

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 1 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

## 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing

### 13.1 Introduction

Trace Evidence Collection and Documentation, also referred to as Trace Evidence Processing, encompasses the recognition, documentation, collection, and in some cases, screening of trace evidence such as fibers, paint, and glass. The integrity and significance of trace material as associative evidence relies on proper detection, collection, and preservation methods.

This procedure describes the methods for the documentation, detection, collection and preservation of trace evidence from items submitted to the laboratory for examination.

The level of processing to be performed will vary depending on the type of evidence to be examined, the case circumstances, the discipline-specific skill set of the analyst and the requested examination.

NOTE: This procedure is for evidence processing that is conducted within the laboratory.

### 13.2 Qualifications

Trace Evidence Processing may be performed by an analyst who has completed training in a Trace discipline such as fibers, paint, explosives or glass and has the appropriate training, skills and abilities for the processing task at hand. This may be determined by the Unit Supervisor or in consultation with the Technical Leader.

Trace Evidence Processing may also be performed by a Trace Evidence Analyst or Trace Evidence Trainee who has completed the training and been authorized in “**Trace Evidence Collection and Documentation**”.

### 13.3 Scope

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 2 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

While it is not possible to anticipate all types of evidence or examination requests that the analyst may encounter, the following summaries are provided as a guideline to assist the analyst in determining the scope of the Trace Evidence Processing.

The Trace Evidence Processing analyst may be responsible for:

- Recognition of questioned Trace evidence
- Documentation and collection of questioned Trace evidence
- Collection of appropriate known Trace evidence samples
- Screening/Evaluation (Example: determining whether a sample or known is collected or not collected based on similarities or differences in gross physical appearance) .

## 13.4 Preservation and Precautions

A number of precautions must be taken to ensure the integrity of Trace evidence. This is true regardless of the type of Trace evidence present (e.g. hairs, fibers, paint, etc.). The guidelines below will assist in preventing the contamination and loss of Trace evidence during examination.

If a case involves disciplines other than Trace evidence, it is recommended that consultation with personnel from that discipline occur before any work is undertaken. Unless circumstances dictate otherwise, the Trace evidence should be collected and preserved prior to other examinations.

*Trace evidence examinations on questioned and known items (and/or victim and suspect items) must be conducted separately in different locations, or at different times to prevent contamination.* The same requirement shall be placed on questioned and known items that need to be preserved for future Trace evidence examinations. The evidence type will dictate the amount of time needed to protect the evidence. For Trace evidence that has the possibility of going airborne, such as fibers, it is recommended that at least one week has passed between the processing of questioned and known items should the same location be used.

Appropriate protective apparel, such as laboratory coats and gloves, must be worn to prevent contamination from the clothing of the examiner. This apparel must be changed as necessary to avoid cross contamination between evidence items, locations, and individuals.

Appropriate protective apparel must be worn to prevent contamination such as the transfer of DNA.

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.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	<i>Document #: 7499</i>	<i>Page 3 of 11</i>
	<i>Revision #: 1</i>	<i>Issued Date: 04/13/2018</i>
	<i>Document Manager: Cheryl Lozen</i>	<i>Approved By: Jeffrey Nye</i>

Items of evidence should be kept in a secure, sealed package until the item is processed in a controlled environment (e.g. in the laboratory).

Equipment/tools 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 and cross contamination.

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.

Any supplies to be used for the collection or storage of Trace evidence must be maintained in a manner to avoid contamination.

Any contact, condition, or situation that could cause contamination or otherwise compromise the Trace evidence examination must be documented.

## **13.5 Trace Evidence Detection and Collection Technique Selection**

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.

Collection techniques should be carefully considered based on the condition of the evidence and the possibility of subsequent analysis by another discipline. The analyst should be aware that various types of evidence could be present during the processing 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. Consultation with the investigating agency and with other disciplines must always be a consideration.

During processing, if another possibly relevant evidence type is observed or suspected (e.g., latent print, footwear impression, blood) further case consultation must be considered.

The analyst may choose to collect all Trace evidence from a given item or area or to employ one or more methods for detecting and/or selecting Trace evidence of interest. These methods may include but are not limited to general visual searches, visual searches assisted by different types of illumination such as

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 4 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

oblique lighting and alternate light sources (UV, laser, high intensity) and visual searches assisted by magnification.

There are a variety of methods that may be used to observe and collect Trace evidence such as fibers, glass, and paint. The choice of collection method will depend upon the evidence type, the substrate and the need to document the exact location of the evidence, among other variables.

