

Trace Evidence Recovery Guidelines

Scientific Working Group on Materials Analysis
(SWGMAAT)
Evidence Committee
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1.0. Scope

This guide describes procedures and techniques for the documentation, detection, collection, and preservation of trace evidence from crime scenes, individuals, and items submitted to the laboratory for examination.

2.0. Significance and Use

Locard's Exchange Principle states that whenever two objects come into contact, a transfer of material will occur (1). Trace evidence that is transferred can be used to associate objects, individuals, or locations.

2.1. The integrity and significance of trace material as associative evidence relies on proper detection, collection, and preservation.

2.2. An understanding of the transfer and persistence of trace evidence will assist the examiner in interpreting the significance of the analytical results.

3.0. Documentation

3.1. When a case is initiated, a file specific for that case must be created to contain the case documentation for the length of time required by the prevailing laws and nonconflicting agency policy.

3.2. Documentation of questioned and known trace evidence collection, whether done in a laboratory or at a scene, must include permanent notes about

- a. date (and time, when appropriate) of the collection,
- b. name of person or persons collecting the evidence,
- c. a descriptive listing of item or items collected,
- d. a unique identifier for each item collected such as an item number and case number, and
- e. location of each item (documented by notes, sketches, measurements, photographs, or a combination of these).

3.3. The chain of custody for each item must be initiated upon collection and maintained until final disposition.

3.4. Recommended procedures for documenting and labeling physical evidence are outlined in ASTM Standard E 1459-92, Standard Guide for Physical Evidence Labeling and Related Documentation (9.2), and Standard E 1492-92, Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory (3).

3.5. The principles of record initiation, maintenance, storage, and security are fundamentally the same for evidence collections within the laboratory and collections that may begin at a site remote from the laboratory.

4.0. Contamination and Loss

4.1. When collecting or examining items, care must be taken to prevent contamination and loss of trace materials.

4.2. If a case involves disciplines other than trace evidence, the involved examiners should confer before any work is undertaken. Unless circumstances dictate otherwise, the trace evidence should be collected and preserved prior to other examinations.

4.3. General principles and practices to avoid evidence contamination and loss, applicable to both laboratory and nonlaboratory settings, include the following:

4.3.1. Contact between items and personnel before the appropriate trace evidence has been secured should be restricted.

4.3.2. Appropriate protective apparel, such as laboratory coats and disposable gloves, must be worn to prevent contamination from the clothing of the examiner. The apparel must be changed as necessary to avoid contamination or transfer between evidentiary items, locations, and personnel.

4.3.3. Items being collected for trace evidence examination must be handled as little as possible to minimize loss of the trace evidence and to limit exposure of the items to contaminants.

4.3.4. Collect, package, and seal items individually in appropriate packaging. Keep items in a secure, sealed package until the item is processed in a controlled environment.

4.3.5. Equipment and work surfaces used during collection and examination must be cleaned in an appropriate manner before processing begins and as often as necessary during processing to prevent contamination.

4.3.6. Adhesive lift materials (used for collection, storage, or both) must be maintained in a manner to avoid contamination. Caution should be used to prevent tape edges from contacting any uncleaned surfaces.

4.3.7. Evidence examination areas should have adequate lighting, easily cleaned surfaces, and a physical environment designed to restrict excessive air currents, static electricity, and general foot traffic.

4.3.8. The examination of questioned and known items for trace evidence must be conducted separately in different locations, at different times, or both, to prevent contamination. It is recommended that questioned items with the most probative value be examined first.

4.3.9. Any contact, condition, or situation that could cause contamination or otherwise compromise the trace evidence examination must be documented and communicated between the laboratory analyst or analysts and the submitter.

5.0. Detection, Collection, and Preservation Techniques

5.1. When selecting detection, collection, and preservation methods and the processing sequence, consider the circumstances of the case, ambient conditions, the discriminatory power of the different techniques, and the need to preserve or collect other types of evidence.

5.2. Record the techniques used for detection, collection, and preservation of the evidentiary items and the location from which they are removed.

5.3. Methods used for detecting trace evidence include but are not limited to general visual searches; visual searches assisted by different types of illumination, such as oblique lighting and alternate light sources (UV, laser, high intensity); and visual searches assisted by magnification.

5.4. Trace evidence recovery or collection techniques used should be the most direct and least intrusive technique or techniques practical. Collection techniques include picking, lifting, scraping, vacuum sweeping, combing, and clipping.

5.4.1. *Picking.* Trace evidence may be separated from an item by using clean forceps or other implements. The collected samples should be immediately protected against loss or contamination.

5.4.2. *Lifting.* An adhesive-bearing substrate such as tape is repeatedly and firmly patted or rolled over the item causing loosely adhering trace evidence to stick to the tape. Do not overload the tape. The collected lifts are typically placed on a transparent backing (e.g., clear plastic sheeting, glass slides, and clear plastic or glass petri dishes). This protects against contamination and permits samples to be easily viewed and removed for further comparison.

