

Static Headspace Sampling of Vapors from Fire Debris Samples



WHAT IS AN AAFS STANDARD FACTSHEET?

The AAFS produces clear, concise, and easy-to-understand factsheets to summarize the contents of technical and professional forensic science standards on the OSAC Registry. They are not intended to provide an interpretation for any portion of a published standard.

WHAT IS THE PURPOSE OF THIS STANDARD?

Fire debris may contain residues from an ignitable liquid used as a fuel for a fire. Ignitable liquids can include petroleum-based products such as gasoline, paint thinner, and kerosene, as well as non-petroleum-based products, such as alcohols and vegetable oil-based products. Ignitable liquid residues are often present in very small quantities after a fire, if present during the fire. During a fire investigation, materials containing ignitable liquid residues can be recovered for further analysis.

The purpose of this standard is to provide guidance for the separation of small quantities of ignitable liquid residues from fire debris evidence using a syringe to remove a portion of the static headspace above the debris. The resulting sample is suitable for analysis by a technique such as Gas Chromatography-Mass Spectrometry (GC-MS) per ANSI/ASTM E1618-19.

WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

This standard provides instructions for a sampling procedure that removes a small amount of vapor from within a closed container of fire debris evidence. It describes the apparatus, materials, and procedure involved in the sampling process. This type of extraction allows the evidence to remain in approximately the same condition as received. This procedure is well suited for light to medium range ignitable liquids, and less appropriate for heavy range ignitable liquids.

Sampling results from this procedure may be reproduced but cannot be preserved.



HOW IS THIS STANDARD USED, AND WHAT ARE ITS KEY ELEMENTS?

This standard provides instructions for performing a technique to sample vapor residues of ignitable liquids that may be present in fire debris evidence submitted to forensic science service providers (FSSP).

Unlike some other methods of separation and concentration, this practice allows for resampling and reanalysis as only a small aliquot of the headspace is withdrawn from the sample container. Sample preservation is not possible with this sampling technique.

This standard delineates the required evidence preparation and sampling procedure and includes basic quality assurance instructions with reference to FSSP policies.

The procedure is preferably performed in the original packaging, but some evidence types, such as liquids, may be transferred to vials or other containers prior to sampling. This sampling technique is particularly well suited for the recovery of highly volatile ignitable liquids such as alcohols or ketones. The product of this standard is a sample that requires analysis with a technique such as Gas Chromatography-Mass Spectrometry and interpretation using ANSI/ASTM E1618-19.

The sampling procedure described in this standard can be performed alone, but it is intended for use within an analytical scheme as described in [ANSI/ASTM E3245-20e1](#) and in conjunction with other extraction procedures, such as ANSI/ASTM E1386-15, [ANSI/ASTM E1412-19](#), [ANSI/ASTM E1413-19](#), or ANSI/ASTM E2154-15a.