Some additional approved procedures and packaging directions pertaining to sample collection techniques such as tape lifting, particle picking, vacuuming, and collecting known samples can be found in the **Crime Scene Procedure Manual 14.2 Collection-Packaging of Trace Evidence** and in other **Trace Evidence Procedure Manuals such as the Trace Glass Procedure - 6.1.5.1 Collection and Documentation**.

**Additional or more detailed procedures may also be found below.**

## **13.6 Collection and Packaging of Trace Evidence**

General Description of Techniques:

### **13.6.1 Picking** - also see **Crime Scene Procedure Manual 14.2 Collection-Packaging of Trace Evidence**

Picking is the recommended technique when visible Trace evidence is to be collected. This is a method that allows the analyst to document the exact location a specific piece of Trace evidence was recovered from.

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.

When finished with the visual examination/screening and particle picking of the evidence item, it is recommended that an additional Trace evidence collection technique be employed to collect any remaining Trace evidence that is not visible to the unaided eye.

### **13.6.2 Lifting** - also see **Crime Scene Procedure Manual 14.2 Collection-Packaging of Trace Evidence**

In this technique, an adhesive-bearing substrate such as clear 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 clean 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.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 5 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

For situations where the adhesive of clear tape may be too strong, Post-it® type paper notes can be used to lift fibers and Trace evidence. The note can be folded to capture the fibers and other Trace evidence and placed in a paper packet or other appropriate container.

Consideration should be given to the need for, or investigative value of, taking multiple lifts of different areas of an object. These separate lifts may demonstrate position of objects or location of cross transfer, for example.

Lifting should not be performed on Trace evidence that could be damaged or altered by the chemical components of the adhesive (e.g. paint).

### 13.6.3 Scraping

A clean spatula or similar tool is used to dislodge Trace evidence, such as glass or paint particles from clothing items, onto a collection surface such as clean paper. This collection method is useful when collecting Trace evidence that is not visible or apparent to the unaided eye. This is a common form of paint and glass collection from clothing items in hit-and-run cases.

Scraping is not normally an appropriate collection technique for collecting fiber evidence and should only be utilized if necessary.

Because the scraping method collects Trace evidence from a larger area, determining the exact location of a specific piece of Trace evidence is usually not possible.

#### Equipment

A flat, thin non-porous object such as a metal spatula or metal ruler may be used to scrape an object for Trace evidence. The device used must be capable of being thoroughly cleaned between samples to avoid contamination and not introduce Trace evidence to the sample.

#### Collection Method:

1. Place or hold the evidence to be examined vertically over a double layer of large, clean piece of paper on a horizontal surface.
2. Use the scraping device to scrape and/or beat the object thoroughly, causing heavier Trace evidence particles to fall to the paper below.
3. Collect any gathered material on the top paper to the center and fold into a paper fold or otherwise package to avoid contamination, damage, or loss.

#### Cautions

This technique should be performed in a room away from drafts or air currents to avoid light Trace evidence from becoming airborne. Consider that such evidence may be lost when employing scraping as a collection technique under these conditions.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 6 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

Utilize multiple scraping devices or ensure that the scraping device is thoroughly cleaned between samples to prevent cross-contamination. Whenever possible, it is recommended that a different set of scraping tools be used for items collected from different individuals involved in a given case.

Ensure that the paper below the evidence is large enough to collect Trace evidence that may scatter during the scraping process.

Be aware that scraping can cause light Trace evidence such as fibers to become airborne, providing a possible mechanism for contamination of other evidence open in the room or examined at a future time. Thoroughly clean the examination area and do not process victim and suspect items in the same room when possible airborne evidence is a consideration.

### **13.6.4 Vacuum Sweeping - also see Crime Scene Procedure Manual 14.2 Collection-Packaging of Trace Evidence**

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 use.

### **13.6.5 Combing**

A clean comb or brush can be used to recover Trace evidence from the hair, wig or extension(s) of an individual. Comb the item over a clean piece of paper to collect any Trace evidence that is not trapped in the comb. The combing device and collected debris from the item should be packaged together.

## **13.7 Collection of Known/Comparison Samples - also see Crime Scene Procedure Manual 14.2 Collection-Packaging of Trace Evidence**

### **13.7.1 Fibers - Collection of Known/Comparison Samples**

Known fibers from a possible source are normally required when the laboratory is requested to perform a fiber comparison.

A potential fiber source may have one or more different types and colors of fibers present, and the differences may only be apparent using microscopic or instrumental techniques. Because of this, it is important to obtain a known sample that adequately represents all of the fiber types present in the potential source. This will be accomplished in two ways:

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 7 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

1. Differences in the color or texture of a fabric, carpet, or other source should alert the analyst that different fiber types might be present so a known sample must be collected from each area.
2. A fiber sample that is being excised from a potential source must be large enough to capture the variation of fiber types present.

