

1.5.6.6 The supervisor may also send an unmarked image of the latent impression and record print to the other LPEs for a consensus of opinion. The supervisor will review the independent analysis results and may render a final opinion or bring the matter to the Section Manager. The Section Manager will analyze the latent impression and record print and then review the opinions of all examiners. The Section Manager may then make the final decision of exclusion or identification and the matter is resolved. All documentation of analysis conducted by all examiners, the supervisor and the Section Manager will be placed in the case record and it will be classified and documented as a Conflict Resolution.

1.5.6.7 If the opinion of exclusion is reached after review when the verifier has the opinion of identification, the verifier can no longer serve as the primary verifier and the case must be re-assigned by a supervisor to another verifier for completion.

1.5.6.8 After review, if the opinion of the verifier and the supervisor is that the impression is inconclusive when the case examiner concluded it was an identification, then the latent impression will be changed to inconclusive and the matter is resolved. The verifier and the supervisor must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. A line will be drawn through the annotations marked on the latent impression image or latent lift card and record prints used for comparison by the case examiner and the examiner will initial and date beside the correction. This will be classified and documented as a Conflict Resolution.

1.5.7 Case Examiner concludes Identification/Verifier concludes Exclusion

If the case examiner forms the opinion of identification and the verifier cannot agree and both still have differing opinions after the consultation, then the case examiner and the verifier will provide charted copies of the images detailing his/her analysis and comparisons to arrive at his/her respective conclusions to the supervisor. The supervisor will form a Conflict Resolution Panel (CRP) consisting of at least two (2) Certified Latent Print Examiners (CLPE) from the HFSC LP Section and provide them with copies of the unmarked impression and the known record prints. The CRP will
conduct an independent ACE of the impression and known record prints and provide copies of his/her ACE documentation to the supervisor. The supervisor will complete his/her own ACE as well.

1.5.7.1 **If the final outcome of the CRP and the supervisor’s conclusions uphold the conclusion of identification, then the verifier will be removed from the case and the case will be assigned by the supervisor to one of the CRP members for verification.**

1.5.7.2 **If the CRP and supervisor’s conclusions support the conclusion of the verifier of exclusion, the case examiner will be removed from the case and the case will be re-assigned by the supervisor to one of the CRP members.**

1.5.8 The verifier must annotate the differing opinion and resolution in the Verification Worksheet and the case examiner must annotate the difference and resolution in his/her notes. All images, notes, and conclusions of the CRP members and the supervisor will be placed inside the case notes section of the case record.

1.5.9 Differences of conclusion of suitability or inconclusive are considered less serious than those of conflicting conclusions of identification and exclusion. At the direction of the Section Manager, a quality review of the examiner or verifier’s work may take place, depending on the circumstances and a review of past occurrences.

1.5.10 In the case of differences of conclusions involving identification and exclusion, a sampling of cases completed by the verifier or the case examiner will be reviewed to determine if there is a systemic problem. The quality assurance/quality review will be documented and kept on file.

*Note: In instances where a supervisor or the Section Manager is the case examiner or initial verifier and the differing conclusions cannot be settled with consultation, then another supervisor/the Section Manager will assume the duties of the supervisor in the conflict resolution procedures as outlined above.*

**1.6 Documenting Conflict Resolution**

1.6.1 For all instances of differences of conclusions involving suitability or inconclusive results that are resolved at the examiner and verifier level, at a minimum, the verification worksheet and case examiner’s notes will reflect the consultation and resulting conclusions. If the conflict is elevated to involve the supervisor, all notes of analysis, to include images, conducted by all involved examiners, supervisor, and Section Manager, if applicable, will be included in the case notes. The supervisor will keep a log of all conflicts elevated to his/her attention. At a minimum, the following will be documented:

- Date of conflict
- Examiner involved
- Verifier involved
- Forensic Case Number
- Summary of conflict and resulting action taken
- Resolution
1.6.2 For all instances of differences of conclusions involving identification and exclusion, the verifier and the examiner’s notes will reflect the conflict and the resolution. In addition, the supervisor will document and keep on file the following:

- Date of conflict
- Examiner involved
- Verifier involved
- Forensic Case Number
- All ACE documentation involving the examiner and verifier
- All documentation from the CRP members
- Summary of conflict and resulting action taken
- Resolution
- Memorandum prepared by the supervisor indicating the actions taken and the recommendations from the Section Manager.

1.7 References

Defense Forensic Science Center, Document CILA LP 11.1 Conflict Resolution, 13 March 2014

SWGFAST, Document #15 Standard for the Definition and Measurement of Rates of Errors and Non-Consensus Decisions in Friction Ridge Examination (Latent/Tenprint) 11/15/12

SWGFAST, Document #16 Standard for the Technical Review of Friction Ridge Examinations (Latent/Tenprint) 11/16/12 Ver. 2.0

SWGFAST, Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint) 3/13/13

SWGFAST, Document #21 Standard for Consultation Latent/Tenprint) 3/14/13 DRAFT FOR COMMENT, Ver. 1.0
Latent Print Section
Technical/Administrative Review (TR/AR)
Forensic Analysis Division
1. Technical/Administrative Review (TR/AR)

1.1 Purpose
   1.1.1 Personnel conducting Technical/Administrative reviews are responsible for reviewing
casework for technical and administrative accuracy prior to the report being released. The
reviewer is responsible for evaluating that the case record fully supports the
reported conclusions. The case record may include notes, documents, images, and
other supporting documentation. Refer to the HFSC Quality Manual for further details
and guidance.

1.2 Authorizations
   1.2.1 Personnel conducting a technical review of a completed latent print examination case
must be a Latent Print Examiner, trained to competency, and authorized by the
Section Manager to conduct such reviews.
   1.2.2 Personnel conducting a technical review of a completed latent print processing case
must be a Latent Print Examiner or a Latent Print Technician, trained to competency,
and authorized by the Section Manager to conduct such reviews.
   1.2.3 Any member of the Latent Print Section can administratively review a latent print
examination case or a latent print processing case. Administrative reviews can be
conducted by other discipline staff employed by the Houston Forensic Science Center
if needed.

1.3 Definitions
   1.3.1 A technical review is a review of all case related material to ensure reported results
and conclusions are supported by the examination documentation. A technical
review is not synonymous with the verification phase of the ACE-V process nor does
it necessarily include the re-examination of the images in the case. [1] The following
are considered when performing a technical review:
   1.3.1.1 The appropriate examinations have been performed in accordance with
customer requests or additional tests completed in response to correspondence
with the customer.
   1.3.1.2 The conclusions are consistent with the case documentation and are in
accordance with unit policy and procedures.
   1.3.1.3 Identifications, if applicable, have been properly annotated within the case
documentation and evidence/digital images/photographs.
   1.3.1.4 Verifications, if applicable, have been properly documented in accordance with
unit standard operating procedures and the verification worksheet has been
completed by the verifier(s).
   1.3.1.5 All processing techniques, if applicable, have been properly documented and are
performed in the proper sequence according to established unit standard
operating procedures.
1.3.2 An administrative review is a review of the case documentation to ensure completeness and the final report of examination conclusions conforms to unit standards. The following are considered during the administrative review:

1.3.2.1 All notes are complete, understandable, accurate, and indicate a proper inventory was conducted and any discrepancies annotated.
1.3.2.2 Spelling, especially names of individuals as they appear exactly on exemplar records, is correct and statements are grammatically correct.
1.3.2.3 Mistakes are properly annotated with a line through the mistake, correction added, and examiner’s initials.

1.4 Documentation

1.4.1 Technical reviews will be documented in the case record using the appropriate approved LP TR form.
1.4.2 Administrative reviews will be documented in the case record using the appropriate approved AR Form.
1.4.3 Any discrepancies will be annotated by the reviewer in the Reviewer Comments/Corrections section and discussed with the original examiner for corrections. Once corrections have been made and the case re-submitted for either TR or AR, the reviewer will indicate the corrections have been made by placing his/her initials and date at the end of the reviewer’s comments.
1.4.4 Once the reviewer(s) has completed the TR/AR and the requirements set forth in this document have been met, the reviewer(s) will sign and date the corresponding TR/AR forms indicating the case record has been reviewed and approved. The TR/AR worksheet(s) will be placed within the case record as supporting documentation.

1.5 References


1.6 Related Documents

FAD-LP-Processing-TR-FRM-1
FAD-LP-AR-FRM-1
FAD-LP-TR-FRM-1
Latent Print Section
Equipment Maintenance & Performance Checks
Forensic Analysis Division
1. Equipment Maintenance and Performance Checks

1.1 Scope

1.1.1 This procedure details the requirements for the maintenance and performance checks of the equipment used by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure

1.2.1 Before being placed into service, equipment is validated or performance checked to ensure it meets the testing/analysis requirements.

1.2.2 Disposable equipment, if used, shall be used one-time only, unless otherwise stated in the standard operating procedure.

1.2.3 In accordance with the HFSC Quality Manual, critical equipment is any piece of equipment that must be maintained in proper working order to ensure the reliability of results produced using it.

1.2.4 Manuals, instructions, and other documents necessary for proper operation of equipment will be stored with the equipment or in an accessible location.

1.2.5 Equipment requiring periodic performance checks/validation will be uniquely identified and labelled so that records of performance/validation checks can be traced to the equipment.

1.2.6 All equipment shall be purchased from a reputable manufacturer or vendor.

1.2.7 Records associated with section equipment, where applicable and appropriate, should include the following:
- Identity of the equipment and its software.
- The manufacturer’s name and serial number or other unique identifier.
- Dates, results, and copies of reports and certificates of all calibrations, and due dates of next calibration or verification.

1.2.8 The following equipment does not require performance verification:

1.2.8.1 General-Use/Volumetric Equipment – Visual exam and cleaning at time of use. No records are required.

1.2.8.2 Scales – Scales are used for subsidiary measurements but have no effect on the accuracy or validity of the ACE-V methodology. Scales are not considered critical because they do not affect the scientific methodology of analysis and comparisons of latent impressions. A latent print needs to be able to be re-sized to 1:1 or near 1:1 for entry into AFIS. Adhesive and rigid scales for photography are sufficient and require no validation or performance check.

1.2.9 Equipment is performance checked according to the following schedule:

1.2.9.1 Oven and Humidity Chamber – Ovens and humidity chambers are checked before being placed into service to ensure they are working properly. Ovens and humidity chambers will be performance checked on a monthly basis and a log will be kept of the results. In addition, ovens and humidity chambers are routinely used in the chemical processing of porous evidence and are inherently checked when controls are run during the reagent testing procedure.
1.2.9.1.1 **Ovens** - To perform a check on the oven, turn it on and allow it to heat to the preset operating temperature. Observe the temperature displayed on the oven's external digital display and compare it to the thermometer inside the oven. If the oven is operating within +/- 5°C, it is within tolerance. If the oven is outside of tolerance, refer to the operation manual to adjust the oven. If the oven cannot be adjusted, the Latent Print Manager must be notified to coordinate repairs.

1.2.9.1.2 **Humidity Chambers** - To perform a check on the humidity chamber, turn it on and allow it to heat to the preset operating temperature and humidity. Observe the temperature displayed on the humidity chamber’s external digital display and compare it to the thermometer inside the chamber. If the chamber is operating within +/- 5°C, the chamber temperature is within tolerance. Observe the humidity displayed on the humidity chamber’s external digital display and compare it to the hygrometer inside the chamber. If the chamber is operating within +/- 20% relative humidity, the chamber humidity is within tolerance. If the chamber is outside of tolerance for either temperature or humidity, refer to the operation manual to adjust the chamber. If the humidity chamber cannot be adjusted, the Latent Print Manager must be notified to coordinate repairs.

1.2.9.1.3 See manufacturer’s operation manual for correct operation of the oven and humidity chamber.

1.2.9.2 **Balances and Weights** – Balances are calibrated annually by an ISO/IEC 17025 accredited calibration laboratory. Weights are verified on an externally certified balance annually and a log is kept of the results. See additional requirements for performance checks below.

1.2.9.2.1 **Balances** – In accordance with the HFSC Quality Manual, balances will be performance checked at least once monthly and a log will be kept of the results. Balances are considered operational if the testing weight used is measured +/- 0.03 gram of the expected weight.

1.2.9.2.2 **Weights** – Verified weights can be used to perform a check on balances.

1.2.9.3 **Fume Hoods and CA 9000 Superglue Chamber** – Visual examination and function check at time of use. No records are required. Fume hoods and the CA 9000 Superglue Chamber are calibrated and maintained annually by an external ISO/IEC 17025 accredited calibration laboratory. Documentation of the service will be displayed on the external surface of the respective hood or superglue chamber.

1.2.9.4 **Refrigerators** – Performance check weekly to ensure internal temperature is 2°C to 8°C (35.6°F to 46.4°F). A log will be kept with the results.

1.2.9.5 **Digital Imaging Equipment** – Visual examination and function check at time of use. No records are required of this.

1.2.9.5.1 **Scanners** – Scanners used for the capture of latent prints will be performance checked annually. See Appendix A for the scanner performance verification procedure.
1.2.9.5.2 **Digital Cameras** – Digital cameras used for the capture of latent prints will be performance checked annually. See Appendix B for the digital camera performance verification procedure.

1.2.9.5.3 **Monitors and Photographic Enhancement Software** – Monitors and photographic enhancement software used for the enhancement and digital display of latent print evidence is performance checked annually or when an updated software version is installed. The results are kept in a log. See Appendix C for the monitor and photographic enhancement software performance verification procedure.

### 1.3 References


Appendix A: Scanner Performance Verification Procedure

1. Procedure
   1.1 To determine that a scanner is capable of capturing an image at a given resolution, it is necessary to use a test target. The test target used in this procedure is the T-90-N-CG “Ultra High Resolution Target,” from Applied Image, Inc., Rochester, NY.
   1.1.1 Horizontal and vertical multi-bar test targets are the focus of this procedure. Such multi-bar test targets consist of pairs of dark and light parallel lines (“bars”) of equal width (“line pairs” or “cycle”) which repeat at a given frequency.
   1.1.2 The frequency is defined in terms of cycles per unit distance. On the test target, spatial frequencies are reported in cycles per millimeter (c/mm).
   1.1.3 9.8 – 13 c/mm corresponds to the nominal resolution of 1000 ppi. Any performance check within this range is sufficient.
   1.1.4 The 12.5 c/mm region of the test target is used in the Latent Print Section for performance checking the scanners.

1.2 Locate the portion of the test target which depicts 12.5 c/mm. See Figure 1 below.

Figure 1: Image capturing the 12.5 c/mm portion of the T-90-N-CG Resolution Target

1.3 Visually verify (count) the number of dark and light lines and record each prior to scanning. See Figure 2 below.

NOTE: It is recommended that a magnifier or loupe be used in the counting process. There are 15 light lines and 14 dark lines.
1.4 Set scanner resolution to 1000 ppi.
1.5 Place test target on the scanner platen with top of the target at the top of scanning region. This will allow the user to measure the resolution in the horizontal aspect (as depicted in figures above).
1.6 Scan the test target and save the file in a lossless format such as Bitmap or TIFF.
1.7 Open the file in Adobe Photoshop and zoom into the region that depicts 12.5 c/mm.
1.8 Zoom image so that individual pixels are visible. If the scanner has accurately captured 12.5 c/mm, then it should be possible to distinguish the dark and light line pairs in this region.
1.9 Count the number of light and dark pairs of lines and compare these results from the results from visually counting the line pairs on the test target. If the line pairs match, then the scanner can sample at 12.5 c/mm in the horizontal direction and exceed the 1000 ppi standard.
1.10 Rotate the test target 90° either to the right or left and repeat the process to measure vertical resolution.
1.11 Record the results in the scanner performance log. The scanner performance log shall consist of the following information:
1.11.1 Make, Model, and Serial Number of the Scanner.
1.11.2 Individual testing the scanner.
1.11.3 Date the test was performed.
1.11.4 Line pairs on the T-90-N-CG Test Target (Dark/White)
1.11.5 Line pairs scanned horizontal (Dark/White)
1.11.6 Line pairs scanned vertical (Dark/White)
1.11.7 Determination if scanner meets 1000ppi standard.
1.12 If the line pairs cannot be distinguished at the 1000 ppi setting, then the scanner will not meet the 1000 ppi standard. The scanner must be set at a higher resolution and retested. If the line pairs are able to be counted correctly at a higher resolution, the resolution must be annotated on the performance check log and a label affixed to the scanner clearly indicating latent prints must be scanned at the higher resolution when performing casework. **Do not exceed 2400 ppi in the scanner settings when attempting to re-scan as file sizes larger than this will dramatically increase scanning times and digital storage space during normal casework.**

1.13 If a scanner cannot meet the 1000 ppi standard without exceeding 2400 ppi settings, then the scanner will be taken out of service (and labeled as such) and cannot be used to scan latent prints until it can meet the 1000 ppi standard.
Appendix B: Digital Camera Performance Verification Procedure

1. **Procedure**

1.1. To determine that a camera system is capable of capturing an image at a given resolution, it is necessary to use a test target. The test target used in this procedure is the T-90-N-CG "Ultra High Resolution Target", from Applied Image, Inc., Rochester, NY.

1.1.1. Horizontal and vertical multi-bar test targets are the focus of this procedure. Such multi-bar test targets consist of pairs of dark and light parallel lines ("bars") of equal width ("line pairs" or "cycle") which repeat at a given frequency.

1.1.2. The frequency is defined in terms of cycles per unit distance. On the test target, spatial frequencies are reported in cycles per millimeter (c/mm).

1.1.3. 9.8 – 13 c/mm corresponds to the nominal resolution of 1000 ppi which is an achievable resolution to measure. Any performance check within this range is sufficient.

1.1.4. The 12.5 c/mm region of the test target is used in the Latent Print Section for performance checking the camera systems.

1.1.5. The 12.5 c/mm region of the test target has 15 white line pairs and 14 dark line pairs.

1.2. Determine the number of effective pixels for the camera by dividing the pixel resolution by 1000.

1.2.1. For example: 4288 X 2848 pixels divided by 1000 pixels per inch results in 4.288 x 2.848 inches or 4-1/4 x 2-13/16 inches.

1.2.2. See the manufacturer's specification sheet for this value. See below for the effective current digital cameras within the Latent Print Section.

1.2.2.1. For the Nikon D700 FX cameras, the effective pixels are 4256 x 2832 which equates to 4.256 inches x 2.832 inches or 4-1/4 x 2-13/16 inches. This represents the area of coverage in which the camera should be capable of capturing at 1000 ppi.

1.2.2.2. For the Nikon D800 FX cameras, the effective pixels are 7360 x 4912 which equates to 7.360 inches x 4.912 inches or 7-5/16 x 4-14/16 inches. This represents the area of coverage in which the camera should be capable of capturing at 1000 ppi.

1.3. Make a template (or frame) to the exact dimensions of the area identified for each camera system.

1.4. Place the template on a flat surface such as the copy stand and insert a flat scale within the template’s borders. Ensure the mounted camera’s focal plane is parallel with the flat surface.

1.5. For each camera lens used in the capture of latent prints, zoom the lens to the highest zoom setting possible that can still focus. Adjust the camera height until the template fills the frame and the image is in focus.

1.6. This is the maximum height of camera to subject distance in order for the camera and lens to capture images at 1000 ppi. Record the height from the tip of the lens to the surface in the
Camera Performance Log. If focus cannot be achieved, the lens cannot capture at 1000 ppi and cannot be used to capture latent prints for comparison purposes.

1.7. Replace the template with the T-90-N-CG test target with the target horizontal. Zoom into the area that depicts 12.5 c/mm.

1.8. Set the camera to use manual controls, capture in TIFF format, at the highest resolution setting.

1.9. Import the image into Adobe Photoshop and zoom the 12.5 c/mm area until you can observe individual pixels. If the camera has accurately captured 12.5 c/mm, then you should be able to observe the white and dark line pairs. Count the line pairs to ensure the white pairs equal 15 and the dark pairs equal 14. If the count is correct, this camera and lens can sample at or exceed the 1000 ppi standard.

1.10. Turn the test target vertical and repeat to ensure the lens and camera configuration can sample at or exceed the 1000 ppi standard vertically.

1.11. Record the results in the Camera Performance Log. The Camera Performance Log shall consist of the following information:

1.11.1. Camera Make, Model and Serial Number.
1.11.2. Type and Serial Number of the lens tested.
1.11.3. Individual testing the camera.
1.11.4. Date the test was performed.
1.11.5. Max height of camera to subject distance.
1.11.6. Line pairs on the T-90-N-CG Test target (Dark/White)
1.11.7. Line pairs captured and counted horizontal (Dark/White)
1.11.8. Line pairs captured and counted vertical (Dark/White)
1.11.9. Determination of camera and lens meet 1000 ppi standard.

