

# GUIDELINE FOR THE RECOVERY OF GLASS IN FORENSIC IDENTIFICATION AND COMPARISON OF GLASS

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## **GENERAL REMARK**

This guideline assumes prior knowledge in the forensic discipline. It is based on consensus among the relevant forensic experts and reflects the accepted practices at the time of writing. The requirements of the judicial systems are addressed in general terms only.

### **1. AIMS**

This document describes the recovery of glass fragments for forensic identification and comparison of glass samples and is a part of the European Paint, Glass and Taggants Analysis Guidelines.

The guideline is aimed towards experts in the field of forensic examination of glass.

### **2. SCOPE**

This guideline provides recommendations for the recovery of glass evidence in the laboratory, it does not cover Scene of Crime (SOC) investigation (i.e. recovery of glass fragment at a crime scene).

LIMITATION: This guideline reflects the European Forensic Glass Community's recommendation at the time of writing. This guideline does not serve as a textbook in the field of recovery of glass for forensic purposes

### **3. TERMS AND DEFINITION**

For the purposes of this guideline, the relevant terms and definitions given in ENFSI documents, the ILAC G19 "Modules in Forensic Science Process", as in standards like ISO 9000, ISO 17020 and 17025 apply. Also, refer to the main document Best Practice Manual for the Forensic Identification and Comparison of Glass (PGT-BPM-002).

### **4. INTRODUCTIONS**

As glass objects are frequently broken during criminal acts, often large numbers of glass fragments will be scattered to the surroundings. Their size and distribution will vary, and fragments of different size (cm to sub mm) can attach to garments, shoes, and hair, or become embedded in tools and into wounds, which depends upon the exposure to the breaking glass object or subsequent contact with the broken glass.

The examination, analysis and comparison of glass particles can provide useful information in an investigation.

The examination, sampling and packaging in a laboratory environment must be carried out taking all the necessary precautions to prevent cross contamination or loss of evidence.

The techniques/methodologies presented in this guideline are examples of what is generally accepted by experts in the field of forensic identification/comparison of glass, however, other procedures may also exist.

## 5. METHODOLOGY

### 5.1 Precautions against contamination and loss

When seizing, recovering, storing, transporting and examining items in the laboratory care must be taken to prevent contamination and loss of trace materials.

To reduce the risk of contamination, the following process is recommended:

- Check the evidence packaging for the presence of damage (tears). If damage is detected, record the details and evaluate the risk of contamination or loss of evidence.
- Pay attention to the fact that it is common to find glass fragments on areas about cuts or holes and soles of shoes.
- If the case involves other disciplines (fibres, DNA, etc) the examiners involved are advised to agree on the procedures/order of priority before opening the package.
- Personal protective equipment (PPE) should be worn. The choice of PPE will be determined by the aims of the disciplines involved. Gloves must be changed between the examination of each item.
- The examination of known and questioned items must be conducted (if possible) in different rooms, or on different benches by different examiners if conducted on the same day. The same examiner should only examine items from known and questioned sources on different days.
- Equipment (such as forceps, pens, microscopes etc) and surfaces used must be cleaned before searching procedure and as often as necessary.

Ideally the outside of the packaging should be blanked prior to opening. This is conducted by wiping down the packaging with a tissue and then collecting any loose debris by brushing (for example). The debris can be placed into a pot and inspected using a lower power microscope to ensure the packaging is free of glass particles.

Any situation that could cause contamination or compromise the trace evidence examination should be documented and communicated to the client.

### 5.2 Detection/searching and collection

#### 5.2.1 General

Different methods for detection and collection of glass are used by European glass experts' community [1,2].

The methods used and their efficiency to collect glass fragments depend on:

- The size of the particles. For example, shaking is more efficient than visual inspection for fragments < 0.5 mm [3,4].
- The need to preserve or collect other types of evidence. For example, vacuuming is not recommended if the recovery of fibres is required [5].

It is recommended to examine any recovered items first and the control samples later.

The item/garment should be removed from the bag/wrapping (packaging) and transferred to a clean surface such as clean paper.