The elapse of time does not cause changes in the fiber types, however, conditions such as sun-bleaching, exposure to decomposition, treatment with cleaning agents or continued wear may change the appearance of the fibers over longer periods of time.

**Small Items** - In some cases, potential sources of fiber transfer submitted to the laboratory will be small enough to be transported with ease for advanced examination. If the potential source of a fiber transfer can be packaged and transported with ease, then it should be submitted in its entirety (e.g. clothing items, blankets, throw rugs, etc.).

**Large Items** - If the potential fiber source is a large object or one not easily transported such as a vehicle, large piece of carpeting, a mattress or furniture, the following method may be used to collect a known fiber sample:

Cut a representative sample from various areas of the object. Be sure the cut is deep enough that the backing material or substrate is also collected.

1. If the object appears uniform, only one sample needs to be collected.
2. Collect samples that are visually different (e.g. different colored areas, faded areas due to sunlight, worn sections, etc.).
3. A sample size of approximately 1 X 1 inch is sufficient unless variations are visible, thus warranting a larger size cutting. If the source appears uniform, a smaller size cutting may be acceptable.
4. Package in an envelope, paper or plastic bag, or other container. Do not choose plastic packaging if probative biological evidence may be present (e.g. blood stains, semen stains, hairs, etc.).
5. Securely seal and label the package with a description of where the sample came from, along with any other labeling requirements stated in the Laboratory Operations Manual.

### Cautions

- Do not package known fiber samples in the same envelope as questioned fiber evidence. This could allow cross contamination to occur.
- If at all possible, do not pull or tape lift an object to collect known samples. Pulling or tweezing may damage/alter the fibers and lifts are not acceptable known fiber samples.
- Do not use plastic bags (including evidence bags) that have small holes in them. Such bags are manufactured to allow excess air to escape; however, they are not appropriate for Trace evidence collection.
- Securely seal all possible openings in packaging, including seams if necessary.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 8 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

### 13.7.2 Paint - Collection of Known/Comparison Samples

Known paint samples from a possible source are required when there is a request to perform a paint comparison. Paint comparisons are performed on a variety of paint types such as vehicle paints, architectural paints, spray paints, and cosmetic lacquers.

A potential paint source may have one or more paint layers, different paint types and/or different colors of paint present (e.g. vehicles). These differences may only be apparent using microscopic or instrumental techniques. Because of this, it is important to obtain known paint samples that adequately represent all of the paint layers and types present on a potential source. If multiple body panels of a vehicle exhibit damage, a known paint sample should be collected from each.

The elapse of time typically does not cause changes in a source's paint composition; however, conditions such as sun-bleaching or continued wear may change the appearance of the paint over longer periods of time. Also consider the possibility of additional paint or repair having been done in the time between the incident and obtaining known samples.

**Small Items** - If an item that is a potential source of paint transfer submitted to the laboratory is small enough to be transported with ease for advanced examination, then it should be kept in its entirety (e.g. tools, spray paint cans, etc.).

**Large Items** - If the potential paint source is a large object or one not easily transported, such as a vehicle part or a door from a residence, the following method may be used to collect a paint known sample:

1. Locate the/an area of damage, if applicable. If no damaged areas can be located, this must be noted. Collect from an area as close to the point of damage as possible. Consideration must be given to the possibility of tool marks, and these should not be disrupted.
2. Note: If broken edges are present, care should be taken to collect as much of the damaged edge material as possible. The potential for a fracture match may exist.
3. Use a clean razor blade, scalpel, forceps or knife to gently pry, carve, or chip the paint from the surface down to the foundation or substrate. If possible, do not remove the paint by scraping the surface as all paint layers may not be represented and/or the layer structure may be destroyed.
4. Collect about a nickel-sized combined amount of paint from a particular damaged area, when possible.
5. Place the known paint sample into a paperfold or small paper envelope, carefully sealing to prevent loss.
6. Securely seal and label the package(s) with a description of where the sample came from, along with any other labeling requirements stated in the Laboratory Operations Manual.
7. Continue to collect paint from each damaged area in the same manner, even if the object appears uniformly painted. Also collect samples that are visually different. Package and label each area separately.

### 13.7.3 Glass - Collection of Known/Comparison Samples

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 9 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

Known glass samples from a possible source are required when the laboratory is required to perform a glass comparison. Glass comparisons are performed on window glass, vehicle glass, object glass, and other glass types.

A critical factor in comparing questioned glass evidence to a potential glass source is whether the characteristics of the evidence sample fall within the range of variation present in the source. This means that the variation within the potential source must be assessed, and therefore, known glass samples from differing areas must be collected.

**Small Items** - If an item that is a potential source of glass transfer is small enough to be transported with ease for advanced examination, then it should be collected in its entirety (e.g. small window, bottle, vehicle headlamp, etc.).