1.12. If the correct line pairs cannot be distinguished using a particular lens, then the lens/camera combination does not meet the 1000ppi standard. To determine if the camera is performing correctly, performance test another lens. If the camera meets the standard utilizing a different lens/camera combination, then the fault lies with the lens. The lens must be taken out of service until it can be repaired or replaced. If the camera does not meet the 1000ppi standard utilizing other lens/camera combinations, then the camera must be taken out of service and repaired or replaced.
Figure 1: Image of the T-90-N-CG test target using a 105mm macro lens
Appendix C: Monitor & Photographic Enhancement Software Performance Verification Procedure

1. Procedure

1.1 The following procedures will be used to performance check the monitors and Photoshop software installed on the examiner workstations:

   1.1.1 Turn computer on and open the Photoshop program.
   1.1.2 Load the “Color Control” file located on the performance check CD. The “Color Control” file is a scanned TIFF format image of the x-rite ColorChecker Color Rendition Chart with a ruler inserted into the frame.
   1.1.3 Go to “View” on the toolbar and select “Rulers”.
   1.1.4 Go to “Image”, then “Image Size”. Verify that the image size listed matches the size of the image reflected by the ruler.
   1.1.5 Go to “Image”, then “Adjustments”, then “Levels”. Change various aspects of the “Levels” and verify that the brightness/contrast is changing based on the degree of adjustments made.
   1.1.6 Go to “Image”, then “Adjustments”, then “Color Balance”. Change the color levels and observe that the colors are changing in the image.
   1.1.7 Go to “Image”, then “Mode”, then “CMYK”. Verify that the image changed from RGB to CMYK.
   1.1.8 Go to “Filter”, then “Sharpen”, then “Unsharp Mask”. Change the radius and threshold. Verify that sharpening changes are being made to the image.

1.2 The above performance tests shall be conducted on each monitor of the workstation being checked and results recorded on the Digital Photograph Enhancement Software & Monitor Performance Log.
Latent Print Section
Latent Print Technician Program of Instruction (POI)
Forensic Analysis Division
1. Latent Print Technician Program of Instruction

1.1. Scope

1.1.1. This document defines the standards for the training program for Latent Print Technician, assigned to the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.1.2. Upon successful completion of this training program, the Latent Print Technician will be technically proficient in the examination and processing of physical evidence for the detection of friction ridge impressions. In addition, they will be proficient at the documentation, capturing or collecting, and writing reports of their findings. The Latent Print Technician will also be able to testify as an expert witness in courts of law, as required, to their findings and procedures used.

1.1.3. The full Program of Instruction (POI) for a Latent Print Technician is 640 hrs. The total hours may be more or less than written and is dependent on the ability, skills, incentive of the student, and those situations which cannot be controlled, such as leave, sickness, or work load.

1.1.4. When the training program is modified for a student, the Section Manager or designee must approve the modification.

1.1.5. The training program is maintained by the Section Manager or designee and may not be altered without his or her permission. Any new training handouts must be approved before being used.

1.2. Responsibilities

1.2.1. Student Responsibilities

1.2.1.1. The student will be assigned to a qualified Latent Print Examiner who will act as their mentor. Experienced Latent Print Technicians and/or Examiners may also provide training in various areas if needed.

1.2.1.2. The student must satisfactorily complete all practicals which are graded as satisfactory or unsatisfactory.

1.2.1.3. The student will provide the instructor with weekly Student Logs.

1.2.1.4. During the training, all cases processed and examinations performed will be double-checked by the assigned coach or by another qualified Latent Print Examiner. All reports will also be co-signed by this examiner during the training phase.

1.2.1.5. The student should continue reading available books and articles within the Latent Print Section library.

1.2.1.6. The student should accompany examiners to court to gain exposure to expert testimony on latent prints.

1.2.1.7. Any latent print training classes available during the training phase may be attended by the student.

1.2.1.8. The student will keep a notebook of all their experience obtained during this training program. This should include time spent working, classes attended, classes instructed, court testimony observed, and special projects completed during the training phase. This information will be a valuable aid for future court testimony.

1.2.2. Training Coordinator Responsibilities
1.2.2.1. The Latent Print Training Coordinator will provide Monthly Training Reports (MTR) to the Section Manager. These reports are due within ten working days of the last day of each month.

1.2.2.2. MTR’s will be submitted in the form of a memorandum and will include the following information:
   - The student’s name and POI title.
   - The courses covered during the month and if the course was completed successfully.
   - The courses scheduled for the next month.
   - The student’s progress through the POI and scheduled completion date (i.e. ahead or behind schedule, account for adjustments).
   - Significant student accomplishments during the month.
   - Other remarks the Training Coordinator deems appropriate.

1.2.3. When a student fails a written examination or practical exercise, the Training Coordinator will immediately provide a memorandum to the Section Manager. The memorandum will include the following information:
   - The student’s name and POI title.
   - The course failed and the score received. In the case of practical examinations, give the reason for the failure.
   - State the remedial actions implemented and the date for the re-examination.

1.2.4. After each test or practical, the instructor will meet with the student to discuss the student’s performance.

1.3. Overview of Training Program

1.3.1. This course listing does not preclude the instructor from adding other pertinent topics as applicable and/or related to the science of fingerprints, forensic science, and the criminal justice system. The Section Manager prior to instruction or incorporation within the program must approve additional courses or topics.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Course of Instruction</th>
<th>Training Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Latent Print Section</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to the Science of Fingerprints</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Introduction to Physical Evidence</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Latent Print Development Techniques</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Latent Print Preservation Techniques</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>Court Testimony and Ethics</td>
<td>80</td>
</tr>
<tr>
<td>7</td>
<td>Final Examination and Practical</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>Supervised Case Work</td>
<td>160</td>
</tr>
</tbody>
</table>

1.3.2. Blocks of instruction may be segmented as necessary for optimal student understanding of the subjects and concepts presented. Field trips may be authorized by the Section Manager or designee to enhance the student’s training. All courses will be supplemented by required readings, group discussion, independent and directed study, practical exercises, or research (or any combination thereof).

1.3.3. During the training, all cases processed will be reviewed by the mentor or by a qualified staff member. All reports will also be co-signed by the reviewer during the training phase.
1.4. Remedial Training

1.4.1. If a practical is graded as unsatisfactory, the student will be given two more opportunities to complete the practical in a satisfactory manner.

1.4.2. In the event the student fails to complete a chapter satisfactorily, the chapter will be reviewed with the student and the chapter will be repeated. If the student does not perform to an acceptable level on the retraining and retesting, a memo will be issued to the Trainee’s supervisor(s) and Section Manager or designee(s) listing the deficiencies and remediation steps taken. The supervisor(s) and Section Manager or designee(s) will determine the course of action based on the Trainer’s recommendations.
1.5. Chapter 1: Introduction to the Latent Print Section

1.5.1. Training Objectives: The student will attain:
   1.5.1.1. An understanding of the mission and operations in effect for the Houston Forensic Science Center
   1.5.1.2. An understanding of the standard operating procedures and quality assurance in effect for the Houston Forensic Science Center and specifically the Latent Print Section
   1.5.1.3. An introduction to the training program of the Latent Print Section
   1.5.1.4. An introduction to the records and forms used by the Latent Print Section
   1.5.1.5. An introduction to the equipment used by the Latent Print Section
   1.5.1.6. An understanding of the chemicals and their safe use in the Latent Print Lab
   1.5.1.7. An introduction to basic health and safety issues

1.5.2. Training Outline:
   • Houston Forensic Science Center procedures and forms
   • Latent Print Section procedures and forms
   • Latent Print Examiner Training Program
   • Location of labs/evidence storage and procedures for each
   • Instrument familiarization
   • Chemical information
   • Report Writing

1.5.3. Health and Safety Information:
   • Wearing protective equipment such as gloves, laboratory coats, and eye protection.
   • Proper use of vent hoods
   • Clean work habits such as washing hands after preparation of chemicals, no eating or drinking in the lab
   • Safe handling procedures of reagents, cleaning and disposal
   • Potential biological hazards

1.5.4. Required Readings:
   • Quality Manual, Houston Forensic Science Center
   • Health and Safety Manual, Houston Forensic Science Center
   • Standard Operating Procedures, Latent Print Section
   • Fingerprint Sourcebook, NIJ, Chapters 11 and 12
   • Right to Know, Prinzing Enterprises, Inc., Pamphlet
   • Safety for the Forensic Identification Specialist, Masters Chapters 4-6, 8, 13, 14, 16-18, and 20
   • Safety Data Sheets (SDS), as applicable
   • Overview of Laboratory Safety. JFI, 1994, 44 (1):41-51

1.5.5. Training Practicals: None

1.5.6. Training Standards:
   • Self-study for required reading
   • The student must pass a written test on required reading
1.6. Chapter 2: Introduction to the Science of Fingerprints

1.6.1. Training Objectives: The student will attain:
   1.6.1.1. An understanding of the formation of friction ridges that are formed during fetal development prior to birth
   1.6.1.2. An understanding that the friction ridge skin arrangement is unique and persistent through the life of the individual, except through damage by scarring or certain diseases
   1.6.1.3. An understanding of the terminology used in the science of fingerprints
   1.6.1.4. Basic pattern recognition

1.6.2. Training Outline:
   • Formation and Physiology of Friction Ridge Skin
   • Science of Fingerprint Terminology
   • Basic Pattern Recognition

1.6.3. Required Readings:
   • Fingerprint Source Book, NIJ, Chapters 1-3
   • Friction Ridge Skin, Cowger, Chapters 1 & 3
   • Quantitative-Qualitative Friction Ridge Analysis, Ashgaugh, Chapters 2 & 3
   • Fingerprint Pattern Recognition, Booklet, CJIS Services Division
   • Loss of Ridged Skin Before Birth, Harold Cummins, Finger Print and Identification Magazine, February 1965

1.6.4. Training Practicals:
   • Pattern Interpretation Exercises

1.6.5. Training Standard:
   • Self-study for required reading
   • The student must pass a written test on required reading
   • Passing score on pattern interpretation exercise
1.7. Chapter 3: Introduction to Physical Evidence

1.7.1. Training Objectives: The student will attain:
   - 1.7.1.1. An understanding of the nature and capabilities of physical evidence
   - 1.7.1.2. An understanding of the manner in which latent print procedures interface with other forensic disciplines
   - 1.7.1.3. An understanding of the proper procedures for completing documentation, correspondence, and packaging and storage of evidence

1.7.2. Training Outline:
   - Types of Physical Evidence
   - Firearm and Toolmark Evidence
   - Shoe and Tire Evidence
   - DNA and Serology Evidence
   - Chemistry/Toxicology Evidence

1.7.3. Required Reading:

1.7.4. Training Practicals: None

1.7.5. Training Standards:
   - Self-study for required reading
   - Tours of HFSC Forensic Disciplines
1.8. Chapter 4: Latent Print Development Techniques

1.8.1. Training Objectives: The student will attain:

1.8.1.1. Working knowledge of the different types of powders and their application
1.8.1.2. Working knowledge of the different types of chemicals and their application
1.8.1.3. Working knowledge of the Cyanoacrylate and dye staining techniques
1.8.1.4. Working knowledge of basic laser theory and alternate light sources
1.8.1.5. Working knowledge of proper processing on difficult and contaminated surfaces
1.8.1.6. Working knowledge of proper methods, control standards, and sequences and ability to assess the effectiveness/results of applied techniques
1.8.1.7. Working knowledge of latent print development techniques that may interfere with laboratory analysis by other forensic disciplines

1.8.2. Training Outline:
- Latent Prints—General Information
  - Surface conditions and environmental factors
  - Porous, non-porous, and semi-porous surfaces
  - Latent print residue components targeted by different development procedures
- Powder Techniques
  - Selection of powders, brushes and lift tapes
- Basic Chemical Techniques
  - Reagents for blood
  - DFO/IND and Ninhydrin
  - Gun Bluing Solution
  - Cyanoacrylate Ester Fuming Techniques
  - Dye Staining Techniques
- Laser and Alternate Light Source (ALS) Enhancement
  - White light
  - Crimescope CS-16-500
  - Laser 532nm
- Specialized Techniques
  - Rough surfaces
  - Adhesive tapes
  - Wet surfaces
  - Grease contaminated surfaces
  - Thermal paper
  - Varnished surfaces

1.8.3. Required Readings:
- Fingerprint Detection With Lasers, Menzel
- Fingerprint Detection by Fluorescence Examination, Police Scientific Development Branch
- Advances in Fingerprint Technology, Lee and Gaensslen, 3rd Edition, Chapters 1 – 13
- Fingerprint Development Handbook, Home Office Scientific Development Branch
- Fingerprint Sourcebook, NIJ, Chapter 7
- Fingerprints and Factors Affecting Their Condition JFI 45(2) July/August 1993 pp. 176-183
- Cyanoacrylate Fuming Precautions, JFI 44(5). Pp 409-411, July/August 1996
• Sequencing of Reagents for the Improved Visualization of Latent Prints, JFI 38(5) pp. 197-210, September/October 1998
• Ridge Detail through Latex Gloves, Hall JFI 41(6), 1991 pp. 415-416
• A Further Study to Investigate The Effect of Fingerprint Enhancement Techniques on the DNA Analysis of Bloodstains, JFI, Vol 49 (4), pp. 357-375, July/August 1999
• Tonally Reversed Friction Ridge Prints on Plastic, JFI, 39(1) pp. 11-22, January/February 1989
• Factors Affecting the Recovery of Latent Prints on Firearms. JFI, 1997, 47(2):

1.8.4. Training Practicals:
• Process different non-porous surfaces with different powder techniques
• Process various items using ninhydrin/DFO/IND/Zinc Chloride
• Process various items with Cyanoacrylate Ester Fuming
• Process various items with dye stains
• Examine various surfaces using alternate light sources and Laser light
• Process items with adhesive surfaces using various techniques
• Process various items to develop blood contaminated latent impressions
• Process thermal paper
• Process brass/ aluminum cartridge cases
• Process wet, non-porous surfaces
• Process grease contaminated items
• Process varnished surfaces

1.8.5. Training Standards:
• Self-study for required reading
• The student must pass a written test on required reading
• Write an essay on why latent prints may not be developed on surfaces
• Demonstrate competency in proper evidence handling procedures
• Demonstrate competency in sequential processing on multiple substrates
• Demonstrate competency in the proper operation of the Cyanoacrylate-Ester fuming chambers
• Demonstrate competency in the proper operation of the oven and humidity chambers
• Demonstrate competency in the proper operation of the Alternate Light Source and Laser
1.9. Chapter 5: LATENT PRINT PRESERVATION TECHNIQUES

1.9.1. Training Objectives: The student will attain:
• An understanding of Latent Print Photography to include:
  • Cameras and their Operation
  • Lenses and their Uses and Operation
  • Lens Filters
  • Depth of Field
  • Shutter
  • Different Lighting Techniques
  • Photography of Developed Latent Prints
  • Photography of Visible Friction Ridge Detail
• An understanding of Lifting Techniques to include:
  • Lifting Tapes and Backing Cards
  • Rubber Lifters
  • An Understanding of Friction Ridge Casting Techniques
• An Understanding of Proper Documentation

1.9.2. Training Outline:
• Latent Print Photography/Digital Imaging
• Camera Types and Operation
• Filter Types and Their Uses
• Lighting Techniques
• Image Size, Use of Scale
• Photography of Developed Friction Ridge Detail
• Correcting Color and Position Reversals
• Lifting Techniques for Friction Ridge Detail
• Types of Lifting Tape
• Documentation of Friction Ridge Detail
• Unusual Lifting Techniques
• Casting Techniques for Friction Ridge Detail

1.9.3. Required Readings:
• Forensic Photography, Redsicker, Chapters 1, 8 – 10
• Identification Photography, by Robert E. May (Booklet)
• Friction Ridge Skin, Cowger, Chapter 5
• Scott’s Fingerprint Mechanics, Chapters 4 – 9
• Fingerprints and Other Ridge Skin Impressions, Champod, Chapters 3 & 4, Appendix 3
• The Science of Fingerprints, FBI, Chapters 13 – 15
• Fingerprint Sourcebook, NIJ, Chapters 8, 10
• Collecting and Packaging Exhibits from the Scene of the Crime for Transfer to the Forensic Laboratory, JFI 47 (3), 1997, pp. 276-282
• Identification Photography: Photography of Latent Prints. May. Booklet FBI Academy

1.9.4. Training Practicals:
• Process and photograph latent prints developed from various porous substrates.
• Process and photograph latent prints developed from various non-porous substrates.
• Process and photograph latent prints developed from various semi-porous substrates.

1.9.5. Training Standards:
• Self-study for required readings.
• The student must pass a written examination on the required readings.
• The student must successfully complete all training practicals.

1.10. Chapter 6: Court Testimony and Ethics
1.10.1. Training Objectives: The student will attain:
• 1.10.1.1. An understanding of the proper procedures for presenting latent print testimony.
• 1.10.1.2. An understanding of proper courtroom demeanor.
• 1.10.1.3. An understanding of courtroom operational procedures.
• 1.10.1.4. An understanding of professional ethics.
• 1.10.1.5. An understanding of major court decisions and their significance.

1.10.2. Training Outline:
• The Court System
• Subpoena Notification
• Pre Trial Conference Preparation
• Courtroom Procedures
• The Qualifying Process
• Introduction of Physical Evidence
• Court Exhibits
• Rules of Evidence
• Professional Ethics

1.10.3. Required Readings:
• Ethics in Forensic Science, Barnett, Chapters 1, 2, 4, 5 & 6
• Ethics and the Practice of Forensic Science, Bowen, Chapters 1 – 9
• The Expert Witness, FBI Pamphlet
• Courtroom Testimony for the Fingerprint Expert, Gary Jones, Chapters 3 – 7
• Friction Ridge Skin, Cowger, Chapter 9
• Effective Expert Witnessing, 5th Edition Matson, Chapters 2, 3, 7, 10 & 11
• Fingerprint Sourcebook, NIJ, Chapter 13
• Expert Witnessing: Explaining and Understanding Science, Meyer, Chapters 2, 3, 7 – 9
• Defending Against the Critics Curse, Glenn Langenburg, The Chesapeake Examiner, Spring 2003 Vol. 41 No. 1
• Nonverbal Elements in Courtroom Demeanor, John L. Waltman, FBI Law Enforcement Bulletin, March 1984
• Rebutting the “No Fingerprint” Defense, John P. Nielson, The Detail #70, www.clpex.com (update to article previously printed in the August 83 IAI Newsletter)
• The Forensic Science is Challenged, Andre Moenssens, The Chesapeake Examiner, Vol. 40 No. 2
Latent Print Program of Instruction (POI)
Forensic Analysis Division

- Landmark Decisions Involving Evidence of Friction Skin Impression, Andre Moenssens, Finger Print and Identification Magazine, December 1966
- The Duties and Responsibilities of the Forensic Scientist: Exploring the Limits JFI, 34(3) pp. 719-729, May 1989
- Cult of the Mediocre, Robert Olsen, Identification News, November 1982
- Confirmation Bias, Ethics, and Mistakes in Forensics, Jon Byrd, Journal of Forensic Identification, 511\523 56 (4), 2006

1.10.4. TRAINING PRACTICALS:
- Preparation of Curriculum Vitae
- Preparation of Direct Examination Questions
- Moot Court on Direct & Cross Examination

1.10.5. TRAINING STANDARDS:
- Student must pass a written test on required reading.
- The student will successfully complete all practicals.
- Student must have an acceptable performance in all mock court situations as evaluated by the Supervisor of the Latent Print Section, with recommendations and critique from moot court panel.
1.11. Chapter 7: Final Examination and Practical

1.11.1. Training Objectives:
   1.11.1.1. The student will complete:
   1.11.1.2. A practical that will consist of mock evidence. The trainee will be expected to process the mock evidence, preserve any latent prints, complete all paper work including a report, and testify in a mock court.
   1.11.1.3. A written final examination that will cover all aspects of training.
   1.11.1.4. A student must successfully complete the designated modules in the training manual and must also pass the final practical and written examination before acquiring authorization to perform supervised dependent casework.
1.12. Chapter 8: Supervised Casework

1.12.1. Dependent Supervised Casework:

1.12.1.1. During supervised casework, the student processes cases from start to finish with close supervision. At each stage of dependent supervised casework, the student’s work will be reviewed by a primary trainer to ensure all applicable procedures are being followed and adequate documentation is recorded in the case notes and/or LIMS. Cases worked under dependent supervised casework will be assigned to the primary trainer with the student completing all aspects of the case. The primary trainer will consult with the Section Manager about the progress made and the amount of cases worked and will make a recommendation. The Section Manager will then decide to either move the student into independent supervised casework or to keep the student in dependent supervised casework.

1.12.2. Independent Supervised Casework:

1.12.2.1. During independent supervised casework, the student acts as the primary technician by processing cases from start to finish with minimal supervision. After the student has completed each case, the student’s work will be reviewed by a primary trainer to ensure all applicable procedures are being followed and adequate documentation is recorded in the case notes and/or LIMS. The primary trainer will consult with the Section Manager about the progress made and the amount of cases worked and will make a recommendation. The Section Manager will then decide if the student is ready to be signed off to perform independent casework or to keep the student in independent supervised casework.
Latent Print Section
Latent Print Examiner Program of Instruction (POI)
Forensic Analysis Division
1. Latent Print Examiner Program of Instruction

1.1. Scope

1.1.1. This document defines the training program for Latent Print Examiners, assigned to the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.1.2. Upon successful completion of this training program, the Latent Print Examiner (LPE) will be technically proficient in the processing of physical evidence for the detection of friction ridge impressions and the examination and comparison of friction ridge impressions. In addition, they will be proficient in the documentation, capturing or collecting, and writing reports of their findings. The LPE will testify as an expert witness in courts of law, as required, to their findings and procedures used.

1.1.3. The full Program of Instruction (POI) for an LPE is 2080 hours. The total hours may be modified depending on the ability, skills, incentive of the student, and those situations which cannot be controlled, such as leave, sickness, or work load.

1.1.4. When the training program is modified for a student, the Section Manager or designee must approve the modification.

1.1.5. The training program is maintained by the Section Manager or designee and may not be altered without his or her permission. Any new training handouts must be approved before being used.