5.4.3. *Scraping.* A clean spatula or similar tool is used to dislodge trace evidence from an item onto a collection surface such as clean paper. The collected debris is immediately packaged in a manner to avoid sample loss. This technique is most often conducted within the laboratory in a controlled environment that reduces the risk of contamination or loss of the trace evidence.

5.4.4. *Vacuum Sweeping.* A vacuum cleaner equipped with a filter trap is used to recover trace evidence from an item or area. The filter and its contents should be immediately packaged to avoid sample loss. The appropriate vacuum parts, filter, and trap must be changed and rigorously cleaned between each vacuuming to avoid contamination. Consider using this method subsequent to other collection techniques as it is indiscriminate and may result in the collection of a large amount of extraneous material.

5.4.5. *Combing.* A clean comb or brush is used to recover trace evidence from the hair of an individual. The combing device and collected debris from the hair should be packaged together.

5.4.6. *Clipping.* Trace evidence can be recovered from fingernails by nail clipping, scraping, or both. Fingernails may be clipped with clean scissors or clippers and packaged in clean paper. Fingernails may be scraped with a clean implement to collect debris from under the fingernails. Package the collected debris and the scraping device as one unit, typically in clean paper. Commonly, fingernails from the right and left hands are packaged separately. This does not preclude the collection of each or any nail separately from all others, such as a nail with obvious damage.

5.5. Appropriate preservation and packaging of trace evidence and items to be examined for trace evidence will vary. Appropriate packaging must prevent loss or contamination of the trace evidence.

5.5.1. All evidence packages must be properly sealed in a manner to prevent tampering and eliminate loss or contamination of the trace evidence through open edges.

5.5.2. Small or loose trace evidence must be secured in clean, unused primary containers such as paper packets or petri dishes. The primary container should then be appropriately secured in an envelope or paper bag.

5.5.3. Large items, such as whole garments, should preferably be sealed individually in clean, unused packaging.

5.5.4. Clothing and other items that are wet must be air dried as soon as possible, without exposure to heat or sunlight, in a secured area in a manner that will prevent loss or contamination of trace evidence. An arrangement to collect any trace evidence that may fall from the item during drying should be used.

5.5.5. Small or manageable items at a crime scene that bear visible, firmly attached trace evidence should be documented, packaged intact, and transported to the laboratory for examination.

5.5.6. Items at a crime scene that bear visible but easily lost trace evidence or items that are impractical to transport should be documented and the trace evidence collected by an appropriate technique.

6.0. Site and Special Collection Considerations

6.1. Personnel responsible for the detection and collection of trace evidence should be aware of the applicable laws governing search warrants, searches, and seizures within their jurisdiction.

6.2. Personnel should be aware that various types of evidence will be present during the processing of a crime scene or the examination of items submitted to the laboratory. Some types of evidence other than trace evidence may be more significant to a particular case and therefore should be given higher priority.

6.3. Representative known samples of an item, sufficient to represent all variations that may be present within that item, should be collected for comparison with the questioned trace evidence. The areas from which these samples are collected must be documented.

6.4. Patterned marks or impressions may be encountered and may require additional documentation and collection procedures such as 1:1 scale photography. Enhancement techniques such as oblique lighting or powder dusting and preservation techniques such as adhesive lifting or casting should be considered.

6.5. The possibility of physically matching a fractured, broken, torn, or cut portion of an object to its source should always be considered. The entire questioned item and possible source item should be collected, protecting the edges from further deformation. When the possibility of a physical match exists, one should not overlook the necessity of maintaining all items separately to prevent contamination.

7.0. Evidence Security

7.1. Trace evidence shall remain in secure, controlled-access areas, protected from loss, damage, or contamination. It must have a documented and continuous chain of custody from the time of evidence collection until the time the evidence is admitted into court or the case has been disposed and the evidence is no longer needed.

7.2. The security and integrity of evidence is the responsibility of all persons who may identify, collect, package, store, transport, or examine evidentiary items.

7.3. Procedures and techniques for the identification, storage, and retrieval of evidence in a forensic science laboratory are outlined in ASTM Standard Practice E 1492-92, Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory.

8.0. Training Requirements for Trace Evidence Collection Personnel

8.1. The responsibility of trace evidence collection may be assigned to personnel of varying occupations and levels of expertise such as crime scene technicians, law enforcement personnel, and medical personnel. These personnel must be trained in trace evidence detection, collection, and preservation techniques.

8.2. Training should include but not be limited to the record-keeping protocol of the agency; crime scene search techniques; rules of evidence handling; safety concerns of evidence handling and detection techniques; legal aspects of search warrants, seizures, and evidence recovery; chain-of-custody requirements; storage of physical evidence; the detection, collection, and preservation methods used for trace evidence; contamination prevention; and the significance of trace evidence analysis results.

9.0. Referenced Documents

1. Locard, E. The analysis of dust traces. Part I. *American Journal of Police Science* (1930) 1:276-298.
2. *ASTM E 1459-92: Standard Guide for Physical Evidence Labeling and Related Documentation*. American Society for Testing and Materials, West Conshohocken, Pennsylvania.
3. *ASTM E 1492-92: Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory*. American Society for Testing and Materials, West Conshohocken, Pennsylvania.

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