**Large Items** - If the potential glass source is a large object or one not easily transported, such as a vehicle window, use the following method to collect a glass known sample:

1. For broken window or door glass, collect known fragments that are still adhering to the frame and as close as possible to the point of impact.
2. Collect several fragments of glass from different areas of the breakage of the same pane of glass. This is because of the potential variation that exists in the pane of glass. One suggestion is to collect fragments from the 12, 3, 6, and 9 o'clock positions around the edge of the break.
3. Collect several samples from each pane of dual-paned windows such as thermal (architectural) windows or vehicle windshields that consist of two panes of glass laminated together. Label clearly which sample is from the inside pane and which is from the outside pane.
4. A sample consisting of at least four full-thickness fragments from various positions around the edge of the break is usually adequate.
5. Package each known sample collected separately in a cardboard box, solid container, or other packaging that eliminates the possibility of the package and/or handlers getting cut and reduces the likelihood of further breakage. Do not use glass containers.
6. Securely seal and label the package with a description of where the sample came from, along with any other labeling requirements stated in the Laboratory Operations Manual.

### Safety

Broken glass edges are extremely sharp and should be handled with caution. Use personal protective equipment or tools to reduce the risk of being cut.

### Cautions

If a physical match is of investigative value, and/or is a possible examination, be sure to collect as much of the original glass as possible.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 10 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

## 13.8 Documentation

Documentation of questioned and known Trace evidence collection shall include notes about

- Date (and time, when appropriate) of the collection
- Name of person or persons collecting the evidence
- A descriptive listing of item or items collected
- A unique identifier for each item collected such as an item number or container number
- Location of each item (documented by notes, sketches, measurements, photographs, or a combination of these)

*Note: If the processing involves fibers (or other evidence that could go airborne), it must be documented how the evidence was protected by time and space from contamination or cross contamination during processing.*

### Documentation shall also include:

- Identification of the room or area in which the processing was conducted
- Notes of the evidence packaging and condition as received
- Description of the evidence and note any measurements made
- Equipment and tools utilized including cameras
- Notes of observations and processing performed

The method used for processing must be documented in the case notes (alternate light source, stereoscope, visual exam, examination with magnifier). In addition, the case notes may include a statement addressing the quantity and description of targeted Trace evidence located. This may be an actual count if the quantity is relatively small, or a statement estimating that a large quantity (e.g. dozens or hundreds) was located. The description(s) may be either specific or general depending on the case situation, but must be sufficiently detailed so another Trace analyst could understand what was targeted and found.

When visible evidence is collected, if possible, photograph the evidence in place and with a scale, before collection/removal.

Label evidence packaging with a description of contents, lab number, initials, and date.

If multiple tape lifts are collected from the same piece of evidence, the total number generated should be documented in the case notes.

	<b>TRACE-PM 13.0 Trace Evidence Collection and Documentation - Trace Evidence Processing</b>	
	Document #: 7499	Page 11 of 11
	Revision #: 1	Issued Date: 04/13/2018
	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

## 13.9 Written Report

If a Trace Evidence Processing report is issued, it should contain information as to the items examined, and any items created such as tape lifts, paper packets etc.

Care should be taken to avoid definitely describing Trace evidence collected during processing. An example of what to avoid would be describing a questioned sample as “glass” or as a “fiber”. Using terminology such as “possible glass” or “possible fibers” may be appropriate. Consult with a Trace Evidence Analyst for guidance as to terminology that will be appropriate depending on the evidence type involved.

## 13.10 References

Scientific Working Group on Materials Analysis (SWGMA) – Evidence Committee, Trace Evidence Recovery Guidelines, January 1998 Revision.

Discipline-Specific Trace Evidence Procedure Manuals

Saferstein, Richard, Criminalistics: An Introduction to Forensic Science, 8th ed., Prentice Hall, New Jersey, 2004, Chapter 8, “Hairs, Fibers, and Paint.”

Saferstein, Richard (ed.), Forensic Science Handbook Vol. II, Prentice Hall, New Jersey, 1988, Chapter 5, “The Forensic Aspects of Textile Fiber Examination.”

Fisher, B. A. J., Techniques of Crime Scene Investigation, 5th ed., CRC Press, 1993.

Saferstein, Richard (ed.), Forensic Science Handbook Volume 1, 2nd ed., Prentice Hall, New Jersey, 2002, Chapter 4, “Forensic Glass Comparisons.”

Saferstein, Richard, Criminalistics: An Introduction to Forensic Science, 8th ed., Prentice Hall, New Jersey, 2004, Chapter 4, “Physical Properties: Glass and Soil.”