1.2. Responsibilities

1.2.1. Student Responsibilities

1.2.1.1. The student will be assigned to a qualified LPE who will act as their mentor. Experienced staff members in the Latent Print Section may also provide training in various areas if needed.

1.2.1.2. The student must satisfactorily complete all practicals which are graded as satisfactory or unsatisfactory.

1.2.1.3. The student will provide the instructor with weekly Student Logs.

1.2.1.4. The student should read books and articles contained within the Latent Print Section library.

1.2.1.5. The student should accompany examiners to court to gain exposure to expert testimony on latent prints.

1.2.1.6. Any latent print training classes available during the training phase should be attended by the student.

1.2.1.7. The student will keep a notebook of their training activities during the training program. This should include time spent working, classes attended, classes instructed, court testimony observed, and special projects completed during the training phase. This information will be a valuable aid for future court testimony.

1.2.2. Training Coordinator Responsibilities

1.2.2.1. The Latent Print Training Coordinator will provide Monthly Training Reports (MTR) to the Section Manager. These reports are due within ten working days of the last day of each month.

1.2.2.2. MTR’s will be submitted in the form of a memorandum and will include the following information:
• The student’s name and POI title.
• The courses covered during the month and if the course was completed successfully.
• The courses scheduled for the next month.
• The student’s progress through the POI and scheduled completion date (i.e. ahead or behind schedule, account for adjustments).
• Significant student accomplishments during the month.
• Other remarks the Training Coordinator deems appropriate.

1.2.2.3. After each test or practical, the instructor will meet with the student to discuss the student’s performance.

1.2.2.4. When a student fails a written examination or practical exercise, the Training Coordinator must immediately provide a memorandum to the Section Manager or designee. The memorandum will include the following information:
• The student's name and POI title.
• The course failed and score received.
• For practical examinations state the reason for failure.
• State the remedial actions implemented and the date for the re-examination.

1.3. Overview of Program of Instruction

1.3.1. This course listing does not preclude the instructor from adding other pertinent topics as applicable and/or related to the science of fingerprints, forensic science, and the criminal justice system. The Section Manager or designee, prior to instruction or incorporation within the program must approve additional courses or topics.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Course of Instruction</th>
<th>Training Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Houston Forensic Science Center (HFSC)</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Overview of Forensic Science</td>
<td>40</td>
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<tr>
<td>3</td>
<td>History of Fingerprint Identification</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Introduction to Friction Ridge Skin</td>
<td>40</td>
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<tr>
<td>5</td>
<td>Obtaining Inked Finger, Palm, and Foot Prints</td>
<td>40</td>
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<tr>
<td>6</td>
<td>Automated Fingerprint Identification Systems</td>
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<tr>
<td>7</td>
<td>Safety and Evidence Handling Procedures</td>
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<tr>
<td>8</td>
<td>Comparison of Friction Ridge Impressions</td>
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<td>9</td>
<td>Latent Print Development</td>
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<td>10</td>
<td>Latent Print Preservation</td>
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<td>11</td>
<td>Court Testimony Procedures, Legal Aspects, and Ethics</td>
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<td>Final Practical, Written, Comparison and Moot Court Testimony</td>
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<td>13</td>
<td>Supervised Casework</td>
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<td></td>
<td>Total Training Hours</td>
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</table>

1.3.2. Blocks of instruction may be segmented as necessary for optimal student understanding of the subjects and concepts presented. Field trips may be authorized by the Section Manager or designee to enhance the student’s training. All courses will be supplemented
by recommended reading, group discussion, independent and directed study, practical
exercises, or research (or any combination thereof).

1.3.3. Chapter 8, Comparison of Friction Ridge Impressions, will be conducted over the entire
training period prior to the student entering Dependent Supervised Casework.

1.3.4. During training, all cases processed and all examinations performed will be reviewed by
the mentor or by a qualified LPE for completeness and technical accuracy. All reports will
be co-signed by the reviewing examiner during the training phase.

1.4. Remedial Training
1.4.1. If a practical is graded as unsatisfactory, the student will be given two opportunities to
complete the practical in a satisfactory manner. If the student still does not pass the
practical the chapter is considered failed.

1.4.2. In the event the student fails to complete a chapter satisfactorily, the chapter will be
reviewed with the student and the chapter will be repeated. If the student does not
perform to an acceptable level on the retraining and retesting, a memo will be issued to
the Trainee’s supervisor(s) and Section Manager listing the deficiencies and remediation
steps taken. The supervisor(s) and Section Manager will determine the course of action
based on the Trainer’s recommendations.
1.5. Chapter 1: Introduction to Houston Forensic Science Center (HFSC)

1.5.1. Training Objectives

1.5.1.1. This block of instruction is to familiarize the student with the mission and operations of HFSC, the Latent Print Section, and the Quality Division.

1.5.1.2. The student will be introduced to the laboratory policies and procedures; orientation of the laboratory operations and familiarization with the training program.

1.5.1.3. The student will also be introduced to the records, reports, and forms issued by the Latent Print Section. Opportunities for advancement within the Latent Print Section (LPS) and certification requirements will be discussed with the student.

1.5.2. Training Outline

- HFSC procedures and forms
- Latent Print Section procedures and forms
- Latent Print Examiner training program
- Quality
  - Accreditation
  - Types of reviews
  - Types of errors
  - Corrective actions
  - Proficiency/competency tests
  - Types of reports written
  - Location of labs/evidence storage and procedures for each

1.5.3. Reference Reading

- HFSC Division Standard Operating Procedures
- HFSC Quality Manual
- Standard Operating Procedures, Latent Print Section
- Fingerprint Source Book, NIJ Chapters 10, 12
- NIST Expert Working Group on Human factors, Latent Print Examination and Human Factors, NIJ, 2012, Chapters 5, 9
- Parkinson, G. Certification Programs of the IAI, JFI, 1996, 46(2):169-172

1.5.4. Training Practicals: None

1.5.5. Training Standards

- Self-study of recommended reading.
- Successful completion of this segment of training will be determined by a written test.
1.6. Chapter 2: Overview of Forensic Science

1.6.1. Training Objectives

1.6.1.1. This block of instruction covers the nature and capabilities of physical evidence.
1.6.1.2. The student will understand the capabilities and basic operating procedures of the different disciplines within HFSC and an understanding of forensic science.

1.6.2. Training Outline

- What is forensic science?
- Types of physical evidence.
- Firearm and tool mark evidence.
- Shoe and tire evidence.
- DNA and serology evidence.
- Chemistry.
- Toxicology evidence.

1.6.3. Reference Reading

- Forensic Evidence: Science and the Criminal Law, Kiely - Chapter 2
- Advances in FP Technology, Lee and Gaensslen, 2nd Edition - Chapters 2, 9
- Scientific Evidence in Civil and Criminal Cases, Moenssens - Chapters 3, 6, 9,13-15
- Forensic Comparative Science, Vanderkolk - Chapters 8, 9
- Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh - Chapter 1
- An Introduction to Scientific and Investigative Techniques, Stuart, J. et al, CRC Press, 3rd Edition - Chapters 1, 13, and Appendix B
- The Fingerprint Source Book, NIJ - Chapter 11

1.6.4. Training Practicals: None

1.6.5. Training Standards

- Self-study of recommended reading.
- Successful completion of this segment of training will be determined by a written test.
- Tour of other HFSC forensic disciplines.
1.7. Chapter 3: History of Fingerprint Identification

1.7.1. Training Objectives

1.7.1.1. This block of instruction covers the background and history of the science of fingerprints.

1.7.1.2. The student will have an understanding of historical people, events, and other methods of identification.

1.7.2. Training Outline

• Earliest recorded awareness of fingerprints.
• Early observations and methods of personal identification.
• Scars, marks and tattoos.
• Scientific observations leading to modern fingerprint identification.
• Biographies and contributions of the early pioneers.
• Chronology of fingerprints in the United States.

1.7.3. Reference Reading

• Fingerprint Source Book, NIJ - Chapter 1
• Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh - Chapter 2
• Advances in FP Technology, 2nd Edition, Lee Gaensslen, 2nd Edition - Chapter 1
• Fingerprint Techniques, Moenssens - Chapter 1
• Friction Ridge Skin, Cowger - Chapter 1
• Fingerprints: History, Law and Romance, Wilton - Chapters 1-23
• History of the FBI - www.fbi.gov/libref/historic/history/text.htm
• Hartling, M. The Family Who Brought Fingerprinting to New York State, New York State Identifier, Fall 1992

1.7.4. Training Practicals: None

1.7.5. Training Standards

• Self-study of recommended reading
• Successful completion of this segment of training will be determined by a written test
• Write an essay on a historical aspect of the science of fingerprints
1.8. Chapter 4: Introduction to Friction Ridge Skin and Pattern Interpretation

1.8.1. Training Objectives

1.8.1.1. This block of instruction covers the biology/physiology of friction ridge skin, the basic foundation for friction ridge skin as a means of identification.

1.8.1.2. The student will understand they are persistent throughout life except for scarring or certain diseases and not duplicated in their minute detail.

1.8.1.3. The student will be introduced to common terminology and definitions associated with friction ridge pattern recognition, the patterns on the fingers, basic classification systems, and their uses as criminal or civil records.

1.8.1.4. The student will attain an understanding of the biological significance of friction skin ridge patterns, their formation, the basic anatomy and terminology of the hands and feet.

1.8.2. Training Outline

• Law enforcement and civil application
  • Crime records
  • Criminal investigations
  • Background checks
• Formation of friction ridge skin
  • Volar pads
  • Flexion/tension creases
  • Layers of skin
• How scars are formed
• Abnormal friction ridges
• Science of fingerprint terminology
  • Core/delta
  • Type lines
  • Sufficient recurve
• Basic pattern recognition
  • Arch
  • Loop
  • Whorl
• Classifications systems
  • Henry
  • NCIC
• Automated Fingerprint Identification Systems

1.8.3. Reference Reading

• Fingerprint Source Book, NIJ - Chapters 2, 3, 5
• Automated Fingerprint Identification Systems (AFIS), Komarinski - Chapter 3
• Finger Prints, Palms and Soles, Cummins and Midlo
• Friction Ridge Skin, Cowger - Chapter 3
• Fingerprints and Other Ridge Skin Impressions, C. Champod, CRC - Chapter 1
• Advances in Fingerprint Technology, 2nd Edition, Lee and Gaensslen - Chapter 3
• Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh, 2nd Edition - Chapter 3
• Fingerprint Pattern Recognition, CJIS Services Division – Booklet
• Fingerprint Training Manual, FBI CJIS, (REV. 12-93) - Booklet
• Ashbaugh, D. Defined Pattern, Overall Pattern, and Unique Pattern, JFI, 42(6):503-512
• Cummins, H. Finger Prints: Normal and Abnormal Patterns, Finger Print and Identification Magazine, November 1967
• Cummins, H. Loss of Ridged Skin Before Birth, Finger Print and Identification Magazine, February 1965
• David, T.J. Congenital Malformations of Human Dermatoglyphs, Download from adc.bmj.com, January 2009
• Maceo, A. Scars in Friction-Ridge Skin, Evidence Technology Magazine, July-August 2005, pp. 26-28

1.8.4. Training Practicals
• Pattern interpretation exercises

1.8.5. Training Standards
• Self-study for recommended reading.
• Successful completion of this segment of training will be determined by a written test.
• Acceptable performance of pattern interpretation exercises.
1.9. Chapter 5: Obtaining Inked Finger, Palm, and Foot Prints

1.9.1. Training Objectives

1.9.1.1. This block of instruction is to acquaint and familiarize the student with the materials, procedures, methods, and techniques of recording finger, palm and sole prints.

1.9.1.2. The student will obtain sufficient practical working knowledge and skill to demonstrate an acceptable proficiency level in recording friction ridge skin patterns and the importance of recording all friction ridge detail.

1.9.1.3. The student will understand the proper method of completing fingerprinting card information, sequence for recording fingers, and purpose for printing plain impressions.

1.9.2. Training Outline

- Obtaining Inked/Record Print
- Fingerprint equipment and maintenance
- Fingerprint cards
- Rolled impressions
- Simultaneous impressions
- Taking palm prints
- Taking major case prints
- Taking foot prints
- Specialized techniques in obtaining friction ridge detail
- FBI criminal and civil files, State and local fingerprint repositories
- Obtaining post-mortem friction ridge detail

1.9.3. Reference Reading

- The Fingerprint Source Book, NIJ - Chapter 4
- The Science of Fingerprints, FBI - Chapters 9-11, and 19
- Finger Prints, Palms and Soles, Cummins and Midlo - Chapter 3
- Scott’s Fingerprint Mechanics, Olsen, Sr. - Chapter 2
- Friction Ridge Skin, Cowger- Chapter 2
- Texas DPS, Recording Fingerprints, CR-13 (10/82) – Pamphlet
- Wertheim, P. Inked Major Case Prints, JFI, 1999, 49(5):468-177

1.9.4. Training Practicals

- Take a complete set of finger prints from 5 different subjects.
- Take a complete set of palm prints from 5 different subjects.
- Take a complete set of foot prints from 2 different subjects.
• Take a complete set of major case prints from 2 different subjects.

1.9.5. Training Standards
• Self-study for recommended reading.
• Acceptable performance of recording finger, palm and foot prints of at least two different recording methods.
• Successful completion of this segment of training will be determined by a written test.
1.10. Chapter 6: Automated Fingerprint Identification Systems (AFIS)

1.10.1. Training Objectives

1.10.1.1. This block of instruction covers the history, capabilities and limitations of AFIS and the four types of searches.

1.10.1.2. The student will be introduced to the Latent Print Section AFIS operational procedures.

1.10.2. Training Outline

- The history and science behind AFIS.
- AFIS basic equipment and operation.
- The three AFIS databases used by HFSC.
- Submission of latent images for AFIS search.
- Reasons why an AFIS search may be negative

1.10.3. Reference Reading

- Automated Fingerprint Identification Systems, Komaranski - Chapters 1-2, 4-6
- The Fingerprint Source Book, NIJ - Chapter 6
- Advances in Fingerprint Technology, Lee and Gaensslen, 2nd Edition - Chapter 8
- Wolz, W. The Effects of Friction Ridge Skin Growth on AFIS Matches, JFI, 1997, 47(2):150-161

1.10.4. Training Practicals

- Obtain clear and suitable record prints for comparison purposes.

1.10.5. Training Standards

- Self-study for recommended reading.
- Observe searches conducted by the AFIS Section.
- The trainee must satisfactorily complete the practical.
- Successful completion of this segment of training will be determined by a written test.
1.11. Chapter 7: Evidence Handling Procedures and Safety

1.11.1. Training Objectives
    1.11.1.1. This block of instruction provides the student with the knowledge and practical skills to properly handle, mark, package, and transport physical evidence thereby preserving its integrity and evidentiary value.
    1.11.1.2. The student will learn the equipment used by the Latent Print Section, and gain a basic understanding of procedures for the safe preparation and handling of chemicals, firearms and how to properly swab evidence for DNA.
    1.11.1.3. The student will understand basic health and safety issues such as potential biological hazards, personal safety hazards posed by pathogens present on body fluid contaminated evidence, procedures for handling sharps, and the use of protective clothing/equipment.

1.11.2. Training Outline
    • Personal protective equipment in the laboratory.
    • Proper use of vent hoods.
    • Proper techniques for swabbing, packaging and documentation of DNA samples.
    • Safe handling and disposal of sharp items.
    • Clean work habits
    • Safe handling procedures of reagents, cleaning and disposal
    • Basic firearms safety (Instructed by Firearms Section)
    • Evidence storage, packaging and marking procedures.
    • Chain of Custody.

1.11.3. Reference Reading
    • HFSC Health and Safety Manual
    • HFSC Evidence Handbook
    • Fingerprint Source Book, NIJ - Chapter 10
    • Handbook of Forensic Services, Rev. 2013, by U.S. Dept. of Justice – Booklet
    • Right to Know, Prinzing Enterprises, Inc. – Pamphlet
    • Safety for the Forensic Identification Specialist, Masters, 2nd Edition
    • Safety Data Sheets (SDS), as applicable

1.11.4. Training Practicals: None

1.11.5. Training Standards
    • Self-study for recommended reading
    • Successful completion of this segment of training will be determined by a written test.
1.12. Chapter 8: Comparison of Friction Ridge Impressions

1.12.1. Training Objectives

1.12.1.1. This block of instruction covers the analysis of friction ridge detail to determine their value for comparison purposes, the nature of uniqueness, the relationship of individual ridge characteristics as a positive means of identification.

1.12.1.2. The student will learn to recognize and utilize ridge flow, and other features for supporting the comparison as well as the conditions that create distortion.

1.12.1.3. The student will understand the evaluation criteria for determining identification or exclusionary value of latent prints, the deciding factors and understanding what is a valid identification and why no minimum “number” of matching ridge characteristics can be defined to effect an identification.

1.12.1.4. The student will gain an understanding of the purpose for documentation, which must be in a format that a qualified latent print examiner would be able to evaluate the analyses performed and verify the conclusions.

1.12.2. Training Outline

- Orientation and location of latent finger, palm, foot, and joint impressions
- Class and individual characteristics
- Ridge flow
- Scientific methodology
- Comparison considerations
- Forged or fabricated latent print
- Sufficiency in detail to establish identity
- Quantity and clarity of detail present
- Uniqueness of formations
- Examiner experience and ability
- Simultaneous impressions
- Natural and unnatural breaks
- False ridge detail
- Verifications
- Comparison aids
  - Enlargements
  - Enhancement
- The three levels of detail
  - Level 1: Pattern flow
  - Level 2: Ridge path
  - Level 3: Ridge shape
- Friction ridge characteristics
  - Ending ridge
  - Bifurcation
  - Dot
- Effects of distortion
  - Pressure
• Color or position reversals
• Movement
• Smearing
• Background artifacts
• Double taps

• Types of conclusions
  • Identification
  • Exclusion
  • Inconclusive
  • Not Suitable for Comparison

• Differing opinions
  • Consultations
  • Conflict resolution

1.12.3. Reference Reading

• Advances in FP Technology, Lee and Gaensslen, 3rd Edition - Chapter 15
• Friction Ridge Skin, Cowger - Chapters 5, 6
• Forensic Comparative Science, Vanderkolk - Chapters 1-7, 11
• Fingerprints and Other Ridge Skin Impressions, C. Champod - Chapter 2
• The Fingerprint Source Book, NJ - Chapters 9, 14, 15
• Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh - Chapters 4-8
• NIST Expert Working Group on Human factors, Latent Print Examination and Human Factors, NIJ, 2012 - Chapters 1-4
• Ashbaugh, D. Incipient Ridges and the Clarity Spectrum. JFI, 1992, 42(2):106-114
• Castellon, S. Clues in Friction Ridge Comparisons: Tonal Reversals, JFI, 2004, 64(3):223-237
• Cooke, T.D. You Can Qualify, Identification News, April 1964, pp. 4-10
• FBI Law Enforcement Bulletin, An Analysis of Standards in Fingerprint Identification, June 1972, pp. 1-6
• Interpol European Expert Group on Fingerprint Identification, Parts I and II, Internet
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- Leo, B. Distortion Versus Dissimilarity in Friction Skin Identification, JFI, 1998, 48(2):125-129
- Maceo, A. Documenting and Reporting Inconclusive Results, JFI, 201, 61(3):226-231
- Mankevich, A. Blind Verification: Does it Compromise the Confidence of ACE-V Methodology to the Scientific Method, Chesapeake Examiner, Fall 2007, 45(2):22-29
- McRoberts, A. Fingerprints: What They Can and Cannot Do, SCAFO Online Articles, Printed 1999
- Shelton, D. The ‘CSI Effect’: Does it Really Exist, NIJ Journal, No. 259,
- Thornton, J. The One-Dissimilarity Doctrine in Fingerprint Identification, March 1977, No. 306, pp. 89-95

1.12.4. Training Practicals

- Trace 5 inked prints that have been enlarged 5 times
- Complete sufficiency exercise
- Give a presentation on any topic covered up to this point
- A minimum of one comparison exercise/week, based on skill/other assignments
- Ten prints
- Latent prints
- Palm prints
- Foot prints
- Third level detail
- Simultaneous impressions

1.12.5. Training Standards

- The trainee must satisfactorily complete all of the practicals.
- Successful completion of this segment of training will be determined by a written test.
1.13. Chapter 9: Latent Print Development

1.13.1. Training Objectives

1.13.1.1. This block of instruction is to familiarize the student with the different types of physical and chemical processes, their application and the factors affecting the development and collection of identifiable latent prints from difficult and contaminated surfaces. Knowledge of latent print development, proper choice of techniques, sequencing and possible interference with other forensic disciplines.

1.13.1.2. The student will learn of forensic light sources, the principles of fluorescence, inherent luminescence, light wavelengths, band pass filters and how they relate to the detection of latent prints. The proper methods, control standards, sequencing and the ability to assess the effectiveness/results of applied techniques.

1.13.1.3. The student will understand latent print residue components targeted by different chemical and development procedures, surface conditions, environmental factors affecting selection and sequencing of development procedures. The student will gain an understanding there is no scientific way to determine how long a latent print has been on a surface.

