



VIRGINIA DEPARTMENT OF FORENSIC SCIENCE

EVIDENCE HANDLING & LABORATORY CAPABILITIES GUIDE

TRACE EVIDENCE: GLASS

Contact Information

If you have any questions concerning the Trace Evidence laboratory examination capabilities or evidence handling procedures, please call the Training Section or the Trace Evidence Section at the Forensic Laboratory that services your area.

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GLASS EXAMINATION OVERVIEW

Glass evidence is a very valuable tool to the criminal investigator because glass is present in nearly every building and in all automobiles and is frequently broken to gain entry. When a glass source is broken in the commission of a crime, glass particles may be transferred to the perpetrator and taken from the scene. While the comparison of questioned glass particles to a known broken glass source(s) is the most common request for forensic glass examination, other examinations involving glass evidence may be conducted. These include: identification of a material as glass, direction-of-impact determination, sequence of impact determination and the determination of point(s) of impact from either a projectile or a blow to the glass.

If large enough, the physical properties (e.g., color, thickness, tint) of a questioned glass are compared with the known glass. Refractive index may be determined on the known and questioned glass samples, and can be measured on particles that are not visible with the naked eye. When questioned glass particles are found to have properties consistent with the known glass source, an association is made and conclusions are drawn based upon the obtained results.

CAPABILITIES AND SERVICES

Identification of material as glass

Comparison of questioned glass particles to known glass samples

Fracture matches of glass

Direction of impact determinations

Sequence of impact determinations

Point of impact determinations

COLLECTION GUIDELINES

ITEM - Known Glass Samples

METHOD - Collect samples of ALL broken glass sources at the scene, including samples from all panes of a multi-paned window. Collect broken glass from the window frame whenever possible. Laminated glass, such as that used in automobile windshields, consists of two window panes separated by a thin layer of plastic. If the pane was penetrated, submit a sample of the laminated glass that has all layers of the laminate. Package each broken known glass source separately and package all knowns in a separate container(s) from any questioned items. Place broken glass sources in leak-proof containers such as plastic sample jars or plastic bags. Do not use paper or glass containers.

ITEM - Questioned Items

METHOD - All questioned items should be packaged separately from broken glass sources. Collect suspect's outer clothing and shoes as soon as possible after the offense. Package the shoes separately from the suspect's clothing. Have the suspect disrobe over a piece of new, clean butcher paper. Wrap the clothing in the same paper and place into paper bags. The shoes should be wrapped separately in paper and then placed into a paper bag. Package clothing and shoes with enough room to allow for the evidence to be removed from the container without excessive contact with the outer container. Indicate on the Request for Laboratory Examination form (RFLE) from which suspect the clothing and shoes were removed.

Hair combings may be obtained by using a new, clean comb and combing the hair over a piece of new, clean butcher paper. The paper then can become a paper evidence fold with the comb and any debris secured inside and submitted as a separate item.

Collect and submit any questioned items, such as tools or a baseball bat, by wrapping in paper and placing in a paper bag or securing in a cardboard box.

DISCUSSION - Having the suspect disrobe over paper will help to retain any glass particles that may fall from the clothing during this process. Do not use tape for recovering glass particles, for preserving glass particles or for binding items together that are to be searched for glass particles.

ITEM - Fracture Match Evidence

METHOD - If a glass fragment transfer has occurred which might be large enough for a physical fit, submit the questioned fragment(s) and any remaining broken glass from the suspected source. For hit-and-run scenes, submit all available pieces of headlight and other lamp glass.

DISCUSSION- Physical fitting provides the only conclusive association between glass samples.

ITEM - Point of Impact/Direction of Impact/ Sequence of Impact Determinations

METHOD - The broken glass source must be non-tempered. All of the larger pieces should be submitted, including those from the floor, the ground and those remaining in the frame. The remaining pieces of glass still in the frame must be marked by the investigator to indicate inside/outside orientation. Label the glass where it was removed from the frame (e.g., top, bottom). Tape may be used for securing large glass fragments together in a frame. Package in a manner that prevents the glass from further breakage. Securing the glass in a heavy cardboard "sandwich" or placing the glass in a box with packing material may accomplish this goal.

DISCUSSION – These types of analyses cannot be performed on tempered glass. When broken, a tempered glass pane will break into thousands of “dices” rather than cracking out from a point of impact.

Glass fracture examinations cannot be conducted from photographs. The broken pane must be reconstructed; therefore, it is important to recover as many larger sized glass fragments as possible.

SUBMISSION REMINDERS

DO NOT use tape or any other adhesives to collect glass.

Submit samples from all broken glass sources at the scene. Each broken glass source should be packaged separately.

Package known glass sources separately from questioned glass sources.

In scenes where glass was broken and clothing recovered from the suspect, submit the clothing even if glass particles are not readily visible on the clothing or the shoes. Glass particles often are only visible when using a microscope.

Submit the suspect’s outer clothing (e.g., jacket, shirt, pants, hats, gloves) in addition to the shoes. Glass located on suspect’s clothing is more significant than glass found embedded in or on shoes.

Package shoes separately from the suspect’s clothing.

Indicate on the RFLE from which suspect the clothing and/or shoes were removed.