



SUBJECT Alternative Sampling Media for Collection of Samples from Fixed Surfaces
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Our laboratory has received a number of fire debris samples that were collected via swabbing. These samples generally consisted of absorbent pads that had been rubbed onto substrate surfaces believed to have come into contact with an ignitable liquid. These pad samples were extracted and analysed via gas chromatography-mass spectrometry, as per our standard analysis procedures.

Analysis of these absorbent pads has revealed that some contain significant quantities of multiple chemical compounds that are also present in ignitable liquids. These compounds present themselves in patterns similar to those encountered in ignitable liquids and affect the interpretation of analysis results. Subsequent research by our laboratory has determined that certain types of adsorbent sampling media are not appropriate for use at fire scenes. This Technical Bulletin aims to disseminate the results of this research and emphasise good sampling practice.

Choosing the Right Sampling Medium

It is always best to submit a sample of the substrate itself rather than a subsample obtained via swabbing. However, this is not always possible as some fixed surfaces may not be amenable to removal. Ideally, the material to be used for sampling should be inert, sterile, and unadulterated. This reduces the number of extraneous chemical compounds created by the material during the extraction process. When selecting a sampling medium, consider choosing products packaged in single-use containers (i.e. sterile) to reduce the risks of cross-contamination during storage. Alternatively, store sampling media in a clean, sealed fire debris container and take them out when they are required. Suitable sampling media can usually be purchased from medical supply stores, hardware stores, pharmacies, and supermarkets. If possible, check local distributors in your area for products similar to those described below. Even if you cannot find these products, similar ones are bound to be available. **In all cases, when trialing the use of new sampling media, it is imperative that an unused swab is submitted along with any collected samples to serve as a comparison.** Comparison sampling media should be submitted to the laboratory either in its original retail packaging (unopened), or sealed in a fire debris container as is normal for regular samples.

Research Results

Our research has shown that pure cotton materials, most commonly available in the form of cotton pads or balls, are generally low in volatile content and produce minimal interference. Ideally, the cotton should contain no additives and should have undergone as little chemical treatment as

possible. Alternatively, wound-dressing pads can be used. These generally consist of a cotton-type absorbent material adhered to a base. These materials are also generally larger than other types of pads, allowing them to be gripped and deployed more easily. They are also stronger than basic cotton pads as they are designed to stretch and conform to different surface geometries. Other types of wound dressings and pads may be appropriate, but exercise caution with products marketed as “non-adhering” as these can sometimes contain petroleum distillates. Cotton-tipped applicators can also be problematic, as they have been shown to contain isoparaffinic products. In any case, a comparison sample of any new media will be required.



Fig. 1: Examples of appropriate sampling media with low volatile profiles; pure cotton pads and sterile dressings.

Sampling Media to Avoid

Note that a positive analysis result that suggests a sampling medium contains petrol or petroleum distillates is not necessarily incorrect. Petroleum products are used in the manufacture of various absorbent and adherent materials and it should therefore be expected that some would test positive for the presence of ignitable liquids. However, to reduce the risk of confusion, a number of sampling media should be avoided altogether. In particular, some sanitary pad products contain high concentrations of ignitable liquid target compounds. Sanitary pads contain adhesives, and typically utilise synthetic absorbents, both of which release various compounds when undergoing the extraction process. Some gauze bandages have been shown to contain heavy petroleum distillate products; other types of wound dressing products are preferred (see above). Avoid products that are moistened or treated with alcohol (i.e. alcohol swabs) as the alcohol compounds may overwhelm any residues in the debris, potentially leading to misclassification of the sample as an oxygenated product instead of a petroleum product. Also refrain from moistening sampling media before application, as this can reduce the effectiveness of extraction. Products that contain a large amount of synthetic material (i.e. plastics and synthetic fibres) may also present issues as the petroleum residues in these products may disrupt petroleum residues in the sample. As always, a comparison sample of any potential swab media should be submitted.

If you have any questions regarding the information in this Bulletin, or want advice on sampling media selection, please contact our office.