1.13.2. Training Outline

• Latent prints—general information
  • Surface conditions and environmental factors
  • Porous, non-porous, and semi-porous surfaces
  • Latent print residue components targeted by different development procedures
  • Sequential Processing of varying substrates
• Powder techniques
  • Selection of powders, brushes, and lift tapes
• Basic chemical techniques
  • Reagents for blood
  • DFO/IND and ninhydrin
  • Gun bluing solution
  • Cyanoacrylate ester fuming techniques
  • Dye staining techniques
• Laser and alternate light source (ALS) enhancement
  • White light
  • Crimescope CS-16-500
  • Laser 532nm
• Specialized techniques
  • Rough surfaces
  • Adhesive tapes
  • Wet surfaces
  • Grease contaminated surfaces
  • Thermal paper
  • Varnished surfaces
### 1.13.3. Reference Reading

- **Fingerprint Detection by Fluorescence Examination**, Police Scientific Development Branch
- **Friction Ridge Skin**, Cowger - Chapter 4
- **Advances in Fingerprint Technology**, Lee and Gaesslens, 3rd Edition - Chapters 1-13
- **Fingerprint Development Handbook**, Home Office Scientific Development Branch, UK
- **Fingerprints and Other Ridge Skin Impressions**, C. Champod, CRC - Chapter 3
- **The Fingerprint Sourcebook**, NIJ - Chapter 7
- Bobev, K. Fingerprints and Factors Affecting Their Condition, JFI, 1995, 45(2):176-183
- Nunn, S. Touch DNA Collection Versus Firearm Fingerprinting, JFS, 2013, 58(3):601-6

### 1.13.4. Training Practicals

- Process different non-porous surfaces with different powder techniques
- Process various items using ninhydrin/DFO/IND/Zinc Chloride
- Process various items with Cyanoacrylate Ester Fuming
- Process various items with dye stains
- Examine various surfaces using alternate light sources and laser light
- Process items with adhesive surfaces using various techniques
- Process various items to develop blood contaminated latent impressions
- Process thermal paper
- Process brass/aluminum cartridge cases
- Process wet, non-porous surfaces
- Process grease contaminated items
- Process varnished surfaces
1.13.5. Training Standards

- Self-study for recommended reading
- Successful completion of this segment of training will be determined by a written test
- Write an essay on why latent prints may not be developed on surfaces
- Demonstrate competency in proper evidence handling procedures
- Demonstrate competency in sequential processing on multiple substrates
- Demonstrate competency in the proper operation of the Cyanoacrylate-Ester fuming chambers
- Demonstrate competency in the proper operation of the oven and humidity chambers
- Demonstrate competency in the proper operation of the Alternate Light Source and Laser

1.14.1. Training Objectives

1.14.1.1. This block of instruction covers different ways to examine evidence, preserve and collect latent prints for future examination and comparison.

1.14.1.2. The student will learn photography, lifting techniques and proper documentation.

1.14.1.3. The student will have a basic understanding of digital imaging procedures.

1.14.2. Training Outline

- Latent print photography/digital imaging
  - Camera types and operation
  - Filter types and their uses
  - Camera lenses
  - Depth of Field
  - Shutter
  - Lighting techniques
  - Image size, use of scale
  - Photography of developed friction ridge detail
  - Image enhancement software
  - Image storage and printing
  - Enhancing digital images

- Lifting techniques for friction ridge detail
  - Types of lifting tape
  - Documentation
  - Unusual lifting techniques
  - Casting techniques for friction ridge detail

1.14.3. Reference Reading

- Advances in FP Technology, Lee and Gaensslen, 3rd Edition - Chapter 16
- Forensic Photography, Redsicker - Chapters 1, 10
- Identification Photography, by Robert E. May - FBI Academy Booklet
- Friction Ridge Skin, Cowger - Chapter 5
- Fingerprints and Other Ridge Skin Impressions, Champod - Chapters 3 & 4, Appendix 3
- The Fingerprint Source Book, NIJ - Chapter 8
- The Science of Fingerprints, FBI Booklet - Chapters 13-15
- Shelef, R. Collecting and Packaging Exhibits from the Scene of the Crime for Transfer to the Forensic Laboratory, JFI, 1997, 47(3):276-282

1.14.4. Training Practicals

- Process and photograph latent prints developed from various porous substrates
- Process and photograph latent prints developed from various non-porous substrates
- Process and photograph latent prints developed from various semi-porous substrates
1.14.5. Training Standards

- Self-study for recommended readings
- Successful completion of this segment of training will be determined by a written test
- The student must successfully complete all training practicals
1.15. Chapter 11: Court Testimony Procedures, Legal Aspects, and Ethics

1.15.1. Training Objectives

1.15.1.1. This block of instruction covers the court system, rules of evidence, proper procedures for presenting latent print testimony, terminology, legal aspects of forensic identification and significant court cases.

1.15.1.2. The student will understand the value of a pretrial conference with the attorney, proper procedures for presenting latent print testimony that is accurate reflects knowledge of the science, understandable terminology, and believable.

1.15.1.3. The student will learn courtroom operational procedures for an expert witness to include; subpoena, swearing-in, depositions, preliminary hearings, voir dire, direct examination, cross examination, re-direct and re-cross examinations, method of addressing the court, and courtroom nomenclature.

1.15.1.4. The student will understand proper courtroom demeanor to include; proper grooming, dress, walk, tone of voice, expression, speech, and distracting mannerisms. Also, how to testify to latent prints not being found.

1.15.1.5. The student will learn about major court decisions, their significance and gain an understanding of professional ethics.

1.15.2. Training Outline

• Courtroom demeanor
  • Grooming/dress
  • Tone of voice
  • Use of expressions or jargon
  • Demeanor
  • Treating prosecution and defense the same

• Courtroom procedures
  • Subpoena notification
  • Swearing in
  • Voir dire
  • Establishing foundation for evidence admission
  • Direct examination
  • Cross examination
  • Addressing the judge

• Pretrial conference preparation
  • Qualifying questions
  • Curriculum vitae
  • Meeting with prosecutor or defense

• Significant court cases
  • People v. Jennings
  • Frye v. United States
  • Daubert v. Merrell Dow
  • General Electric v. Joiner
  • Carmichael v. Kumho Tire Company
• United States v. Byron Mitchell
• United States v. Llera Plaza
• Massachusetts v. Patterson
• Massachusetts v. Cowens
• Rules of evidence
• Professional ethics

1.15.3. Reference Reading
• An Intro. to Scientific and Investigative Techniques, Stuart, CRC Press, 3rd Edition
  Chapters 33, 34
• Advances in FP Technology, Lee and Gaensslen - Chapter 10
• Forensic Evidence: Science and the Law, Kiely - Chapter 1
• Ethics and the Practice of Forensic Science, Bowen - Chapters 1-7, 9
• Effective Expert Witnessing, 5th Edition, Matson - Chapters 1-7
• Fingerprint Sourcebook, NJI - Chapter 13
• Expert Witnessing: Explaining and Understanding Science, Meyer - Chapters 1-3, 7-9
• NIST Expert Working Group on Human Factors, LP Examination and Human Factors, NJI, 2012, - Chapter 6
• Handbook for Grand Jurors, Texas Dist. & Co. Attn. Association – Booklet
• Acree, M. People v. Jennings: A Significant Case in American Fingerprint
• Berg, E. Legal Ramification of Digital Imaging in Law Enforcement, Forensic Science Communications, 2000, 2(4)
• Byrd, J. Confirmation Bias, Ethics, and Mistakes in Forensics, JFI, 2006, 56 (4): 511-523
• Davidson, L. The Duties and Responsibilities of the Identification Witness, JFI, 1992, 42(3):197-204
• Kahn, L. et al, How to Succeed as an Expert Witness, Profiles in DNA
• Langenburg, G. Defending Against the Critics Curse, Holy Grail, 2014
• What Are the Effects of the Daubert Decision on Fingerprint Identification, The Print, July/August 2005, Vol. 1 No. 4
• Mock, J, Courtroom Testimony and the Cyanoacrylate Technique: The Had Facts, Fall 1985, Vol. 1 No. 1
• Moenssens, A. Landmark Decisions Involving Evidence of Friction Skin Impression, Finger Print and Identification Magazine, December 1966
• Moenssens, A. The Forensic Science is Challenged, The Chesapeake Examiner, Vol. 40 (2)
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• Scarborough, S. Comprehensive Question List for the Courtroom, JFI, 2002, 52(6):725-731
• Scarborough, S. The “Daubert Card” Fingerprint Testimony Card, Scarborough, 2005
• Steele, L. The Defense Challenge to Fingerprints, Criminal Law Review, Vol 40 (3)
• Wertheim, P. Qualifying as an Expert Fingerprint Witness: Designing a Set of Questions to Assist in Court Testimony, JFI, 1990, 40 (2): 60-68

1.15.4. Training Practicals
• Preparation of curriculum vitae
• Preparation of direct examination question
• Moot court on direct & cross examination
• Prepare exhibit(s) for court
• Write a brief synopsis of significant court cases and their importance
• Research and discuss Federal Rule 702

1.15.5. Training Standards
• Successful completion of this segment of training will be determined by a written test.
• The student will successfully complete all practicals
• Student must have an acceptable performance in all mock court situations as evaluated by the Supervisor of the Latent Print Section, with recommendations and critique from moot court panel.
• When possible, attend/observe testimony of another analyst.
1.16. Chapter 12: Final Examination (Practical, Written, Comparison, and Final Mock Court)

1.16.1. Training Objectives

1.16.1.1. The student will complete a comprehensive written final examination that will cover all aspects of training.

1.16.1.2. The student will complete a final comparison exercise with no missed identifications.

1.16.1.3. The student will process mock evidence, preserve any latent prints, analyze the latent prints for suitability, perform comparisons, complete all paper work including a report, and testify in a moot court to their findings.

1.16.1.4. The student will prepare and give a presentation on one latent print topic covered during their training at a Forensic Analysis Division Meeting and/or an educational conference. (*This requirement may be completed at any point in the training or after successful completion of their last forensic case during Independent Supervised Casework, but shall be completed prior to being authorized and released to perform Independent Casework.*)

1.16.1.5. The student must successfully complete the designated modules in the training manual and must pass the final practical and written examination before acquiring authorization to perform supervised dependent casework.
1.17. Chapter 13: Supervised Case Work

1.17.1. Dependent Supervised Casework

1.17.1.1. During supervised casework, the student processes and analyzes cases from start to finish with close supervision. At each stage of dependent supervised casework, the student’s work will be reviewed by a primary trainer to ensure all applicable procedures are being followed and adequate documentation is recorded in the case notes and/or LIMS. Cases worked under dependent supervised casework will be assigned to the primary trainer with the student completing all aspects of the case. The primary trainer will consult with the Section Manager about the progress made and the amount of cases worked and will make a recommendation. The Section Manager will then decide to either move the student into independent supervised casework or to keep the student in dependent supervised casework.

1.17.2. Independent Supervised Casework:

1.17.2.1. During independent supervised casework, the student acts as the primary technician by processing cases from start to finish with minimal supervision. After the student has completed each case, the student’s work will be reviewed by a primary trainer to ensure all applicable procedures are being followed and adequate documentation is recorded in the case notes and/or LIMS. The primary trainer will consult with the Section Manager about the progress made and the amount of cases worked and will make a recommendation. The Section Manager will then decide if the student is ready to be signed off to perform independent casework or to keep the student in independent supervised casework.
Latent Print Section

Quality SOP

Forensic Analysis Division
1. Latent Print Section Quality SOP

1.1 Scope

1.1.1 This document details several specific measures taken to ensure quality by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Responsibilities

1.2.1 The Latent Print Manager is responsible for:

1.2.1.1 Managing staff, work processes, and latent print requests
1.2.1.2 Ensuring adherence to the Latent Print Quality Program which includes but is not limited to the following:
   1.2.1.2.1 Technical and Administrative Review of casework.
   1.2.1.2.2 Quality Reviews of casework.
   1.2.1.2.3 Examiner and Technician training to include competency and proficiency testing.
   1.2.1.2.4 Latent Print Section document development, review, and management.
   1.2.1.2.5 Performance verification of equipment.
   1.2.1.2.6 Continual process improvement.

1.2.2 Latent Print Supervisors are responsible for:

1.2.2.1 Conducting or assign an examiner to conduct Technical/Administrative Reviews (TR/AR).
1.2.2.2 Monitoring the performance of examiners assigned to conduct TR/ARs.
1.2.2.3 Assisting the Section Manager in reviewing and managing latent print quality documents.
1.2.2.4 Ensuring Latent Print personnel are following the HFSC and Latent Print Section policies and procedures.

1.2.3 All Latent Print Examiners (LPEs) and Technicians (LPTs) are responsible for:

1.2.3.1 Adhering to all Latent Print Section procedures and policies.
1.2.3.2 Supporting continuous process improvement by periodically reviewing Latent Print Section documents to detect procedural drift.
   1.2.3.2.1 Select documents will be reviewed by LPEs at least twice a year.
   1.2.3.2.2 The documents chosen to be reviewed will be at the Latent Print Manager’s discretion.
1.2.3.3 Making recommendations for process improvements.

1.3 Procedure

1.3.1 The Latent Print Section Quality Program strongly depends on the TR/AR, QA/QC processes, and operates under the HFSC Quality Manual.

1.3.1.1 Technical/Administrative Review
   1.3.1.1.1 The Latent Print Section will perform Technical and Administrative Reviews. See Standard Operating Procedure FAD-LP-TR/AR.

1.3.1.2 Quality Review
1.3.1.2.1 The Latent Print Manager or designee will select one completed case from each examiner/technician quarterly and perform a Quality Assurance/Quality Control review.

1.3.1.2.2 The Latent Print Manager or designee will review the available case record materials during the Quality Review for administrative and technical accuracy.

1.3.1.2.3 A verification of compliance will be documented using the appropriate technical or administrative review form.

1.3.1.2.4 A QA/QC log will be maintained by the Section Manager.

1.3.2 Proficiency Testing

1.3.2.1 All Latent Print Examiners within the Latent Print Section will take an external proficiency test annually in latent print impressions.

1.3.2.2 All examiners that perform Footwear/Tire Track Examinations will take an annual external proficiency test.

1.3.2.3 All Latent Print Technicians and Latent Print Examiners performing evidence processing duties will take an annual proficiency test.

1.4 Records/Results

1.4.1 Technical Reviews, Administrative Reviews, and Quality Reviews will be recorded on the appropriate form or worksheet located in HFSC’s document control system.

1.4.2 Quarterly QA/QC records will be maintained by the Latent Print Section Manager or designee. If a serious issue is detected, such as Erroneous Identifications, a Corrective Action/Preventive Action (CAPA) report will be documented as outlined in the HFSC Quality Manual.

1.4.3 Proficiency tests will be processed and examined in such a manner that mirrors routine casework. All processes and analysis of proficiency tests will be documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.5 References

Defense Forensic Science Center, CILA LP 5.9 Latent Print Branch Quality, 15 July 2014.

SWGFAST, Glossary- Consolidated, 09/09/03 Ver 1.
Latent Print Section
Reporting Results and Interpretations
Forensic Analysis Division
1. Reporting Results and Interpretations

1.1. Scope
1.1.1. This procedure details reporting examination results in the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure
1.2.1. Case Records
1.2.1.1. Case records should be accurate, complete, and in accordance with all of HFSC’s policies, procedures, and standards.
1.2.1.2. Case record documentation shall be of sufficient detail that in the absence of the original case examiner, another qualified examiner could evaluate what was done and interpret the data. The history of the evidence while in the custody of the original case examiner and throughout the examination processes shall be maintained.
1.2.1.3. When referencing a previously released/published document (e.g. Latent Print Report, Examiner Case Records) the date the document was released/published shall be included.
1.2.1.4. At a minimum, the case record shall contain the following information:
   • Forensic Case Number.
   • Date case records were generated.
   • Examiner/Technician writing the case records.
   • Items of Evidence.
     o Items of Evidence listing in the case records and final report shall be the same.
   • Examinations & processing techniques performed.
     o This shall include the date(s) performed and results.
   • Results of Analysis, Comparison, and Evaluation.
   • Name of the verifying examiner, date, and results of the verifying examiner.
     o This is completed by the verifying examiner on Verification FRM-1
   • Results of any required Automated Fingerprint Identification System searches completed prior to writing the report.

1.2.2. Reports
1.2.2.1. All examination results shall be reported in the laboratory report.
1.2.2.2. All reports shall be simple, accurate, and complete.
1.2.2.3. Reports should stand alone without the need to refer to other documents, with the exception of previous reports issued in the same or associated cases.
1.2.2.4. The following information should be addressed in all Latent Print Processing or Comparison Reports (if applicable).
   • Statement that processing or analysis was conducted.
   • Unique identifiers for all latent prints present or developed on evidence.
   • Number of latent prints found on each item of evidence.
   • Request for additional record finger and/or palm prints.
1.2.2.5. There are only three possible latent print comparison results which are used in reports generated by the HFSC Latent Print Section.

- **Identification** - An identification is the determination by a qualified examiner that two friction ridge impressions originated from the same source due to sufficient quality and quantity of corresponding information such that the examiner would not expect to see that same arrangement of features repeated in a print from another source.

- **Exclusion** – The decision by the examiner that the impressions compared had sufficient features in disagreement to conclude that the impressions did not originate from the same source.

- **Inconclusive** - Inconclusive can be used under two (2) circumstances based on observations from the examiner:
  - A result of incomplete or unclear record finger, palm, or foot prints (lack of area of detail needed in the records to compare to the latent print or record prints are of poor quality such as over inking, distortion, etc.)
  - Result reached when the latent print has corresponding features, in sequence, but lacks sufficiency to identify. Can also apply in conjunction with the previous having dissimilar features but not enough to exclude as being from the same source.

- Reasons for reaching Inconclusive Results must be documented in the case record and the final report.

1.2.3. **Standardized Report Phrasing**

1.2.3.1. In an effort to standardize report writing in the Latent Print Section, standardized phrasing is provided below. Although the standardized report phrasing will effectively convey the results of most analysis, it is recognized that these phrases will not fit every reporting situation. Therefore, this list is not limiting.

1.2.3.2. **Latent Analysis/Latent to Records/Physical Processing**

- Item(s) ______ through ______ were visually analyzed for the presence of latent prints.

- Item(s) ______ through ______ were physically and chemically processed for the development of latent prints.

- A total of _____ latent impressions were developed on Items_____ and labeled L-_____ through L-_____.

---

Latent Analysis/Latent to Records/Physical Processing
- All latent impressions developed will be analyzed to determine if they are of value for comparison purposes. A separate supplemental report will be issued with the results.

- No latent prints of value for comparison purposes were found on Item(s) ____.

- ____ latent fingerprint(s)/palm print(s)/impression(s) of value for comparison purposes was/were found on Item(s) _____. The latent print(s) was/were labeled L-___ through L-____.

- Any latent impressions not listed were analyzed and determined to be of no value for comparison purposes.

- Upon further analysis, the latent print(s) labeled L-___ was/were determined to be of no value for comparison purposes.

- Upon further analysis, the latent prints labeled L-___ was/were determined to be of value for comparison purposes.

- The latent prints, labeled L-____ through L-_____ were compared to the record fingerprint/palm prints bearing the name ____ contained in Item ____. 

- All latent prints of value for comparison purposes in the case have been identified.

1.2.3.3. Results Table

1.2.3.3.1. Results of comparisons conducted in any case are listed in a table on the laboratory report. See the table below.

1.2.3.3.2. Statements to be included in the “Results” portion of the chart:

- Incl to Item#___/___ (Name); cannot be excluded and lacks sufficient detail to be identified.

- Incl to Item#___/___ (Name); incomplete recording/poor quality of friction ridge area.

- UTC; No FP/PP could be located for (Name).
The attached table lists the results of the comparisons conducted in this case.

<table>
<thead>
<tr>
<th>L#</th>
<th>Item#/Location of Lift(s)</th>
<th>Results: (Conclusion/Name/Anatomical Source/Remarks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>*INCL - Inconclusive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*UTC - Unable to Compare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*FP - Fingerprint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*ID - Identification/Identified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*EXCL - Excluded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*PP - Palm Print</td>
</tr>
</tbody>
</table>

1.2.3.4. Record to Record Comparisons

- A comparison of Item _____ with Item _____ revealed both originated from the same source.

1.2.3.5. AFIS Searches

- As a result of (a) search(s) through the Federal Bureau of Investigation’s, City of Houston’s, and/or the Texas Department of Public Safety’s Automated Fingerprint Identification System(s) (AFIS), the latent prints, labeled L-_____ through L-______ were compared to the record fingerprint/palm prints bearing the name ____ contained in Item ____.

- The latent print(s) of value labeled L__ through L__ was/were searched in the Automated Fingerprint Identification System(s) of the Federal Bureau of Investigation, City of Houston, and the Texas Department of Public Safety with negative results. The latent print was/was not registered to the respective Unsolved Latent File(s) (ULF).

1.2.3.6. Preliminary Associations on Non-Violent Crimes
• An official identification HAS NOT been effected at this time and this report is being provided as an investigative lead only.

The latent print(s) of value labeled L-__ through L-__ was/were searched in the Automated Fingerprint Identification System(s) of the Federal Bureau of Investigation, City of Houston, and the Texas Department of Public Safety. As a result, it has been concluded there is a high degree of association between one or more latent prints submitted with the below listed person:

Last Name, First Name, Middle Name FBI#/SID#/HPD#

If a confirmatory examination of the preliminary association is deemed pertinent to the case by the submitting agency between the latent print(s) and the associated record prints of Last name, First name, Middle name FBI#/SID#/HPD#, please submit a new request to the Latent Print Section for a full confirmatory examination.

Under no circumstances does the association contained in this report indicate an official identification has been effected as defined by the Scientific Working Group on Friction Ridge Analysis, Study, and Technology’s Standards for Examining Friction Ridge Impressions and Resulting Conclusions.

1.2.3.7. Non-Retained Biometric AFIS Reverse Hits

• An official identification HAS NOT been effected at this time and this report is being provided as an investigative lead only.