In addition to searching for glass on the item itself, the packaging should also be examined.

## 5.2.2 Methods of recovery

In order to search and collect glass fragments, it is recommended:

(A) Initially perform a visual inspection (i.e. a macroscopic search) of the item.

Some glass fragments can be visible to the naked eye under adequate illumination, such as oblique white lighting, and can therefore be located, recovered and secured for further examination.

To locate potential glass fragments that cannot be visualised using a white light source, a search may be assisted by using alternative light source, such as UV which can facilitate the discovery of float glass. Scientists using this type of lighting must be fully trained in its use and ensure that appropriate safety measures are taken to protect themselves and other people present in the environment.

Where needed an item can also be examined microscopically. For example, a hammer can be examined under lower power microscope to observe any powdered or embedded glass particles, which can be picked off and retained for examination.

If glass fragments are potentially observed these should be collected by picking off, using clean forceps and any particles retained for further examination.

(B) After the macroscopic search, different other techniques can be used to collect glass fragments as:

- Shaking: The item is shaken above clean paper and the debris is transferred to a suitable container for further isolation.
- Brushing and hitting: a brush (such as clean toothbrush) can be used to recover glass particles from an item. It also can be tapped using a gloved hand or clean fixed scalpel above a clean paper. The debris is collected and transferred to a suitable container.
- Combing: A sterile gauze is inserted in the teeth of a clean comb. This method is generally used to recover glass particles from the hair of an individual. The combing device and any recovered glass collected from the hair should be packaged together.
- Vacuuming: A vacuum cleaner equipped with a filter trap can be used to recover trace evidence from the item. The filter and its contents must be immediately packaged to avoid sample loss. The appropriate vacuum part, filter, and trap must be changed and/or rigorously cleaned between each vacuuming to avoid contamination.
- Tape lifting: taping of the surface of a garment or tool for example, can be performed using clear adhesive tape, in sequence over the item. After taping, the 'lift' is placed on to a transparent backing, for example an acetate sheet; overlapping the tape should be avoided so as to preserve other evidence. This technique can be useful when collecting very small fragments along with fibre evidence. In addition, the item can also be brushed or shaken afterwards to ensure all particles have been recovered.

## 5.3 Packaging and labelling

The preservation and packaging of items and evidence must be appropriate to ensure the integrity of the evidence. For example, it is recommended to avoid glass containers to package glass fragments.

All evidence packaging must be correctly sealed in such a way to prevent loss and contamination.

Items, such as garments must be re-sealed from its original packaging seal so it can be examined further as required.

The packages containing any recovered evidence and debris from an item must be clearly labelled and according to local laboratory regulations. We recommend that each package is labelled with the following details:

- the date the trace was recovered
- the name of the person recovering the trace
- a description of the recovered trace
- a unique identifying mark for each item or trace (case number, item number etc.) – which can be linked to the identity of the original item

## 6. REFERENCES

- [1] EN ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories.
- [2] SO 21043-2. Forensic Sciences Part 2: Recognition, recording, collecting, transport and storage of items.
- [3] LAC-G19:08/2014, Modules in a Forensic Process.
- [4] QCC-PT-001, Guidance on the conduct of proficiency tests and collaborative exercises within ENFSI, version 001, 27/06/2014.
- [5] ENFSI QCC-BPS-001, 2007, Guidance for Best Practice Sampling in Forensic Science, version 001, 06/12/2007.
- [6] ENFSI SoC BPM 2012, Scenes of Crime Best Practices Manual, version 001, December 2012.
- [7] ASTM 1459-92 Standard guide for physical evidence labelling and related documentation.
- [8] ASTM, 1492-92 Standard practice for receiving, documenting, storing, and retrieving evidence in a forensic science laboratory.
- [9] SWGMAT, Trace Evidence Recovery Guidelines.
- [10] SWGMAT, Trace Evidence Quality Assurance Guidelines.

## 7. AMENDMENTS TO PREVIOUS VERSION

Not applicable