

When is it useful?

The number of glass fragments found and the location of the fragments can be a very useful means of indicating when the contact with the source of glass occurred and the extent the contact in question.

When and how a window was broken can also be a critical consideration in the investigation of a range of incidents, and in particular, fires.

- Was the window broken before the fire?
- How did it break?
- Was the damage caused by heat or was it smashed to gain entry?
- Was it broken from the inside of the premises or the outside?
- Was it broken by an explosion?



These are a sample of the questions that can be answered following a careful excavation to find the evidence.

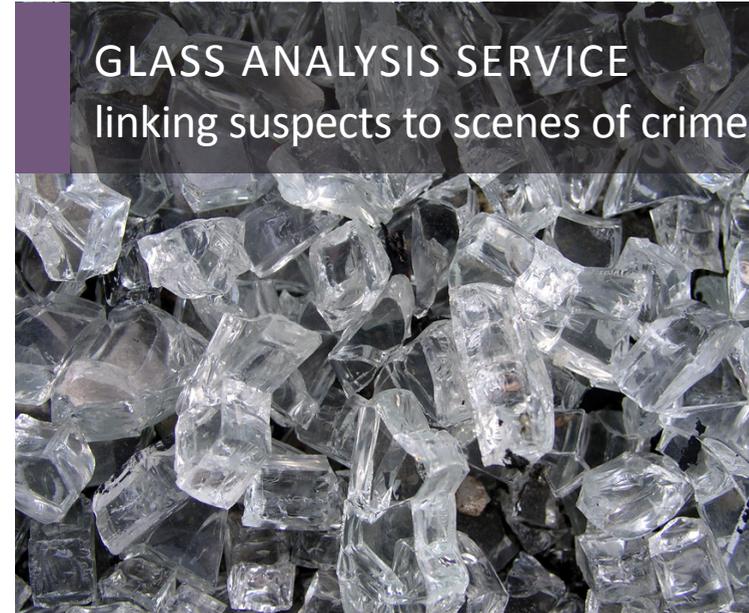
Case example

In a hit-and-run case, the victim had hit the car windscreen and caused it to smash. Analysis showed that the two sides of the laminated windscreen had different refractive indices and elemental compositions.

Fragments of glass were found on the victim that matched the outside pane of the car windscreen and fragments were found on the person suspected of driving the car that matched the inside pane of the windscreen.

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GLASS ANALYSIS SERVICE linking suspects to scenes of crime



Specialist expertise
in recovery & analysis

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Introduction

Glass is often broken during the commission of various offences; for example, forcing entry to a premises or during an assault with a glass or a bottle.

When glass is broken, it produces many small fragments. There is potential for these small fragments to be transferred to the clothing, hair or footwear of anyone in the vicinity of the glass as it breaks.

Microscopic fragments of glass can be recovered at the laboratory from items of clothing, footwear, hair comings of a suspect or from implements that may have been used to cause damage to glass.

Due to the versatility of glass and the consequential wide range of applications, the transfer of glass fragments can provide an effective means of linking an item, vehicle or suspect with a wide range of different incidents, from assaults to traffic offences, such as fail to stop collisions, burglaries or thefts from a vehicle.

GLASS ANALYSIS SERVICE - linking suspects to scenes of crime

Trace evidence such as glass will usually exhibit characteristics of its origin that, on its own, can provide valuable evidence in an investigation.

At Cellmark, complex and detailed examinations are carried out in purpose-built laboratories, using established techniques and technology and following ISO17025 accredited procedures.

Refractive index

The refractive index of glass is a measurement of how much a beam of light is bent when it travels from the less dense medium air to the more dense medium glass.

Different types of glass have differing refractive indices, so it is possible to use this information to group fragments of glass together and to establish whether they may have come from the same pane of glass.

Chemical composition

Glass is made from a variety of raw materials - silica, soda lime, lead oxide, boro and aluminosilicate as well as traces of iron, cobalt, copper and gold to add colour.

Additionally, these raw materials will also contain impurities resulting in glass products with measurable variations in their chemical properties.

Thermal history

The thermal history is used to distinguish toughened glass from non-toughened glass. Toughened glass is a type of safety glass found in vehicle rear windscreens and side windows and, more recently, in patio doors.



Sampling

Collect several pieces of glass for control samples (six, if possible) from around the broken area.

When more than one glass pane or item has been broken, collect several pieces of glass (six, if possible), from each broken pane or item.

The recovered glass should represent the full original thickness and should be representative of all the glass types present.

Do not recover glass from the floor, footwell, etc., but rather from its original casing. If samples are obtainable only from the floor, they should be labelled as such.

Before removal, mark the glass with a permanent marker showing which is inside or outside.

Provide a sketch showing the size and height of the window, and the method of breaking, if known, (e.g. has the glass fallen out or has it been kicked out to enable the offender to climb in, particularly where the frame remains locked?).

Storage

Package glass from each broken pane or item separately. State the number of broken panes on the submission form.

Place samples of each control glass into a small plastic tub or box and then place into a tamper evident bag.

Seal the sample as soon as possible to prevent leakage or injury.



Surface characteristics

These fall into 3 main areas, etched, stained and plated.

Where fragments of glass are recovered from clothing and other items they may bear traces of the original surface that can be compared to a control sample, providing confirmation of the type of glass under examination.

Glass retention & persistence

After the initial contact, glass fragments will be lost from a suspect's clothing over time, depending on relative properties of the garment and the suspect's activity.

Retention qualities:

Coarse knitted jumpers	Very good
Sweatshirts	↓
Jeans	
Cotton shirts	
Nylon jackets	

Here at Cellmark, we have a highly skilled team of scientists with a wealth of experience of working on cases involving glass and associated trace evidence.

This work is carried out in a team with a full range of complementary skills relating to the recovery, preservation and analysis of trace evidence and biological materials.

This permits the results of any comparison to be considered within the context of all of the scientific findings and thus maximising the overall effectiveness of the scientific outcomes.