As a result of a reverse AFIS search of a latent print registered to the Unsolved Latent File (ULF) in the Federal Bureau of Investigation’s Automated Fingerprint Identification System (AFIS), it has been concluded there is a high degree of association between one or more latent prints with the below listed person:

Last name, First name, Middle name FBI# ___________ (Non-retained biometric submitted to FBI by ORI ___________).

The record prints are unavailable through the FBI AFIS on the above listed person; therefore, an identification has NOT been effected.
If a confirmatory examination of the preliminary association is deemed pertinent to the case by the submitting agency, please submit a set of quality fingerprints/palm prints from the above listed person and the original evidence. Once the confirmatory examination has been conducted between the record prints of the above person and the original latent prints, a supplemental report will be issued with the results.

Under no circumstances does the association contained in this report indicate an official identification has been effected as defined by the Scientific Working Group on Friction Ridge Analysis, Study, and Technology’s Standards for Examining Friction Ridge Impressions and Resulting Conclusions.

1.2.3.8. AFIS Reverse Hits

• An official identification HAS NOT been effected at this time and this report is being provided as an investigative lead only.

As a result of a reverse AFIS search of a latent print registered to the Unsolved Latent File (ULF) in the Federal Bureau of Investigation’s/ State of Texas’/City of Houston’s Automated Fingerprint Identification System (AFIS), it has been concluded there is a high degree of association between one or more latent prints with the below listed person:

Last Name, First Name, Middle Name FBI#/SID#/HPD#

If a confirmatory examination of the preliminary association is deemed pertinent to the case by the submitting agency between the latent print(s) and the associated record prints of Last name, First name, Middle name FBI#/SID#/HPD#, please submit a new request to the Latent Print Section for a confirmatory examination.

Under no circumstances does the association contained in this report indicate an official identification has been effected as defined by the Scientific Working Group on Friction Ridge Analysis, Study, and Technology’s Standards for Examining Friction Ridge Impressions and Resulting Conclusions.

1.2.3.9. Need Additional/Clear Records

• For a complete examination, please submit (fill in what type of prints are needed).
1.2.3.10. **Registering to the Unsolved Latent File**

- If the latent fingerprints/palm prints require registering to the Unsolved Latent File for future possible matches, please submit a fully rolled set of quality finger and/or palm prints from the complainant for elimination purposes. After the complainant has been eliminated as being the source, the latent prints will be registered to the Unsolved Latent File (ULF).

1.2.3.11. **Court Testimony Record Prints**

- Please submit fully rolled inked finger and palm prints of the above listed individual at least thirty (30) days in advance if courtroom testimony is required for the identifications in this report. A comparison will be conducted between the database prints and the submitted prints to determine if both originated from the same source. A supplemental report will be generated with the results.

1.2.3.12. **Disposition of Evidence**

- All Items of evidence will be returned to the submitting agency.

- Digital images of the latent impression(s) developed in this case will remain on file at this laboratory.

1.2.3.13. **Rejection/ Lack of Required Information**

- Item(s) ___ was/were not analyzed or compared due to the lack of required submission information.

The Latent Print Section of the Houston Forensic Science Center lacks the ability to retrieve record finger and palm prints without an Agency Identification Number, State Identification Number, and/or the Federal Bureau of Investigation Identification Number.

If complete examinations are still required for this case, please re-submit the laboratory request including the suspect's name, date of birth, and Agency Identification Number, State Identification Number, and/or the Federal Bureau of Investigation Identification Number. Please indicate on the laboratory request if the demographics are unknown/unavailable.
1.2.3.14. Latent to Latent Comparisons

1.2.3.14.1. Latent to latent comparisons of friction ridge skin impressions are not conducted on a routine basis. Any request received for a latent to latent impression comparison must be approved by the Section Manager.

1.2.3.14.2. If a latent to latent comparison is authorized, only positive results will be reported.

1.2.3.14.3. No conclusions of exclusions will be reported.

1.2.3.14.3.1. Latent to Latent Standardized Phrasing

- The latent prints in this case are of no value for comparison purposes.

- The latent prints, labeled L-___ and L-____ originated from the same source.

- No result can be made regarding the remaining latent prints on Item _____ and Item_____.

1.3. Records

1.3.1. Case records and reports will be maintained within the HFSC LIMS, digital image management system, and/or case record folders.

1.4. References

SWGFAST, Document #8 Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) 9/11/12 Ver 2.0

SWGFAST, Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint) 3/13/13 Ver. 2.0

SWGFAST, Document #5 Standards for Reporting Friction Ridge Examinations (Latent/Tenprint) 9/14/12 Ver. 2.0

Defense Forensic Science Center, CILA LP 5.10 Reporting the Results 05 August 2014
Latent Print Section
Automated Fingerprint Identification System (AFIS) Operations
Forensic Analysis Division
1. **Automated Fingerprint Identification System (AFIS) Operations**

   1.1. **Scope**

   1.1.1. This procedure details the searching and retrieval of finger and palm print records and latent impressions in federal, state, and local databases by the Automated Fingerprint Identification Systems (AFIS) Section located within the Latent Print Section of the Houston Forensic Science Center (HFSC). This procedure also includes the definition of Preliminary AFIS Associations and how it is applied to AFIS searches and reporting.

   1.2. **Preliminary AFIS Association**

   1.2.1. A Preliminary AFIS Association is the result of searching a latent print impression in AFIS and applying ACE methodology where the conclusion is reached that the two friction ridge impressions have a high degree of association based on corresponding characteristics contained within the latent image and record image on the computer screen that was returned from the search in AFIS.

   1.2.2. Official identifications are **NEVER** reported from Preliminary AFIS Association results alone.

   1.3. **Equipment**

   1.3.1. Cogent AFIS (CAFIS) is a database containing latent and record finger/palm prints. This database is housed and maintained by the City of Houston Police Department. It is available to HFSC but is operated outside the scope of HFSC.

   1.3.2. Texas Department of Public Safety houses and maintains a database containing latent and record finger/palm prints. It is accessed by and searched by using the Latent Global Workstation (GWS-L) provided by the Texas Department of Public Safety (DPS) or through the Universal Latent Workstation (ULW) software provided by the Federal Bureau of Investigation (FBI). It is available to HFSC but is operated outside the scope of HFSC.

   1.3.3. The Next Generation Identification (NGI) is a database containing latent and record finger/palm prints. This database is housed and maintained by the Federal Bureau of Investigation’s (FBI) Criminal Justice Information Services Division (CJIS). It is available to HFSC but is operated outside the scope of HFSC.

   1.4. **Procedure**

   1.4.1. Latent Print Examiners in the Latent Print Section may have access to the FBI, State of Texas, and the Houston Police Department’s databases in order to obtain record prints, providing they have the necessary information to do.

   1.4.2. **Unknown Latent Impression Searches**

   1.4.2.1. All unidentified latent impressions, deemed suitable for comparison, should be searched through one or more AFIS systems. Policy, customer requests, and examiner requests will determine which databases unidentified impressions are searched in.

   1.4.2.2. Examiners will encode the designated latent impressions, search, and compare returned candidates for a possible preliminary association for each of the
databases used. The following encoding formats will be used for the designated systems:

- **CAFIS** – The Laboratory Case Number followed by the latent number
  - Example: 2015-12345-03

- **GWS-L** – There are three separate sections/fields that must be entered. In the first field, enter the workstation number (42). In the second field, enter the last two (2) digits of the year and the second section of the laboratory case number. It may be necessary to add zeroes in front of the second section of the case number as the field must have eight (8) digits inserted. In the third field, the latent impression number is inserted.
  - Example: 42 15003456 03

- **ULW searching DPS** – When searching the state database using the ULW software, the format field is seven (7) digits long. The first two digits are the last two digits of the year of the case followed by the second section of the laboratory case number. If the second section of the laboratory number does not contain enough numbers to fill the required 7 digit field, zeros will be inserted in between the two digit year and the second half of the laboratory number.
  - 16 (year) 00374 (Lab Case Number with leading zeros)
    - 1600374

- **NGI** – The laboratory case number is used for the entire case utilizing the Transaction Manager software of ULW. When entering each latent impression, the latent number will be inserted within the notes field.
  - Example: 2015-12345

1.4.2.3. Examiners will document their case activities using the approved section notes.

### 1.4.3. Violent Crimes

1.4.3.1. If a preliminary AFIS association is made, examiners will perform the confirmatory examination between the database record prints and the original latent impression(s) to determine identification, exclusion, or inconclusive results. Record finger and/or palm print card(s) from the database that are used to make an official identification will be added as an item of evidence to the case record for violent crimes and an image of the original database record will be retained in the digital image vault.

### 1.4.4. Non-Violent Crimes

1.4.4.1. For non-violent crimes, Preliminary AFIS Association reports have been designed and implemented in an effort to provide the submitter with preliminary investigative leads in a timely and efficient manner. The customer evaluates the Preliminary AFIS Association contained within the report and determines if the association would provide additional merit to his/her investigation. If deemed important to the customer, the customer can request a full confirmatory examination, where all suitable latent prints undergo a full comparison and verification to confirm either identification, inconclusive, or exclusion.

1.4.4.1.1. It is recognized that performing on-screen comparisons utilizing AFIS search software does not offer the examiner the full capacity to declare an official identification has been effected. Potential loss of quality due to compression
of the image(s), monitor resolutions, capture resolutions, limited enhancement tools, etc. are all possible utilizing various AFIS software comparison tools.

1.4.4.1.2. As a presumptive examination, it is also recognized that due to these factors stated above, although rare, false positive AFIS Associations may be discovered upon performing an official confirmatory examination with the original latent images and record finger and/or palm prints. This does not rise to the same level of error as outlined in the ACE-V Methodology SOP under Erroneous Identification.

1.4.4.2. When an examiner determines that a preliminary AFIS association has been effected on a non-violent crime case, such as a property crime, a second examiner will verify the association. Under general conditions, the association and verification is made utilizing the available information contained within the image of the latent searched and the record finger image displayed. For complex or severely degraded or fragmented latent prints, examiners have the discretion to obtain clear record finger and/or palm prints from the database.

1.4.4.3. A screen shot, either printed or in digital format, will have the original examiner’s initials and date and the verifying examiner’s initials and date written on the screen shot. This will be included in the case documentation. It will be reported to the customer that a preliminary AFIS association has been established with a listing of the preliminary associated individual’s identifying information. The report will clearly state that an **official identification has not been effected at this time**. A separate request can be made by the customer if a confirmatory examination needs to be conducted with the original latent(s) and record finger and/or palm prints. (See FAD-LP-Reporting Results).

1.4.5. Reverse Associations

1.4.5.1. All databases have the ability to register unidentified latent impressions to the unsolved latent files (ULF).

1.4.5.2. When a latent impression is searched and no verified identifications are effected as a result of the search, the latent impression may be registered depending on the nature of the offense and section policy.

1.4.5.3. If a latent impression is registered to the ULF, all incoming record finger and/or palm prints are compared by the database software to the latent impressions registered in the ULF. Using a mathematical algorithm, the database software will compare algorithms extracted from prints in the record files and the latent impressions. Each database will produce potential candidates based off of closely matching algorithms.

1.4.5.4. When an examiner determines that a reverse preliminary association has been effected, a second examiner will verify the on-screen association. A screen printout will have both the original examiner’s initials and date and the verifying examiner’s initials and date. This will be included in the case documentation and reported as a preliminary association.

1.5. Records/Results
1.5.1. Examiners will document their case activities using the approved section notes and will issue a report of their findings following the standard operating procedures for reporting results.

1.6. Quality Assurance/Quality Control

1.6.1. Technical and administrative reviews are performed on all casework before a final report is released.

1.7. References

HFSC Latent Print Section, Reporting Results and Interpretations Standard Operating Procedure.

HFSC Latent Print Section, Analysis, Comparison, Evaluation and Verification Methodology Standard Operating Procedure.

HFSC Latent Print Section, Latent Print Section Quality Standard Operating Procedure.

SWGFAST, Document #8 Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) 9/11/12 Ver 2.0

SWGFAST, Document #12 Standard Friction Ridge Automation Training (Latent/Tenprint) 11/14/12 Ver 2.0

SWGFAST, Document #101 Limited Examination Considerations for Latent Print Sections (Latent) Position Statement 09/11/12 Ver 1.0
<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Indanedione (IND)</td>
<td>A reagent that reacts with specific amino acids present in print residue, producing a fluorescent product when exposed to excitation wavelengths of 352-591 nm.</td>
</tr>
<tr>
<td>1,8-diazafluoren-9-one (DFO)</td>
<td>A reagent that reacts with specific amino acids to produce friction ridge detail with fluorescent properties when exposed to excitation wavelengths of 352-591 nm.</td>
</tr>
<tr>
<td>Adhesive</td>
<td>A substrate in which at least part of the surface has sufficient tackiness to cause the outline of friction ridges to transfer to that surface.</td>
</tr>
<tr>
<td>Alternate Light Source (ALS)</td>
<td>Device that produces a variety of selectable wavelengths of light.</td>
</tr>
<tr>
<td>CrimeScope</td>
<td>Portable, multi-waveband tunable alternate light source manufactured by SPEX Forensics.</td>
</tr>
<tr>
<td>Cyanoacrylate Ester (Superglue)</td>
<td>An adhesive used in a fuming method to develop friction ridge detail.</td>
</tr>
<tr>
<td>Fingerprint Powder</td>
<td>Various colored powders comprised of fine particles that adhere to latent print residue or cyanoacrylate ester fumed latent prints to aid in the visualization of latent prints.</td>
</tr>
<tr>
<td>Gentian Violet (CV)</td>
<td>Violet stain used to develop or enhance friction ridge detail, which can be viewed by either fluorescence or non-fluorescence. Also known as Crystal Violet (CV).</td>
</tr>
<tr>
<td>Gun Bluing Solution</td>
<td>A reagent used on metal cartridges and cartridge casings for the development of latent prints following a superglue treatment. The process consists of three basic ingredients which work together to impart a blue-black metal coating on the surface of the cartridge cases in all areas except where a latent print is present. The term “Gun Bluing Solution” encompasses all chemicals used to oxidize firearms.</td>
</tr>
<tr>
<td>Inherent Luminescence</td>
<td>Luminescence resulting from selected wavelength illumination without chemical treatment.</td>
</tr>
<tr>
<td>LASER</td>
<td>Light Amplification by Stimulated Emission of Radiation. Devices that produce coherent wavelengths of light at a specific wavelength.</td>
</tr>
<tr>
<td>Leucocrystal Violet</td>
<td>Reagent used to detect and enhance bloody friction ridge detail by either fluorescent on non-fluorescent staining. Also known as LCV or ALCV.</td>
</tr>
<tr>
<td>Luminescent Dye Stain</td>
<td>A reagent which produces fluorescence when exposed to selected wavelengths of light; used to visualize cyanoacrylate fumed friction ridge detail.</td>
</tr>
<tr>
<td>Magnetic Fingerprint Powder</td>
<td>Various colored powders comprised of fine particles mixed with fine metal particles that adhere to latent print residue or cyanoacrylate ester fumed latent prints to aid in the visualization of latent prints. A magnetic wand is used to magnetize the metal particles within the powder, briefly allowing the powder to clump together for application as long as the magnet on the wand is engaged.</td>
</tr>
<tr>
<td>Ninhydrin (NIN)</td>
<td>1,2,3-triketohydridene hydrate. Reagent that reacts with amino acids to develop friction ridge detail.</td>
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<tr>
<td>Abbreviation</td>
<td>Meaning</td>
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<td>?</td>
<td>Position Questionable</td>
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<tr>
<td>AB</td>
<td>Amido Black</td>
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<tr>
<td>ACCS</td>
<td>AFIS Candidate Comparison Sheet</td>
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<td>Automated Fingerprint Identification System</td>
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<td>BY40</td>
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<td>Exclusion</td>
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<td>Further Processing Required</td>
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<td>GunBlu</td>
<td>Gun Bluing Solution</td>
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<td>Identification</td>
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<td>Impression</td>
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<td>Inconclusive</td>
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<td>JNT</td>
<td>Joint</td>
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<td>L#</td>
<td>Latent Number</td>
</tr>
<tr>
<td>LI</td>
<td>Left Index Finger</td>
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<tr>
<td>LL</td>
<td>Left Little Finger</td>
</tr>
<tr>
<td>LM</td>
<td>Left Middle Finger</td>
</tr>
<tr>
<td>Non-Porous</td>
<td>Not absorbent.</td>
</tr>
<tr>
<td>Porous</td>
<td>Absorbent.</td>
</tr>
<tr>
<td>Semi-Porous</td>
<td>Exhibits traits of both porous and nonporous substrate on the same surface.</td>
</tr>
<tr>
<td>Small Particle Reagent (SPR)</td>
<td>A pre-mixed, commercial product composed of molybdenum disulfide that adheres to fats and oils in latent print residue.</td>
</tr>
<tr>
<td>Sticky Side Powder</td>
<td>A reagent used to develop friction ridge impressions on the adhesive side of tapes.</td>
</tr>
<tr>
<td>Sudan Black</td>
<td>A reagent used to stain fats and oils in prints producing a blue-black image. It is useful on non-porous items heavily contaminated with grease or oils.</td>
</tr>
<tr>
<td>ThermaNin</td>
<td>Ninhydrin derivative for developing latent impressions on thermal paper.</td>
</tr>
<tr>
<td>Ultraviolet light (UV)</td>
<td>Wavelengths of light shorter than that of the visible spectrum, between 10 and 400 nm.</td>
</tr>
<tr>
<td>Wetwop</td>
<td>A commercially available product that is similar to sticky side powder and its application.</td>
</tr>
<tr>
<td>Zinc Chloride</td>
<td>Secondary treatment for the enhancement of Ninhydrin developed friction ridge skin detail which produces a fluorescent product when exposed to selected wavelengths of light.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>LP</td>
<td>Left Palm Print</td>
</tr>
<tr>
<td>LPC</td>
<td>Latent Print Comparison</td>
</tr>
<tr>
<td>LPP</td>
<td>Latent Print Processing</td>
</tr>
<tr>
<td>LR</td>
<td>Left Ring Finger</td>
</tr>
<tr>
<td>LT</td>
<td>Left Thumb</td>
</tr>
<tr>
<td>NC</td>
<td>Not Compared</td>
</tr>
<tr>
<td>NCON</td>
<td>Non-conducive for latent print development</td>
</tr>
<tr>
<td>NFP</td>
<td>No Further Processing Required</td>
</tr>
<tr>
<td>NGI</td>
<td>Next Generation Identification</td>
</tr>
<tr>
<td>NLOV</td>
<td>No Latents of Value</td>
</tr>
<tr>
<td>NMR</td>
<td>Need more records</td>
</tr>
<tr>
<td>NV</td>
<td>No Value</td>
</tr>
<tr>
<td>Ø</td>
<td>Identification</td>
</tr>
<tr>
<td>PAA</td>
<td>Preliminary AFIS Association</td>
</tr>
<tr>
<td>PP</td>
<td>Palm Print</td>
</tr>
<tr>
<td>PSL</td>
<td>Possible Suitable Latent</td>
</tr>
<tr>
<td>PWD</td>
<td>Powder</td>
</tr>
<tr>
<td>R6G</td>
<td>Rhodamine 6G</td>
</tr>
<tr>
<td>RI</td>
<td>Right Index Finger</td>
</tr>
<tr>
<td>RL</td>
<td>Right Little Finger</td>
</tr>
<tr>
<td>RM</td>
<td>Right Middle Finger</td>
</tr>
<tr>
<td>RP</td>
<td>Right Palm Print</td>
</tr>
<tr>
<td>RR</td>
<td>Right Ring Finger</td>
</tr>
<tr>
<td>RT</td>
<td>Right Thumb</td>
</tr>
<tr>
<td>SFC</td>
<td>Suitable for Comparison</td>
</tr>
<tr>
<td>SID</td>
<td>State Identification Number</td>
</tr>
<tr>
<td>SSP</td>
<td>Sticky Side Powder</td>
</tr>
<tr>
<td>Sud Blk</td>
<td>Sudan Black</td>
</tr>
<tr>
<td>TherNin</td>
<td>Thermanin</td>
</tr>
<tr>
<td>UCN</td>
<td>Universal Control Number</td>
</tr>
<tr>
<td>ULF</td>
<td>Unsolved Latent File</td>
</tr>
<tr>
<td>UNK</td>
<td>Unknown</td>
</tr>
<tr>
<td>UTC</td>
<td>Unable to Compare</td>
</tr>
<tr>
<td>VER</td>
<td>Verified</td>
</tr>
<tr>
<td>WHT</td>
<td>White Light</td>
</tr>
<tr>
<td>WW</td>
<td>Wetwop</td>
</tr>
<tr>
<td>Zinc Chl</td>
<td>Zinc Chloride</td>
</tr>
</tbody>
</table>
Latent Print Section
Sequential Processing of Adhesive Surfaces
Forensic Analysis Division
1. Sequential Processing of Adhesive Surfaces

1.1 Scope
   1.1.1 This procedure details the sequential processing of adhesive surfaces by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Limitations
   1.2.1 On the non-adhesive side of tapes, it has been determined that cyanoacrylate fuming can interfere with Sticky Side Powder and Wetwop processing. When processing the non-adhesive side of tape, the adhesive portion of the tape must be protected from cyanoacrylate fuming and luminescent dye stains.
   1.2.2 The tape should be placed adhesive side down on plastic or acetate to protect the adhesive side during processing with cyanoacrylate and luminescent dye stains.

