Forensic Chemistry Section

Fire Debris Passive Diffusion Headspace Extraction Method

1. Scope

This document details the method for extracting evidence with passive diffusion headspace using activated charcoal strips (ACS). ACS strips are supplied by Albrayco Technologies Inc.

2. Safety

2.1 Fire debris will be processed in the laboratory fume hood. The sash will be lowered as low as practicable when handling the evidence.

2.2 The examiner will not sniff or smell the evidence.

2.3 Disposable laboratory coats and 6 mil or thicker nitrile gloves will be worn when processing the evidence.

2. Method

2.1 Internal standards are used with this extraction method.

2.1.1 Tetrachloroethylene (TCE) is diluted 1:2 with Dichloromethane (DCM).

2.1.2 Diphenylmethane (DPM) is added to DCM at 10µg/ml.

2.2 Add 0.5 µl of the diluted TCE to the debris or container.

2.3 One ACS is added to each container of debris. The ACS is split into two half strips either at the beginning or at the end of the extraction, dependent on analyst preference.

2.3.1 If the container is a metal container or glass container with a metal lid, suspend the ACS from the lid of the container using a clean paperclip and magnet.

2.3.2 If the container is a heat sealed bag, the strip is placed loose in the bag making sure there is sufficient pillowing of the bag for proper extraction. Alternatively, the bag may be opened on three sides, placed in a paint can, and the ACS suspended from the lid for extraction.

2.4 Tightly seal the container prior to extraction.

2.5 The evidence is generally extracted for 16 hours at 70C. However, situational dependent, the evidence may be extracted for 4 to 24 hours and 60C to 80C. If the analyst suspects a very high concentration of accelerant or there is the possibility of container overexpansion, the evidence may be extracted at room temperature.

2.6 Allow the oven to cool to approximately room temperature prior to removing the samples.

2.7 One half of the strip is eluted using DCM with DPM. The other half is not generally eluted, however the analyst may choose to process the second half if necessary.

2.8 The strips are stored in crimp-top vials, identified with laboratory number / item number, initials and date.

2.9 If a sample produces a chromatogram with no significant components, the internal standards must show as present. If either internal standard is absent, the following steps will be taken:

2.9.1 If TCE is absent and DPM is present, the sample will be re-extracted

2.9.2 If TCE is absent and DPM is absent, re-inject the sample. If the re-injection does not produce appropriate results, then re-extract the sample.

2.9.3 If TCE is present but DPM is absent then no corrective action is necessary.

2.9.4 A sample producing a chromatogram with significant components, but without identifiable internal standard peaks, is considered to have injected and extracted appropriately.

2.10 Upon completion of data analysis, the examiner may determine that more information is needed to identify a product. At that point, the examiner may choose to extract the second half of the strip with a CS_2 solution (10 µg / ml DPM in CS_2) using the procedures as described above.