Glass

Forensic glass examinations may provide useful information in any number of criminal cases including homicides, burglaries, hit-and-run, and assault cases.

Significance

The examination of glass may reveal:

Classification/Identification of the Material

- Type of glass – tempered, laminated, bottle.

Comparative Associations

- A possible association between a questioned sample (e.g. from an accident scene) and a known source (e.g. a suspect vehicle headlamp).

Physical Fit

- Broken pieces of glass were at one time a single piece of glass.

Damage Analysis

- The direction of force that broke the glass.
- The direction of travel of a projectile that perforated the glass.

Precautions

Broken glass can cut hands, bags, and other evidence. Be sure to take proper precautions when handling and packaging glass evidence. Wear leather gloves underneath the disposable gloves when handling sharp glass fragments. Alternatively, use clean forceps, or a clean hand shovel with a clean piece of cardboard as a dustpan to collect glass fragments. Clean forceps, hand shovels and improvised dust pans between samples.

Collection

Sources of Questioned Samples

Glass may be found on clothing, on the ground or floor next to broken windows, at traffic scenes, on shoes, floorboards of vehicles, victim's hair, or any number of other locations.

Sources of Known Samples

Known sources may include windows, doors, vehicle parts, lights, and glass objects (e.g. bottles).

When collecting glass as a known or comparison sample, collect pieces from different parts of the frame if possible. Many pieces are needed in order to document the variation of chemical features from that pane of glass. If multiple panes are present, collect separate samples from each broken pane. If the window/door is double paned, be sure to collect each of the broken panes separately and label which pane is "exterior" and which pane is "interior". Collect fragments from the frame using clean forceps. A general rule of thumb is to collect at least 10 pieces of tempered glass or enough flat glass to cover a 2 inches square. More glass is always better.

Physical Fit

- Collect all possible glass. If from a window, consider collecting the entire frame leaving existing glass in the frame.

Damage Assessment

For questions regarding direction of force or impact, submitting the entire pane of glass is recommended.

- Low Velocity Forces - If the direction of force which broke the pane of glass is to be determined, all of the glass must be retrieved. Low velocity forces include breakage by a person's hand, a baseball bat, a hammer, etc. Glass remaining in the window frame must be marked so the surfaces can be identified as "inside" or "outside," and may need to be taped to prevent loss or further breakage. The amount of glass on the ground or floor on each side of the frame should be noted and collected separately. Photographs of the window frame should be taken prior to collection of the complete frame.
- Bullet Holes - If projectile holes, such as bullet holes, are to be examined, the entire pane of glass should be submitted intact with "inside" or "outside" indicated. Care must be taken not to disturb any possible gunshot residue on the surface of the glass. The glass may have to be taped on the exit surface to hold it together. If the exit side cannot be determined, consult with the crime laboratory.

Packaging

- Glass found in different areas must be packaged separately.
- Use metal cans, hard plastic containers, cardboard boxes, or pasteboard boxes to prevent loss of glass particles. Glass may tear through both paper and plastic bags.
- Small pieces of glass should be placed in a paperfold, sealed, labeled, and packaged in a small rigid container (e.g., a pill box, metal vial). The container must also be sealed and properly labeled. Seals must have initials running from on the tape to off the tape onto the packaging.
- Large pieces of glass should be packaged in rigid containers. Use packing material such as cardboard or part of a corrugated carton to avoid breakage and to protect the edges. Hand delivery is the preferred way to submit large pieces of glass, as it avoids the task of extensive packaging and reduces the risk of breakage.
- Package so that if a container opens or tears during shipping, the glass is not lost and does not leak out and contaminate other glass evidence or pose a safety hazard.

Submission

Evidence for requests of direction of force or large items need to be hand delivered to the lab. **Do not mail**.

Write in the Special Instructions section of the Request For Laboratory Examination form (RFLE) what type of glass examination is desired (i.e. physical fit, direction of force, comparison, classification of type of glass, etc.).

Call the Crime Lab with any questions regarding collection or packaging.

Item/Material	Collection Methods (In Order of Preference)	Packaging	Additional Notes
Glass – Broken in Frame	1. Intact Object 2. Dismantled Object 3. Picking	Tape over glass to keep still in frame where possible. The frame will often also have additional types of trace materials. Place inside paper inside a rigid container (typically a cardboard box). If can't collect intact or dismantled, then collect fragments. Place large fragments wrapped in paper (for cushioning) inside a rigid container such as a cardboard box or a metal can. Collect smaller fragments in a metal tin or a paper packet inside a pasteboard box (taped shut). Place tin or box inside a paper or plastic bag.	If interested in direction of force (e.g. low velocity - baseball bat or high velocity - bullet) on a window or door of non-tempered flat glass, collect all the glass from the broken frame – preferable still in the frame and taped to prevent falling out. Mark "inside" and "outside" faces of the pane. The glass on the ground on the "inside" and "outside" should be collected separately. If any fibers or hairs are observed on the glass, these should be collected with a sticky note prior to collecting the glass.
Glass – Clothing	1. Intact Object	Place inside a paper bag (sealed).	
Glass – Loose Fragments	1. Picking 2. Lifting	Place large fragments wrapped in paper (for cushioning) inside a rigid container such as a cardboard box or a metal can. Collect smaller fragments in a metal tin or a paper packet inside a pasteboard box (taped shut). Place tin or box inside a paper or plastic bag. Very small fragments may be picked up with sticky notes. Fold sticky note over to protect fragments, place inside a labeled coin envelope (taped shut), sealed inside a larger paper envelope.	If the fragments are too small to collect by picking, then they might be too small for comparison. Such small glass fragments may still be suitable to identify the type of glass.

Item/Material	Collection Methods (In Order of Preference)	Packaging	Additional Notes
Glass – Soles of Shoes	1. Intact Object	Place shoes inside a sealed paper bag.	Do not package with other clothing items.