1.3 Procedure
   1.3.1 The following techniques are provided as a general guide for processing adhesive surfaces. Due to the vast number and ever changing brands and compositions of tape, it is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing. The following techniques are provided as a general guide and not a standard processing sequence.
   1.3.2 Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedures for adhesive surfaces are listed in Figure 1 below.

   NOTE: The non-adhesive side of a tape should be processed in adherence with non-porous sequential processing methods.
1.4 Records/Results

1.4.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.5 References


Latent Print Section
Sequential Processing of Blood Contaminated Evidence
Forensic Analysis Division
1. Processing Blood Contaminated Evidence

1.1 Scope
1.1.1 This procedure details the processing of blood contaminated items of evidence by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure
1.2.1 The following techniques are provided as a general guide for processing porous and non-porous blood contaminated evidence. It is up the examiner/technician processing the evidence to determine the most efficient and effective method for processing.

1.2.2 Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedures for blood contaminated evidence are listed in Figure 1 below.

NOTE: If using LCV and Amido Black, it is best to apply LCV first and then to use Amido Black to darken the stain.

**FIGURE 1: SEQUENTIAL PROCESSING PROCEDURES FOR BLOOD CONTAMINATED EVIDENCE**

<table>
<thead>
<tr>
<th>Non-porous &amp; Semi-porous Evidence</th>
<th>Porous Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, ALS</td>
<td>White Light, ALS</td>
</tr>
<tr>
<td>Leucocrystal Violet (LCV) or Amido Black</td>
<td>Ninhydrin or Leucocrystal Violet (LCV)</td>
</tr>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>White Light, ALS</td>
</tr>
<tr>
<td>Powders</td>
<td>Powders</td>
</tr>
<tr>
<td>Regular, Magnetic, Fluorescent</td>
<td>Powders</td>
</tr>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>White Light, ALS</td>
</tr>
</tbody>
</table>

Sequential Processing of Blood Contaminated Evidence
Issued By: Section Manager
Uncontrolled When Printed
1.3 Records/Results

1.3.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.4 References

Defense Forensic Science Center, CILA LP 53.0 Blood Contaminated Items of Evidence, 07 February 2014.

Latent Print Section
Sequential Processing of Cartridges and Casings
Forensic Analysis Division
1. Processing Cartridges and Casings

1.1 Scope

1.1.1 This procedure details the processing of brass, aluminum, and steel cartridges and cartridge casings by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Limitations

1.2.1 The use of Gun Bluing Solution during latent print processing has the potential to adversely affect the subsequent examination and analysis by the Firearms Section. Before an examiner/technician uses Gun Bluing on cartridges, coordination needs to be made with the Firearms Section to determine potential risks/benefits. Gun Bluing will generally not be used on Cartridge Casings when a Firearms Section request has been made.

1.3 Procedure

1.3.1 The following techniques are provided as a general guide for processing cartridges and cartridge casings. It is up the examiner/technician processing the evidence to determine the most efficient and effective method for processing.

1.3.2 Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedures for cartridges and casings are listed in Figure 1 below.
1.4 Records/Results

1.4.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.5 References


Latent Print Section
Sequential Processing of Grease Contaminated Evidence
Forensic Analysis Division
1. Sequential Processing of Grease Contaminated Evidence

1.1. Scope

1.1.1. This procedure details the sequential processing of grease contaminated forensic material by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure

1.2.1. The following techniques are provided as a general guide for processing of all grease contaminated items of evidence. It is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing. Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedures for grease contaminated evidence are listed in Figure 1 below.

FIGURE 1: SEQUENTIAL PROCESSING PROCEDURES FOR GREASE CONTAMINATED EVIDENCE

<table>
<thead>
<tr>
<th>Sudan Black Process</th>
<th>Gentian Violet Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>White Light, LASER, ALS</td>
</tr>
<tr>
<td>Cyanoacrylate Fuming</td>
<td>Cyanoacrylate Fuming</td>
</tr>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>White Light, LASER, ALS</td>
</tr>
<tr>
<td>Luminescent Dye Stain</td>
<td>Luminescent Dye Stain</td>
</tr>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>LASER, ALS</td>
</tr>
<tr>
<td>Sudan Black</td>
<td>Gentian Violet</td>
</tr>
<tr>
<td>Visual Exam</td>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
<td>Crystal Violet</td>
</tr>
<tr>
<td></td>
<td>Visual Exam</td>
</tr>
<tr>
<td></td>
<td>White Light, LASER, ALS</td>
</tr>
</tbody>
</table>
1.3 Records/Results
   1.3.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.4 References

Defense Forensic Science Center, *CILA LP 55.0 Grease Contaminated Evidence*, 03 March 2014.

Latent Print Section

Sequential Processing of Non-Porous Evidence

Forensic Analysis Division
1. Sequential Processing of Non-Porous Evidence

1.1. Scope

1.1.1. This procedure details the processing of non-porous forensic material by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure

1.2.1. The following techniques are provided as a general guide for processing non-porous items of evidence. It is up the examiner/technician processing the evidence to determine the most efficient and effective method for processing.

1.2.2. Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedure for non-porous evidence is listed in Figure 1 below.

FIGURE 1: SEQUENTIAL PROCESSING PROCEDURES FOR NON-POROUS EVIDENCE

<table>
<thead>
<tr>
<th>Non-Porous Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
</tr>
<tr>
<td>Cyanoacrylate Fuming</td>
</tr>
<tr>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, LASER, ALS</td>
</tr>
<tr>
<td>Luminescent Dye Stain</td>
</tr>
<tr>
<td>Visual Exam</td>
</tr>
<tr>
<td>LASER, ALS</td>
</tr>
<tr>
<td>Powders</td>
</tr>
<tr>
<td>Regular, Magnetic, Fluorescent</td>
</tr>
<tr>
<td>Visual Exam</td>
</tr>
<tr>
<td>White Light, ALS</td>
</tr>
</tbody>
</table>
1.3. Records/Results

1.3.1. Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.4. References

Defense Forensic Science Center, *CILA LP 52.0 Processing Non-Porous Items of Evidence*, 13 January 2014.

Latent Print Section

Sequential Processing of Porous Evidence

Forensic Analysis Division
1. Sequential Processing of Porous Evidence

1.1. Scope
1.1.1. This procedure details the sequential processing of porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure
1.2.1. The following techniques are provided as a general guide for processing porous items of evidence. It is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing.
1.2.2. Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedure for porous evidence is listed in Figure 1 below.

**FIGURE 1: SEQUENTIAL PROCESSING PROCEDURE FOR POROUS EVIDENCE**

![](image)

1.3. Records/Results
1.3.1. Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.4. References

Defense Forensic Science Center, CILA LP 51.0 Processing of Porous Evidence, 13 January 2014
Latent Print Section
Sequential Processing of Semi-Porous Evidence
Forensic Analysis Division
1. Sequential Processing of Semi-Porous Evidence

1.1. Scope

1.1.1. This procedure details the sequential processing of semi-porous evidence by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure

1.2.1. The following techniques are provided as a general guide for processing semi-porous items of evidence. It is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing.

1.2.2. Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phrase of sequential processing. The sequential processing procedure for semi-porous evidence is listed in Figure 1 below.

**FIGURE 1. SEQUENTIAL PROCESSING FOR SEMI-POROUS EVIDENCE**

```
Semi-Porous Evidence

Visual Exam
White Light, LASER, ALS

Cyanacrylate Fuming

Visual Exam
White Light, LASER, ALS

Powders
Regular, Magnetic, Fluorescent

Visual Exam
White Light, LASER, ALS

DFO/IND

Visual Exam
LASER, ALS

Ninhydrin

Visual Exam
White Light, ALS
```
1.3. Records/Results

1.3.1. Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.4. References

Defense Forensic Science Center, *CILA FAD LP PRO 3850 Processing Glossy Paper*, 21 Nov 11
Latent Print Section
Sequential Processing of Thermal Paper
Forensic Analysis Division
1. Sequential Processing of Thermal Paper

1.1 Scope
   1.1.1 This procedure details the sequential processing of thermal paper by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure
   1.2.1 The following techniques are provided as a general guide for processing thermal paper. It is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing.
   1.2.2 Regardless of method selected, the sequential processing order must be followed when more than one processing technique/chemical is applied to an item. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedure for thermal paper is listed in Figure 1 below.

   ![Sequential Processing Procedure Diagram](image)

   **FIGURE 1: SEQUENTIAL PROCESSING PROCEDURE FOR THERMAL PAPER**

1.3 Records/Results
   1.3.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.4 References

Defense Forensic Science Center, *CILA LP 56.0 Processing Thermal Paper Evidence*, 03 March 2014
Latent Print Section
Processing Thermal Paper using 1,2-Indanedione
Forensic Analysis Division
1. Processing thermal paper using 1,2-Indanedione (IND)

1.1 Scope
1.1.1 This document details the procedure for the mixing and using 1,2-Indanedione (IND) on thermal paper by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 IND (2.0 grams)
1.2.2 Ethyl Acetate (70mL)
1.2.3 M Novec HFE-7100 (930 mL)
1.2.4 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, and dark storage bottles
1.2.5 Safety Equipment: fume hood, safety glasses, gloves, orange filtered goggles

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using IND.
1.3.2 Fume hood use is required when preparing and applying IND.
1.3.3 See applicable Safety Data Sheets (SDS).

1.4 QA/QC
1.4.1 A Quality Control check must be performed before use each day and when the reagent is made.
1.4.2 To test the prepared solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper. (Matrix = amino acid; Substrate = paper). Apply IND as described below.
1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under LASER/ALS light.

1.5 Procedure
1.5.1 The application of IND on thermal paper is applied by dipping or spraying. If applying IND by dipping, quickly immerse the paper in the solution and remove. Allow item to dry. If applying IND by spraying, spray the paper and allow to dry.
1.5.2 The item should be left at room temperature, preferably in the dark, for a minimum of 24 hours, to allow the ridge detail to develop. Heat will darken the thermal paper and should not be used in this process.
1.5.3 Developed latent prints will fluoresce under a green LASER/ALS and are viewed with orange goggles.

1.6 Preparation of IND
1.6.1 Working Solution
1.6.1.1 Add 2.0 g of IND to 70 mL of ethyl acetate and place on a stirring device for approximately 20 minutes until the IND is dissolved.
1.6.1.2 Add the dissolved mixture to 930 mL of 3M Novec HFE-7100 solvent.
1.6.1.3 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Records/Results
1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage
1.8.1 Store solution in a dark bottle in a refrigerator to enhance shelf life.

1.9 References


Defense Forensic Science Center, CILA LP 56.1, 1,2 Indanedione (Thermal Paper), 03 March 2014


Latent Print Section

Sequential Processing of Varnished Forensic Material

Forensic Analysis Division
1. Sequential Processing of Varnished Forensic Material

1.1 Scope

1.1.1 This procedure details the processing of varnished forensic material by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure

1.2.1 The following techniques are provided as a general guide for processing varnished items of evidence. It is up the examiner/technician processing the evidence to determine the most efficient and effective method for processing.

1.2.2 Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedure for varnished forensic material is listed in Figure 1 below.

FIGURE 1: SEQUENTIAL PROCESSING PROCEDURE FOR VARNISHED FORENSIC MATERIAL

1.3 Records/Results

1.3.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).
1.4 References

Latent Print Section
Sequential Processing of Wet Non-Porous Evidence
Forensic Analysis Division
1. Sequential Processing of Wet Non-Porous Evidence

1.1 Scope
   1.1.1 This procedure details the sequential processing of wet non-porous forensic material by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Procedure
   1.2.1 The following techniques are provided as a general guide for processing of all wet non-porous items of evidence. It is up to the examiner/technician processing the evidence to determine the most efficient and effective method for processing. Regardless of method selected, items to be processed must follow the sequential processing order for items where more than one processing technique/chemical is applied. Regardless of processing sequence, as each sequential processing technique is applied, the evidence will be visually examined for the presence of latent prints. If friction ridge detail is observed, the detail will be digitally captured before the next phase of sequential processing. The sequential processing procedure for wet non-porous evidence is listed in Figure 1 below.

   **FIGURE 1: SEQUENTIAL PROCESSING PROCEDURE FOR WET NON-POUROUS EVIDENCE**

   ![Sequential Processing Procedure Diagram]

1.3 Records/Results
   1.3.1 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.4 References

   Defense Forensic Science Center, *CILA LP 59.0 Processing Wet or Previously Wet Evidence*, 13 January 2014
Latent Print Section
Amido Black
Forensic Analysis Division
1. Processing evidence using Amido Black

1.1 Scope
1.1.1 This document details the procedure for the mixing and using Amido Black on blood contaminated forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Methanol Based Amido Black

<table>
<thead>
<tr>
<th>Solution Name</th>
<th>Reagents</th>
<th>Preparation</th>
</tr>
</thead>
</table>
| Solution A, Developer| • 2.0 g Naphthol Blue Black  
                        • 250mL Glacial Acetic Acid  
                        • 1.8 L Methanol            | Combine the ingredients and stir on a magnetic stirrer until all the Naphthol Blue Black is dissolved. This should take approximately 30 minutes. |
| Solution B, First Rinse| • 100mL of Glacial Acetic Acid  
                        • 900mL of Methanol           | Combine the ingredients and mix manually.                                   |
| Solution C, Final Rinse| • 50mL of Glacial Acetic Acid  
                        • 950mL of Distilled Water   | Combine the ingredients and mix manually.                                   |

1.2.2 Water Based Amido Black

<table>
<thead>
<tr>
<th>Solution Name</th>
<th>Reagents</th>
<th>Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution A</td>
<td>• Pre-mixed Aqueous Amido Black</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| Solution B, Rinse Solution| • 38 g Citric Acid  
                        • 2 L Distilled Water                                  | Combine the ingredients and place on a stirring device until the citric acid is dissolved. |

1.2.3 Blood Fixative

<table>
<thead>
<tr>
<th>Solution Name</th>
<th>Reagents</th>
<th>Preparation</th>
</tr>
</thead>
</table>
| Blood Fixative      | • 20 g 5-sulfosalicylic acid  
                        • 1000 mL Distilled water | Combine the ingredients and stir on a magnetic stirrer until all the 5-sulfosalicylic acid is dissolved. |

1.2.4 Equipment: Balances, graduated cylinders, magnetic stirrer and stirring bar, and storage bottles
1.2.5 Safety Equipment: fume hood, safety glasses or goggles, gloves

1.3 Limitations
1.3.1 Amido Black is a dye stain which stains proteins found in blood. Amido Black does not react with the normal constituents found in latent print residue; therefore, it must be used in sequence with other processing methods.
1.3.2 Prior to processing blood contaminated evidence with Water Based Amido Black, it is essential that the blood impression is completely dried or fixed by immersing the item in Blood Fixative Solution.

1.3.3 Ensure the substrate is compatible with the formula of Amido Black selected. The methanol-based solution should not be used on painted surfaces as the formula may destroy latent impressions and the surface beneath.

1.4 Safety

1.4.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using Amido Black.

1.4.2 Fume hood use is required when preparing and applying Amido Black.

1.4.3 See applicable Safety Data Sheet (SDS).

1.4.4 Place the appropriate safety label and information on all reagent bottles. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.5 QA/QC

1.5.1 A Quality Control check must be performed before use each day and/or when the reagent is made.

1.5.2 To test the solution, apply synthetic blood to a finger and place a test print on a piece of paper or plastic, depending on the substrate being tested (Matrix = synthetic blood; Substrate = paper/plastic). Apply Amido Black as described below.

1.5.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light.

1.6 Procedure for Fixing Blood Contaminated Evidence (Water Based Method Only)

1.6.1 Use absorbent paper (tissue paper, paper towels, or filter paper) and a wash bottle containing Blood Fixative Solution (2% solution of the sulfosalicylic acid).

1.6.2 Hold a dry piece of the absorbent paper parallel to the surface to be fixed. Begin the fixing procedure by dropping one edge of the paper onto the surface and moisten it heavily with the Blood Fixative Solution so it is anchored in place. Continue moistening the paper, being careful to work out any air bubbles that may be trapped inside.

1.6.3 Once the area of interest is covered, leave the saturated paper in place for at least three minutes. For items containing a thick layer of blood, leave the paper in place five minutes or more.

1.6.4 Once fixing is complete, remove the paper. Excess fixative can be rinsed away but is not necessary. When blood is relatively fresh, fixing changes its color from dark red to dark brown.
1.7 Procedure for Methanol Based Amido Black
  1.7.1 The application of Amido Black may be applied by dipping, spraying, or by using a squirt bottle.
  1.7.2 Apply Solution A by completely covering the target area. Allow to develop for thirty seconds to one minute. Apply Solution B (First Rinse).
  1.7.3 Applications of Solutions A & B can be re-applied to develop better contrast.
  1.7.4 After maximum clarity has been achieved, rinse the evidence with Solution C (Final Rinse).

1.8 Procedure for Water Based Amido Black
  1.8.1 The application of Amido Black may be applied by dipping, spraying, or by using a squirt bottle.
  1.8.2 Apply Solution A and completely cover the target area. Allow to develop for 3 to 5 minutes.
  1.8.3 After maximum clarity has been achieved, rinse the evidence with Solution B (Rinse Solution).
  1.8.4 Rinse with distilled or tap water.

1.9 Records/Results
  1.9.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
  1.9.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.10 Storage
  1.10.1 Store solution(s) in a dark bottle in a refrigerator to enhance shelf life.

1.11 References

  Defense Forensic Science Center, CILA LP 53.1, Amido Black, 07 February 2014


Latent Print Section
Basic Yellow 40 (BY40)
Forensic Analysis Division
1. Processing evidence using Basic Yellow 40 (BY40)

1.1 Scope
   1.1.1 This document details the procedure for mixing and using BY40 on forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
   1.2.1 BY40 (1.0 gram)
   1.2.2 Methanol (500 mL)
   1.2.3 Equipment: balances, beakers, graduated cylinders, magnetic stirrer and stirring bar, funnel, storage bottles, and plastic applicator bottles, tray, or container for submersion
   1.2.4 Safety Equipment: yellow or orange goggles, fume hood, gloves

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using BY40.
   1.3.2 Fume hood use is required when preparing and applying BY40.
   1.3.3 See applicable Safety Data Sheet (SDS).

1.4 QA/QC
   1.4.1 A Quality Control Check must be performed before any evidence processing may begin and before any stock solution is placed into service.
   1.4.2 To test the prepared solution, place a small amount of the prepared BY40 in a container and expose it to the ALS using a blue to blue green wavelength of light (415 nm to 485nm). A positive and passing result will be if the BY40 fluoresces.
   1.4.3 To test that the working solution is staining the cyanoacrylate ester residue, apply BY40 to the test strip used as a quality control check during cyanoacrylate ester fuming. A positive and passing result will be if the latent print fluoresces.

1.5 Procedure
   1.5.1 BY40 is a luminescent dye stain that is applied to items of evidence after cyanoacrylate ester fuming which stains the cyanoacrylate ester residue.
   1.5.2 The application of BY40 may be applied by dipping, spraying, or swabbing with cotton.
   1.5.3 Excess BY40 reagent can be rinsed from the items of evidence using tap water.
   1.5.4 Items that have been processed with BY40 are viewed under blue to blue green ALS light.
1.5.5 Developed latent prints will fluoresce under a blue to blue green ALS and are viewed with yellow or orange goggles, depending on best contrast.

1.6 Preparation of BY40/Methanol

1.6.1 Stock Solution

1.6.1.1 Using a magnetic stirrer, slowly add 1 gram of BY40 crystals to 500 milliliters of methanol and stir until the BY40 is dissolved.

1.6.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.6.2 Working Solution

1.6.2.1 Dilute a portion of the stock solution with additional methanol to preference.

1.7 Records/Results

1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage

1.8.1 Store solution in a plastic bottle/sprayer.

1.9 Shelf Life

1.9.1 Six months

1.10 References


Latent Print Section
CrimeScope CS-16-500 Operating Procedures
Forensic Analysis Division
1. CrimeScope CS-16-500 Operation Procedures

1.1 Scope
   1.1.1 This procedure details the steps for the operation of the CrimeScope CS-16-500 by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Safety
   1.2.1 Before operating the CrimeScope, ensure that precautions are taken by wearing the appropriate personal protection equipment.
   1.2.2 Ensure that proper filtered eyewear is worn at all times during operation.
   1.2.3 Do not operate the CrimeScope unless the photo room door is closed. Ensure the door to the photo room is closed to the general laboratory area.
   1.2.4 Do not aim the CrimeScope directly at yourself or look directly into the light guide.
   1.2.5 Avoid prolonged direct contact of the beam onto evidence since this may cause damage to certain types of evidence, i.e. plastic film due to the heat generated.

1.3 Procedure
   1.3.1 Power On Procedures
      1.3.1.1 Turn the POWER switch located at the back of the unit to the “on” position.
      1.3.1.2 Toggle the switch on the front of the unit labeled “lamp” to the “on” position.
      1.3.1.3 Use the up and down buttons on the hand piece at the end of the fiber optic hose or the front of the unit to toggle between different wavelengths (nm) of light to examine evidence.
      1.3.1.4 Use the fine tune knob to adjust the nm within your desired range.
      1.3.1.5 Place the items of evidence to be examined under the light and proceed with examination.
      1.3.1.6 Cycle through various nm of light if needed during examination by using the controls on the hand piece or the front of the unit. Light intensity can be adjusted by turning the intensity knob on the front of the unit.
      1.3.1.7 Adjust the position of the hand piece as needed to achieve optimum results.

   1.3.2 Power Down Procedures
      1.3.2.1 When finished, toggle the lamp switch to the “off” position.
      1.3.2.2 Allow the fan to run for approximately 15 minutes to allow the unit to cool.
      1.3.2.3 After the unit has cooled, toggle the on/off switch in the back of the unit to “off”.

1.4 References
CrimeScope CS-16-500 Operating Manual

Defense Forensic Science Center, CILA LP 50.4 CrimeScope CS-16-400, 09 June 2014.
Latent Print Section

Cyanoacrylate Ester (Superglue) Fuming Procedure

Forensic Analysis Division
1. Cyanoacrylate Ester (Superglue) Fuming Procedure

1.1 Scope
1.1.1 This document details the procedures for fuming forensic evidence with cyanoacrylate ester by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Cyanoacrylate Fuming Chamber (Misonix CA-6000 or Misonix CA-9000, depending on size and amount of evidence)
1.2.2 Cyanoacrylate Ester
1.2.3 Aluminum Trays
1.2.4 Oil Standard Pad
1.2.5 Clear Plastic Film (Test Strip)

1.3 Safety Information
1.3.1 Cyanoacrylate fumes have been shown to be hazardous to the eyes, nose, and throat. Methyl and ethyl cyanoacrylates are lachrymators and can dry out the mucus membranes.
1.3.2 Heating of cyanoacrylates above 140°C can lead to the production of hydrogen cyanide gas. Ensure all fumes have been evacuated from the chamber before opening. Avoid inhaling any residual vapors.
1.3.3 The hot plate is very hot so caution should be used while operating the fuming chamber.
1.3.4 Cyanoacrylate ester is highly adhesive and bonds skin in seconds. Caution should be used while handling cyanoacrylate.

1.4 QA/QC
1.4.1 A Quality Control Check must be performed alongside the procedure and whenever a new reagent container is opened.
1.4.2 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light after processing.
1.4.3 To perform a Quality Control Check, follow the directions below:
   1.4.3.1 Apply finger to a Sebaceous Oil Standard Pad and place a test print on a piece of plastic film. (Matrix = Sebaceous Oil Standard; Substrate = Plastic Film).
   1.4.3.2 Place plastic film into the appropriate chamber for fuming.

1.5 Procedure
1.5.1 Latent print development with cyanoacrylate ester (CA) is commonly accomplished by heating the cyanoacrylate ester to a degree that it vaporizes within a fuming chamber, exposing items of forensic evidence to the fumes.

1.5.2 Place the evidence in an appropriate sized chamber.

1.5.3 Place plastic test strip inside the chamber.

1.5.4 Process items of evidence according to the procedures associated with the appropriate fuming chamber below.

1.5.5 If latent prints develop prior to completion of the chamber cycle, indicated by the development of the control print or the examiner/technician notices an item of evidence becoming over fumed, press the “Purge” button on the front panel to stop the fuming process and to purge the fumes from the chamber. Otherwise, the chamber will automatically turn off the hot plate and the purge cycle will start after the preset amount of time has lapsed.

1.5.6 When the chamber is safe to open, remove the items of evidence.

1.6 Processing Non-Porous Evidence and Semi-Porous Evidence using the Misonix CA-6000 Fuming Chamber

1.6.1 Procedure

1.6.1.1 Turn on the chamber using the main power switch located on the front panel.

1.6.1.2 Press the unlock button to unlock the main door.

1.6.1.3 Insert forensic evidence inside the chamber or hang evidence on the support bars inside.

1.6.1.4 Place plastic test strip inside in a position that development can be monitored from the main glass.

1.6.1.5 Close the door and turn the handle to seal the chamber.

1.6.1.6 Place a quarter size amount (approximately 1 to 1.5 grams) of cyanoacrylate ester in the aluminum tray. If a new container of cyanoacrylate ester is required, place the appropriate safety label on the new container. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name or initials
- Batch Number

1.6.1.7 Open the lower hot plate door and place the aluminum tray in the center of the hotplate and secure the door.

1.6.1.8 Press the start cycle button.
1.6.1.9 Once the humidity level reaches the set point, the hot plate will automatically activate to begin vaporizing the liquid cyanoacrylate ester.

1.6.1.10 The examiner/technician must do periodic checks of the test strips and evidence to ensure over development does not occur. If the examiner/technician observes an excessive buildup of white polymerization on the background of the test strip or any piece of evidence, the cycle shall be stopped by pressing the “purge” button on the front control panel. If it is not necessary to stop the cycle, the fuming chamber will automatically turn off the hot plate and begin the purge cycle after a pre-set time.

1.6.1.11 Once the purge cycle is complete, press the “Clear” button on the main display panel and the “Unlock” button to disengage the door lock to remove the items of evidence for further evaluation.

1.7 Processing Non-Porous Evidence using the Misonix CA-9000 Fuming Chamber

1.7.1 Procedure

1.7.1.1 Turn on the chamber using the main power switch located on the front panel.
1.7.1.2 Open the main door by lifting the handle straight out, then turning.
1.7.1.3 Insert forensic evidence inside the chamber or hang evidence on the support bars inside.
1.7.1.4 Place plastic test strip inside in a position that development can be monitored from the main glass.
1.7.1.5 Once complete, close the door and turn the handle to seal the chamber.
1.7.1.6 Place an amount of cyanoacrylate ester to cover the entire bottom of the aluminum tray (approximately 3-4 grams). If a new container of cyanoacrylate ester is required, place the appropriate safety label on the new container. Proper labeling should include:

- Date of opening
- Initials of examiner/technician opening the new container
- Batch Number

1.7.1.7 Open the hot plate door and place the aluminum tray in the center of the hot plate and secure the door.
1.7.1.8 Press the start cycle button.
1.7.1.9 Once the humidity level reaches the set point, the hot plate will automatically activate to begin vaporizing the liquid cyanoacrylate ester.

1.7.1.10 The examiner/technician must do periodic checks of the test strips and evidence to ensure over development does not occur. If the examiner/technician observes an excessive buildup of white polymerization on
the background of the test strip or any piece of evidence, the cycle shall be stopped by pressing the “purge” button on the front control panel. If it is not necessary to stop the cycle, the fuming chamber will automatically turn off the hot plate and begin the purge cycle after a pre-set time.

1.7.1.11 Once the purge cycle is complete, press the “Clear” button on the main display panel and the “Unlock” button to disengage the door lock to remove the items of evidence for further evaluation.

1.8 Results/Records

1.8.1 Test results shall be recorded in the Latent Print Section Reagent Log and also the examiner’s/technicians case notes.

1.8.2 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.9 References


Misonix Cyanoacrylate Fuming Chamber, CA-6000 and CA-9000 Operation Manual

Latent Print Section

1,8-Diazafluoren-9-one (DFO)

Forensic Analysis Division
1. Processing evidence using 1,8-Diazafluoren-9-one (DFO)

1.1 Scope
1.1.1 This document details the procedure for the mixing and use of DFO on porous and semi-porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 DFO (0.25 grams)
1.2.2 Methanol (40 mL)
1.2.3 Glacial Acetic Acid (20 mL)
1.2.4 3M Novec HFE-7100 (940 mL)
1.2.5 Equipment: balances, magnetic stirrer and stirring bar, dark storage bottles, funnel, cotton
1.2.6 Safety Equipment: fume hood, gloves, orange filtered goggles

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using DFO.
1.3.2 Fume hood use is required when preparing and applying DFO.
1.3.3 See applicable Safety Data Sheet (SDS).

1.4 QA/QC
1.4.1 A Quality Control check must be performed before use each day and/or when the reagent is made.
1.4.2 To test the solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper (Matrix = amino acid; Substrate = thermal paper). Apply DFO as described below
1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under LASER/ALS light.

1.5 Procedure
1.5.1 The application of DFO may be applied by dipping or spraying.
1.5.2 Items that have been processed with DFO may be placed in an oven set at 100°C for twenty minutes to accelerate the development of latent prints. If an oven is not available, a dry household iron can be used. A dry heat press can also be used.
1.5.3 Developed latent prints will fluoresce under a green LASER/ALS and are viewed with orange goggles.

1.6 Preparation of DFO
1.6.1 Stock Solution
1.6.1.1 Combine 0.25g of DFO, 40 mL of Methanol, and 20 mL of Glacial Acetic Acid (in order listed) into a dark storage bottle and place on a magnetic stirrer for approximately twenty (20) minutes until the DFO crystals have dissolved.
1.6.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.6.2 Working Solution
1.6.2.1 Add 940 mL of 3M Novec HFE- 7100 to the stock solution and continue stirring. If the DFO does not completely dissolve, place cotton in the neck of a funnel and strain out the undissolved DFO particles.

1.7 Records/Results
1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage
1.8.1 Store solution in a dark bottle in a refrigerator to enhance shelf life. However, refrigeration of DFO is not required.

1.9 References


Defense Forensic Science Center, CILA LP 51.2 1,8-Diazafloren-9-one (DFO), 13 Jan 2014


Latent Print Section
Fingerprint Powder Processing
Forensic Analysis Division
1. Processing non-porous and semi-porous evidence using fingerprint powders

1.1 Scope
1.1.1 This document details the procedure for the use of latent print powders on non-porous and semi-porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Powders: Regular/Nonmagnetic powders, Magnetic powders, Fluorescent powders, and Dual Contrast powders
1.2.2 Applicators: Magnetic applicators, Camel hair brushes, Fiberglass brushes, and Feather brushes

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while using fingerprint powders.
1.3.2 Fume hood use is required when applying fingerprint powders.
1.3.3 See applicable SDS.

1.4 QA/QC
1.4.1 Not required for fingerprint powder processing.

1.5 Procedure
1.5.1 Processing evidence using regular, non-magnetic powders.
1.5.1.1 The color of the fingerprint powder should contrast with the substrate.
1.5.1.2 Pour needed amount of powder into a small pile.
1.5.1.3 Dip brush bristle tips into powder and tap off excess powder.
1.5.1.4 Apply a small amount of powder onto the surface and begin to lightly brush.
1.5.1.5 Brush in the direction of any ridges that appear. Build powder onto ridges until enough clarity in the latent print is achieved.
1.5.1.6 Excess powder can be lightly brushed away using a camel hair brush, taking care to brush with the flow of the ridges.
1.5.1.7 When fluorescent powders are used, ridge detail should be viewed using an ALS and/or a LASER.
1.5.1.8 Any impressions developed must be captured digitally. Latent prints may be lifted if desired, as long as the latent has been captured digitally.

1.5.2 Processing evidence using magnetic powders.
1.5.2.1 The color of the fingerprint powder should contrast with the substrate.
1.5.2.2 Place magnetic wand into the magnetic powder with the magnet engaged. This will produce a bristle like effect as the metal is attracted to the magnet.
1.5.2.3 Apply magnetic bristle in a circular motion, ensuring powder touches the surface and the tip of the wand does not.
1.5.2.4 Upon completion of development, release excess powder back into the
container by disengaging the magnet.
1.5.2.5 Engage magnet on clean wand and pass over developed print to remove/collect
excess magnetic powder.
1.5.2.6 When fluorescent powders are used, ridge detail should be viewed using an ALS
and/or a LASER.
1.5.2.7 Any impressions developed must be captured digitally. Latent prints may be
lifted if desired, as long as the latent has been captured digitally.

1.6 Records/Results
1.6.1 Processes used are documented in the case examiner’s/technician’s case notes via the
Laboratory Information Management System (LIMS).

1.7 References

Defense Forensic Science Center, CILA LP 52.4, Fingerprint Powder Processing, 21
January 2014


Latent Print Section
Gentian Violet
Forensic Analysis Division
1. Processing evidence using Gentian Violet

1.1 Scope
1.1.1 This document details the procedure for the mixing and use of Gentian Violet (also known as Crystal Violet or CV) on adhesive surfaces by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Gentian Violet (1.0 gram)
1.2.2 Distilled Water (1.0 liter)
1.2.3 Equipment: Balances, beakers, graduated cylinders, magnetic stirrer and stirring bar, funnel, and storage bottles.
1.2.4 Safety Equipment: fume hood, gloves

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using Gentian Violet.
1.3.2 Fume hood use is required when preparing and applying Gentian Violet.
1.3.3 See applicable SDS.

1.4 QA/QC
1.4.1 A Quality Control Check must be performed before any evidence processing may begin and before any stock solution is placed into service.
1.4.2 To test the prepared solution, apply finger to a Sebaceous Oil Standard Pad and place a test print on the adhesive side of a piece of tape. (Matrix = Sebaceous Oil Standard and Epithelial Cells; Substrate = Adhesive side of Tape). Apply Gentian Violet as described below.
1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light after processing.

1.5 Procedure
1.5.1 The reagent can be applied by dipping, painting with a brush, or squirting.
1.5.2 Cover the entire adhesive side with the reagent and allow to remain for approximately one to two minutes.
1.5.3 Rinse the reagent off of the adhesive side with cold tap water.
1.5.4 Items that have been processed with Gentian Violet are viewed under white light.

1.6 Preparation of Gentian Violet
1.6.1 Working Solution
1.6.1.1 Using a magnetic stirrer, slowly add 1 gram of the Gentian Violet crystals to 1 liter of distilled water and stir until the Gentian Violet is dissolved.
1.6.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:
- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Records/Results
   1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
   1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage
   1.8.1 Store solution in a plastic bottle/sprayer.

1.9 Shelf Life
   1.9.1 Indefinite

1.10 References

   Defense Forensic Science Center, CILA LP 57.1, Gentian Violet, 07 February 2014

Latent Print Section
Gun Bluing Solution Procedure
Forensic Analysis Division
1. Processing using Gun Bluing Solution

1.1 Scope
1.1.1 This procedure details the processing of brass and aluminum cartridges and casings using Gun Bluing solution by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Reagents: Gun Bluing Reagent (Brass Black or Aluminum Black), Distilled Water
1.2.2 Equipment: Tray or Beaker, Plastic Tongs/Tweezers, Graduated Cylinder

1.3 Limitations
1.3.1 Gun Bluing will generally not be used on Cartridge Casings when a Firearms Section request has been made. In addition, this procedure is not to be used with steel cartridges and casings.

1.4 Safety
1.4.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using Gun Bluing Solution.
1.4.2 See applicable Safety Data Sheet (SDS).

1.5 QA/QC
1.5.1 A Quality Control Check must be performed before any evidence processing may begin.
1.5.2 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is the visibility of friction ridge detail after placing a test cartridge case into the Gun Bluing Solution.
1.5.3 To perform a Quality Control Check follow the directions below.
1.5.3.1 Apply finger to an Oil Standard Pad and place a test print on a similar substrate i.e. Brass/Aluminum. (Matrix = Oil Standard; Substrate = Cartridge case).
1.5.3.2 Prepare Gun Bluing Solution as appropriate for the particular type of cartridge case.
1.5.3.3 Place cartridge case in the Gun Bluing Solution for several seconds and remove with plastic tweezers or tongs. Inspect cartridge to ensure that the test impression is visible.
1.5.3.3.1 If friction ridge detail is not present re-submerging test cartridge may result in a positive result.
1.5.3.3.2 If a positive result is not acquired, the Gun Bluing solution must not be used.
1.5.4 Document the results of the Quality Control Check in Latent Print Section Reagent Log and also in the examiner’s/technicians case notes.

1.6 Procedure for Brass
1.6.1 Add 1 mL of Gun Bluing Reagent Brass Black to 40 mL of distilled water in a plastic or glass tray or beaker.
1.6.2 Immerse the brass evidence for several seconds and examine.
1.6.3 Discoloration of the surface will occur and the latent print residue will be revealed as shiny detail. The latent print residue does not allow the gun bluing reagent to readily come into contact with the metal.
1.6.4 Immerse the brass evidence for several seconds and examine.
1.6.5 Re-immers the items as needed for better contrast.
1.6.6 After achieving the desired development, rinse the item with plain tap water to halt the discoloration process.
1.6.7 The item may be coated with a clear thin lacquer to preserve the print.

1.7 Procedure for Aluminum
1.7.1 Add 0.5 mL of Gun Bluing Reagent Aluminum Black to 40 mL of distilled water.
1.7.2 Immerse the aluminum evidence for several seconds and examine.
1.7.3 Discoloration of the surface will occur with and latent print residue will be revealed as shiny detail. The latent print residue does not allow the gun bluing reagent to readily come into contact with the metal.
1.7.4 Immerse the aluminum evidence for several seconds and examine.
1.7.5 Re-immers the items as needed for better contrast.
1.7.6 After achieving the desired development, rinse the item with plain tap water to halt the discoloration process.
1.7.7 The item may be coated with a clear thin lacquer to preserve the latent print.

1.8 Results/Records
1.8.1 Test results shall be recorded in the Latent Print Section Reagent Log and also the examiner’s/technicians case notes.
1.8.2 Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.9 References

Defense Forensic Science Center, CILA FAD LP PRO 3251, 01 July 2010.

Latent Print Section
1,2-Indanedione (IND)
Forensic Analysis Division
1. Processing evidence using 1,2-Indanedione (IND)

1.1 Scope
   1.1.1 This document details the procedure for the mixing and using IND on porous and semi-porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
   1.2.1 IND (2.0 grams)
   1.2.2 Ethyl Acetate (70mL)
   1.2.3 3M Novec HFE-7100 (930 mL)
   1.2.4 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, and dark storage bottles
   1.2.5 Safety Equipment: fume hood, safety glasses, gloves, orange filtered goggles

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using IND.
   1.3.2 Fume hood use is required when preparing and applying IND.
   1.3.3 See applicable Safety Data Sheets (SDS).

1.4 QA/QC
   1.4.1 A Quality Control check must be performed before use each day and/or when the reagent is made.
   1.4.2 To test the solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper (Matrix = amino acid; Substrate = paper). Apply IND as described below.
   1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under LASER/ALS light.

1.5 Procedure
   1.5.1 IND may be applied by dipping or spraying.
   1.5.2 Items that have been processed with IND may be placed in a humidity chamber at approximately 80°C to 100°C and 60% to 80% humidity for 10 to 20 minutes to accelerate the development of latent prints.

      NOTE: Do not use heat on specialty papers (i.e. thermal) because it will darken the paper.

   1.5.3 Developed latent prints will fluoresce under a green LASER/ALS and are viewed with orange goggles.

1.6 Preparation of IND
   1.6.1 Working Solution
1.6.1.1 Add 2.0 g of IND to 70 mL of ethyl acetate and place on a stirring device for approximately 20 minutes until the IND is dissolved.

1.6.1.2 Add the dissolved mixture to 930 mL of 3M Novec HFE-7100 solvent.

1.6.1.3 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Records/Results

1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage

1.8.1 Store solution in a dark bottle in a refrigerator to enhance shelf life.

1.9 References


Defense Forensic Science Center, *CILA LP 51.3, 1,2 Indanedione*, 07 February 2014


Latent Print Section
Leucocrystal Violet (LCV)
Forensic Analysis Division
1. Processing evidence using Leucocrystal Violet (LCV)

1.1 Scope
1.1.1 This document details the procedure for the mixing and using of Leucocrystal Violet (LCV) on non-porous and porous forensic materials contaminated with blood by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Prepared Kit
   - Bottle A (Fix/Peroxide solution)
   - Bottle B (LCV Reagent)
   - Bottle C (Sodium Acetate)
1.2.2 Distilled water
1.2.3 Equipment: funnel, graduated cylinder
1.2.4 Safety Equipment: fume hood, safety glasses or goggles, gloves, orange filtered goggles

1.3 Limitations
1.3.1 LCV is a coloring reagent that is based on the blood-catalyzed reaction of hydrogen peroxide with LCV. When oxidized, LCV appears purple to a deep crystal violet. This oxidation occurs slowly under the influence of light and oxygen, therefore the contrast is not permanent. The background will stain purple over time.
1.3.2 Excess LCV can cause an overdevelopment or running of the blood impressions. Care must be exercised in determining the best method of application.
1.3.3 Serological samples should be taken prior to treating an item of evidence with LCV.

1.4 Safety
1.4.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using LCV.
1.4.2 Fume hood use is required when preparing and applying LCV.
1.4.3 See applicable Safety Data Sheet (SDS).

1.5 QA/QC
1.5.1 A Quality Control check must be performed before use each day and/or when the reagent is made.
1.5.2 To test the solution, apply synthetic blood to a finger and place a test print on a piece of paper or plastic, depending on the substrate being processed (Matrix = synthetic blood; Substrate = paper or plastic). Apply LCV as described below.
1.5.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result will yield purple staining under white light. The use of LASER or ALS may aid in visualization.

1.6 Procedure
1.6.1 LCV is best applied by spraying with the finest mist possible. The reagent can also be applied by pouring the reagent over the item or by submersion.
1.6.2 After application, development will occur within 30 seconds.
1.6.3 Excess solution may be blotted with tissues or paper towels. If necessary, excess solution can be rinsed away with water.
1.6.4 After the area is dry, the preceding steps can be repeated to improve contrast.
1.6.5 View dark-colored objects with blue-green light and orange goggles.

NOTE: Amido Black can be used after LCV.

1.7 Preparation of LCV using Prepared Kit
1.7.1 Add approximately 30 mL (1 oz.) of Bottle A reagent (Fix/Peroxide solution) to Bottle B (LCV Reagent)
1.7.2 Secure cap and shake Bottle B for two to three minutes.
1.7.3 Pour contents of Bottle B back into Bottle A.
1.7.4 Add approximately 30mL (1 oz.) of Bottle A reagent to Bottle C (Sodium Acetate), secure cap and shake for approximately two the three minutes.
1.7.5 Pour contents of Bottle C back into Bottle A, secure cap, and shake until thoroughly mixed.
1.7.6 Place the appropriate safety label and information on the reagent bottle. Proper labeling should include:
   - Name of Reagent
   - Date of Preparation
   - Date of Expiration (if applicable)
   - Preparer’s name and initials
   - Batch Number

1.8 Records/Results
1.8.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.8.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.9 Storage
1.9.1 Store solution(s) in a dark bottle in a refrigerator to enhance shelf life.

1.10 Shelf Life
1.10.1 Unmixed – Indefinite.
1.10.2 Mixed – three (3) months.

1.11 References

Defense Forensic Science Center, CILA LP 53.2, Leucocrystal Violet, 07 February 2014

North Carolina Department of Justice, Technical Procedure for Leuco Crystal Violet (LCV), Digital/Latent Evidence Section, 31 October 2013
Latent Print Section
Ninydrin (NIN)
Forensic Analysis Division
1. Processing evidence using Ninhydrin (NIN)

1.1 Scope
   1.1.1 This document details the procedure for the mixing and using NIN on porous and semi-porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
   1.2.1 Ninhydrin (5.0 grams)
   1.2.2 Ethanol (45.0 mL)
   1.2.3 3M Novec HFE-7100 (1.0 Liter)
   1.2.4 Glacial Acetic Acid (5.0 mL)
   1.2.5 Ethyl Acetate (2.0 mL)
   1.2.6 Acetone method
      1.2.6.1 Ninhydrin (6.0 grams)
      1.2.6.2 Acetone (1.0 Liter)
   1.2.7 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, funnel, and dark storage bottles
   1.2.8 Safety Equipment: fume hood, gloves, safety glasses

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using NIN.
   1.3.2 Fume hood use is required when preparing and applying NIN.
   1.3.3 See applicable Safety Data Sheet (SDS).

1.4 QA/QC
   1.4.1 A Quality Control Check must be performed before use each day and/or when the reagent is made.
   1.4.2 To test the solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper (Matrix = amino acid; Substrate = paper). Apply NIN as described below.
   1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light/LASER/ALS.

1.5 Procedure
   1.5.1 The application of NIN may be applied by dipping or spraying.
   1.5.2 Items that have been processed with NIN may be placed in a humidity chamber at approximately 70°C to 80°C and 60% to 80% humidity to accelerate the development of latent prints. Periodic checks on the items for visible prints are required. If a humidity chamber is not available, a common household steam iron can also be used. Heat should not be used on specialty papers (i.e. thermal) which will darken upon application of heat.
1.5.3 Developed latent prints will appear purple in color and are viewed under white light. Enhanced contrast can be obtained by viewing under a green ALS.

1.6 Preparation of Ninhydrin/HFE-7100
1.6.1 Working Solution
1.6.1.1 Using a magnetic stirrer, slowly add the NIN crystals to the ethanol, glacial acetic acid, and ethyl acetate and stir until the NIN is dissolved.
1.6.1.2 Add the dissolved mixture to 1.0 liter of 3M Novec HFE-7100 solvent.
1.6.1.3 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Preparation of Ninhydrin/Acetone
1.7.1 Working Solution
1.7.1.1 Using a magnetic stirrer, slowly add the NIN crystals to the acetone and stir for approximately 20 minutes, or until the NIN is dissolved.
1.7.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.8 Records/Results
1.8.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.8.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.9 Storage
1.9.1 Store solution in a dark bottle in a refrigerator to enhance shelf life. However, refrigeration of NIN is not required.

1.10 References


Defense Forensic Science Center, CILA LP 51.4, Ninhydrin, 13 January 2014

Latent Print Section
Rhodamine 6G
Forensic Analysis Division
1. Processing evidence using Rhodamine 6G (R6G)

1.1 Scope
   1.1.1 This document details the procedure for mixing and applying R6G on forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
   1.2.1 R6G (1.0 gram)
   1.2.2 Methanol (1 L)
   1.2.3 Distilled Water (1 L)
   1.2.4 Equipment: Balances, beakers, graduated cylinders, magnetic stirrer and stirring bar, funnel, storage bottles, LASER, ALS, and plastic applicator bottles or tray for submersion
   1.2.5 Safety Equipment: orange filter goggles, fume hood, gloves

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using R6G.
   1.3.2 Fume hood use is required when preparing and applying R6G.
   1.3.3 See applicable SDS.

1.4 QA/QC
   1.4.1 A Quality Control Check must be performed before any evidence processing may begin and before any stock solution is placed into service.
   1.4.2 To test the prepared solution, place a small amount of the prepared R6G in a container and expose it to the LASER. A positive and passing result will be if the R6G fluoresces.
   1.4.3 To test that the working solution is staining the cyanoacrylate ester residue, apply R6G to the test strip used as a quality control check during cyanoacrylate ester fuming. A positive and passing result will be if the latent print fluoresces.

1.5 Procedure
   1.5.1 R6G is a luminescent dye stain that is applied to items of evidence after cyanoacrylate ester fuming. R6G stains the cyanoacrylate ester residue.
   1.5.2 R6G may be applied by dipping, spraying, or swabbing with cotton.
1.5.3 R6G may be prepared with methanol or water. The preparation shall be determined based on the substrate of the forensic materials. Items coated with varnish should be treated with water-based R6G.

1.5.4 Excess R6G reagent can be rinsed from the items of evidence using either methanol or distilled water, depending on the mixed reagent applied.

1.5.5 Items that have been processed with R6G are viewed under LASER/ALS light.

1.5.6 Developed latent prints will fluoresce under LASER/ALS and are viewed with orange goggles.

1.6 Preparation of R6G/Methanol

1.6.1 Stock Solution

1.6.1.1 Using a magnetic stirrer, slowly add 1 gram of R6G crystals to 1 liter of methanol and stir until the R6G is dissolved.

1.6.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.6.2 Working Solution

1.6.2.1 Dilute a portion of the stock solution with additional methanol to preference.

1.7 Preparation of R6G/Water Based

1.7.1 Stock Solution

1.7.1.1 Using a magnetic stirrer, slowly add 1 gram of R6G crystals to 1 liter of distilled water and stir until the R6G is dissolved.

1.7.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7.2 Working Solution
1.7.2.1 Dilute a portion of the stock solution with additional distilled water to preference.

1.8 Records/Results
1.8.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.8.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.9 Storage
1.9.1 Store solution in a plastic bottle/sprayer.

1.10 Shelf Life
1.10.1 Indefinite

1.11 References


Defense Forensic Science Center, CILA LP 52.2, Rhodamine 6G, 11 December 2013


Latent Print Section
Small Particle Reagent (SPR)
Forensic Analysis Division
1. Processing Evidence using Small Particle Reagent (SPR)

1.1 Scope
   1.1.1 This document details the procedure for the use of SPR on wet non-porous surfaces by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment/Material
   1.2.1 SPR Pre-Mixed Kit.
   1.2.2 Tap Water, Clean trays.

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using SPR.
   1.3.2 See applicable SDS.

1.4 QA/QC
   1.4.1 A Quality Control Check must be performed each day the reagent is used and when a new container is opened.
   1.4.2 Apply finger to a Sebaceous Oil Standard Pad and place a test print on a piece of clear film. (Matrix = Sebaceous Oil Standard; Substrate = Clear Film). Apply SPR to the clear film containing the test print as described below.
   1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light after processing.
   1.4.4 Upon opening a new bottle, place the appropriate safety label and information on the bottle. Proper labeling should include:

   • Name of Reagent
   • Date of Preparation
   • Date of Expiration (if applicable)
   • Preparer’s name or initials
   • Batch Number

1.5 Procedure
   1.5.1 Application by Dipping (Preferred)
      1.5.1.1 Submerge the item of evidence in a tray of SPR with the side to be processed facing up for approximately 1 minute, continuously agitating the liquid.
      1.5.1.2 Rinse the item of evidence by drawing it across a tray of clear tap water, repeating as necessary.
      1.5.1.3 Allow to dry at room temperature.
   1.5.2 Application by Spraying
      1.5.2.1 Spray the SPR solution on the item to be processed starting from the top and working towards the bottom.
1.5.2.2 If signs of latent print development occur, continue to spray the area until maximum contrast is achieved.
1.5.2.3 Gently spray the item with clear tap water and allow to dry at room temperature.

1.6 Records/Results
1.6.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.6.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.7 Storage
1.7.1 Store commercial SPR in its original container.

1.8 Shelf Life
1.8.1 Indefinite.

1.9 References

Defense Forensic Science Center, *CILA LP 59.1, Small Particle Reagent (SPR)*, 13 January 2014


Latent Print Section
Sticky Side Powder/Wetwop
Forensic Analysis Division
1. Processing evidence using Sticky Side Powder/Wetwop

1.1 Scope
1.1.1 This document details the procedure for the mixing and use of Sticky Side Powder/Wetwop on adhesive surfaces by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Sticky Side Powder
   1.2.1.1 Kodak Photo Flo 200
   1.2.1.2 Distilled Water
   1.2.1.3 Fingerprint Powder (1 tsp)
   1.2.1.4 Equipment: Balances, beakers, camel hair brush, and clean dish
1.2.2 Wetwop
   1.2.2.1 Wetwop premixed kit
   1.2.2.2 Equipment: Camel hair brush and clean dish

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using Sticky Side Powder/Wetwop.
1.3.2 See applicable Safety Data Sheet (SDS).

1.4 QA/QC
1.4.1 A Quality Control Check must be performed when Wetwop is opened, when Sticky Side Powder is prepared, and each day that Wetwop is used.
1.4.2 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light after processing.
1.4.3 To perform a Quality Control Check, follow the directions below:
   1.4.3.1 Apply finger to a Sebaceous Oil Standard Pad and place a test print on the adhesive side of tape. (Matrix = Sebaceous Oil Standard and Epithelial Cells; Substrate = Adhesive side of Tape.)
1.4.3.2 Process adhesive side of the tape as detailed below.

1.5 Procedure
1.5.1 Apply Sticky Side Powder or Wetwop by using a camel hair brush and then painting the reagent on the items of evidence.
1.5.2 Choose the appropriate color Sticky Side Powder or Wetwop that will give the best contrast to the substrate you are processing and pour a small amount into a dish.
1.5.3 Using a small camel hair brush, apply the Sticky Side Powder to the adhesive surface until the entire surface is covered. Let sit for 10 to 20 seconds.
1.5.4 Rinse the reagent off of the adhesive side with cold tap water and let air dry.
1.5.5 Items that have been processed with Sticky Side Powder/Wetwop are viewed under white light.
1.6 Preparation of Sticky Side Powder

1.6.1 Working Solution
   1.6.1.1 Combine equal parts Kodak Photo Flo 200 with distilled water and shake well.
   1.6.1.2 Add approximately 1 tsp of fingerprint powder and mix.

   NOTE: Depending on the consistency, more or less fingerprint powder may be required to acquire the consistency of thin paste.

1.7 Preparation of Wetwop

1.7.1 Wetwop is a commercially prepared solution.
1.7.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:
   - Name of Reagent
   - Date of Preparation
   - Date of Expiration (if applicable)
   - Preparer’s name and initials
   - Batch Number

1.8 Records/Results

1.8.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).
1.8.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.9 Storage

1.9.1 Discard any unused Sticky Side Powder.
1.9.2 Store commercial Wetwop in its original container.

1.10 Shelf Life

1.10.1 Indefinite for Wetwop or until it dries out.

1.11 References


   Defense Forensic Science Center, CILA LP 57.2, Sticky Side Powder/Wetwop, 07 February 2014


Latent Print Section
Sudan Black
Forensic Analysis Division
1. Processing evidence using Sudan Black

1.1 Scope
1.1.1 This document details the procedure for the mixing and use of Sudan Black on grease contaminated evidence forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 Sudan Black (15.0 grams)
1.2.2 Ethanol (1.0 liter)
1.2.3 Distilled water (500 mL)
1.2.4 Equipment: Balances, beaker, graduated cylinders, magnetic stirrer and stirring bar, and storage bottles.
1.2.5 Safety Equipment: Fume Hood, Gloves.

1.3 Limitations
1.3.1 This process has been found to enhance superglue developed latent prints and **should be used as one of the last processes in sequence**. It may be used on heavily contaminated surfaces on which small particle reagent (SPR) and powders would be less effective. Sudan Black may be used on smooth non-porous items as well as items coated in wax.

1.4 Safety
1.4.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using Sudan Black.
1.4.2 Fume hood use is required when preparing and applying Sudan Black.
1.4.3 See applicable SDS.

1.5 QA/QC
1.5.1 A Quality Control Check must be performed before any evidence processing may begin.
1.5.2 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light after processing.
1.5.3 To perform a Quality Control Check, follow the directions below:
1.5.4 Apply finger to a Sebaceous Oil Standard Pad and place a test print on a piece of plastic film. (Matrix = Sebaceous Oil Standard; Substrate = Plastic Film).
1.5.5 Process plastic film with test print as detailed below.

1.6 Procedure
1.6.1 Shake the container of Sudan Black solution and pour an adequate amount into a clean, dry dish to treat item. Larger items can be treated by placing a large tray underneath the item and then by pouring the solution over the item or by spraying.
1.6.2 Remove any metallic looking film which appears on the surface of the working solution before use with blotting or tissue paper. Immerse the item to be processed in the solution for approximately 2 minutes.

1.6.3 Rinse item under slow running cold tap water until excess dye has been rinsed off the background. Rinse larger items by spraying water from a spray bottle.

1.6.4 Air dry article at room temperature.

1.6.5 Observe any developed latent prints with white light.

1.7 Preparation of Sudan Black

1.7.1 Working Solution

1.7.1.1 Add the 15.0 grams of Sudan Black to a clean 2 liter glass beaker.

1.7.1.2 Place on a stirring device and add 1 liter of ethanol while stirring.

1.7.1.3 Continue stirring and add 500mL of distilled water to the Sudan Black/Ethanol mixture.

NOTE: Not all the Sudan Black will dissolve as some will remain in suspension.

1.7.1.4 Transfer the Sudan Black working solution to a clean dry bottle for storage.

1.7.1.5 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name or initials
- Batch Number

1.8 Records/Results

1.8.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.8.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.9 Storage

1.9.1 Store solution in a glass bottle.

1.10 Shelf Life

1.10.1 Indefinite

1.11 References

Defense Forensic Science Center, CILA LP 55.1 Sudan Black, 03 March 2013


Latent Print Section

ThermaNin

Forensic Analysis Division
1. Processing evidence using ThermaNin

1.1 Scope
1.1.1 This document details the procedure for the mixing and use of ThermaNin on thermal paper by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
1.2.1 ThermaNin crystals (0.4 grams)
1.2.2 Isopropyl alcohol (0.5mL)
1.2.3 Heptane (100 mL)
1.2.4 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, dark plastic containers of varying size and dark storage bottles.
1.2.5 Safety Equipment: fume hood, gloves

1.3 Safety
1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using ThermaNin.
1.3.2 Fume hood use is required when preparing and applying ThermaNin.
1.3.3 See applicable Safety Data Sheets (SDS).

1.4 QA/QC
1.4.1 A Quality Control Check must be performed before processing evidence for the day and/or after mixing.
1.4.2 To test the prepared solution, apply finger to an Amino Acid Standard Pad and place a test print on a piece of thermal paper (Matrix = amino acid; Substrate = thermal paper). Apply ThermaNin as described below.
1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light.

1.5 Procedure
1.5.1 The application of ThermaNin may be applied by dipping or spraying.
1.5.2 After sufficient time for the reagent to dry, visualize any developed latent impressions under white light.

1.6 Preparation of ThermaNin
1.6.1 Working Solution
1.6.1.1 Dissolve 0.4 g of ThermaNin in 0.5mL of isopropyl alcohol in a plastic beaker.
1.6.1.2 Add the dissolved mixture to 100mL of heptane in a dark storage bottle.
1.6.1.3 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Records/Results

1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage

1.8.1 Store solution in a dark bottle in a refrigerator to enhance shelf life.

1.9 Shelf Life

1.9.1 Approximately two (2) weeks.

1.10 References


Defense Forensic Science Center, CILA LP 56.3, ThermaNin, 03 March 2014


Latent Print Section

TracER LASER Operation Procedures

Forensic Analysis Division
1. TracER LASER Operation Procedures

1.1 Scope

1.1.1 This procedure details the steps for the operation of the TracER LASER 532nm by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Safety

1.2.1 Before operating the LASER, ensure that precautions are taken by wearing the appropriate personal protection equipment.

1.2.2 Ensure that LASER rated filtered eyewear is worn at all times during operation.

1.2.3 Do not operate the LASER unless the photo room door is closed. Ensure the door to the photo room is closed to the general laboratory area.

1.2.4 Do not aim the laser directly at yourself or look directly into the beam. *Care must be exercised when viewing reflective materials for latent impressions to prevent the laser light being directly reflected back into the user’s eyes.

1.2.5 Long term laser exposure directly to the skin and eyes can be harmful.

1.2.6 Avoid prolonged direct contact of the beam onto evidence since this may cause damage to certain types of evidence, i.e. plastic film.

1.3 Procedure

1.3.1 Turn the POWER switch located on the front panel of the power supply to the on position.

1.3.2 Ensure the hand piece LASER CONTROL is selected to F.P. for front panel control.

1.3.3 Turn the LASER on/off key to the “on” position (allow approximately 5 seconds for shutter to open). A clicking sound will indicate that the LASER is ready.

1.3.4 Using the hand piece trigger, press the trigger to emit the LASER light.

1.3.5 The front panel displays zero until there is actual LASER energy. Set the front panel display to the desired output power using the front panel POWER ADJUST knob.

1.3.6 To use the hand piece LASER control:

1.3.6.1 To use the hand piece LASER CONTROL make sure it is selected to H.P. for Hand Panel control.

1.3.6.2 On the hand piece, select the preset HI or LOW power option.

1.3.6.3 Ensure the hand piece is pointed at an intended target.

1.3.6.4 Using the hand piece trigger, press the trigger to emit the LASER light.

1.3.7 Standby Procedures

1.3.7.1 To shut down the LASER light so the work area is safe for entry of another, you can depress the trigger on the hand controller to shut down the light beam.

1.3.7.2 This is for a temporary shutdown of the LASER light.
1.3.7.3 For longer breaks in operations or end of use, the operator should also turn the LASER Key switch to the off position.

1.3.8 Powering Down Procedures

1.3.8.1 Depress the trigger so that no LASER light is emitting from the hand piece.
1.3.8.2 Turn the LASER key switch to the off position.
1.3.8.3 Press the power on/off button to turn off the equipment. No cool down is required.

1.4 References

TracER LASER Operating Manual

Defense Forensic Science Center, CILA LP 50.2 TracER LASER (Blue and Green), 09 June 2014.
Latent Print Section
Visual Examination Procedures
Forensic Analysis Division
1. Visual Examination Procedures

1.1. Scope
1.1.1. This procedure details the optical methods used by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2. Procedure
1.2.1. The following light sources are the optical methods that are available for use by the examiners/technicians of the Latent Print Section. It is the examiner’s/technician’s responsibility to select the appropriate light source that will render the best results in detecting latent impressions. A visual examination will be conducted before and after each processing technique. If friction ridge impressions are observed, the impressions will be captured digitally.
   1.2.1.1. Dolan Jenner Power Lite
   1.2.1.2. Coherent Tracer 532 nm Laser
   1.2.1.3. Spex Forensics Crimescope

1.3. Records/ Results
1.3.1. Processes used are documented in the case examiner’s/technician’s notes via the Laboratory Information Management System (LIMS).

1.4. References

Latent Print Section
Zinc Chloride
Forensic Analysis Division
1. Processing evidence using Zinc Chloride

1.1 Scope
   1.1.1 This document details the procedure for the mixing and use of zinc chloride on porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

1.2 Equipment, Materials, and Reagents
   1.2.1 Zinc chloride (7.5 grams)
   1.2.2 The same ninhydrin carrier that was used to apply the ninhydrin (HFE-7100 or acetone 500mL)
   1.2.3 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, funnel, and storage bottles
   1.2.4 Safety Equipment: fume hood, gloves, orange filtered goggles

1.3 Safety
   1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using zinc chloride.
   1.3.2 Fume hood use is required when preparing and applying zinc chloride.
   1.3.3 See applicable Safety Data Sheet (SDS).

1.4 QA/QC
   1.4.1 A Quality Control check must be performed before use each day and/or when the reagent is made.
   1.4.2 To test the solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper (Matrix = amino acid; Substrate = paper). Apply zinc chloride as described below.
   1.4.3 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under LASER/ALS.

1.5 Procedure
   1.5.1 The application of zinc chloride is applied by spraying, ensuring the bottle is continually shaken during application to prevent the separation of the zinc chloride with the carrier.
   1.5.2 Items that have been processed with zinc chloride may be placed in a humidity chamber at approximately 70° to 80°C and 60% to 80% humidity for a short time to accelerate the development of latent prints. If a humidity chamber is not available, a common household steam iron can also be used.
   1.5.3 Developed latent prints will fluoresce under a green LASER/ALS and are viewed with orange goggles.

1.6 Preparation of Zinc Chloride
   1.6.1 Working Solution
1.6.1.1 Using a magnetic stirrer, slowly add the zinc chloride to the 500 mL of HFE-7100 or acetone and stir for approximately 20 minutes until the zinc chloride is dissolved.

1.6.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer’s name and initials
- Batch Number

1.7 Records/Results

1.7.1 Processes used are documented in the case examiner’s/technician’s case notes via the Laboratory Information Management System (LIMS).

1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 References
