

## Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration onto an Adsorbent Tube



### 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?

This sample preparation standard provides one of several possible procedures for preparing extracts from fire debris samples. For alternative sample extraction procedures, refer to ANSI/ASTM E1386-15, [ANSI/ASTM E1388-17](#), [ANSI/ASTM E1412-19](#), ANSI/ASTM E2154-15a, ANSI/ASTM E2881-18, and [ANSI/ASTM E3189-19](#). For guidance related to considerations involved in the selection of an extraction procedure, refer to [ANSI/ASTM E3245-20e1](#).

This standard describes the procedure for separation of ignitable liquid residues from fire debris samples using the technique of dynamic headspace concentration onto an adsorbent tube. It also provides information about the quality assurance and quality control practices that are used in association with this technique.

Fire debris extracts obtained using this technique are suitable for subsequent analysis by gas chromatography-mass spectrometry (GC-MS) in accordance with ANSI/ASTM E1618-19.



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

Headspace is the empty space above a fire debris sample in an evidence container. In the dynamic headspace concentration onto an adsorption tube technique, a portion of the headspace vapors from inside a closed container of fire debris is exchanged from the container and passed through an adsorbent tube using applied positive or negative pressure. If any ignitable liquid residues are present in the container, they are collected and concentrated onto the adsorbent tube. The resulting concentrated headspace sample is removed from the adsorbent tube, either by rinsing with solvent or heating, to facilitate subsequent qualitative analysis by gas chromatography-mass spectrometry (GC-MS) in accordance with ANSI/ASTM E1618-19.

A figure that illustrates the procedure, along with descriptions of the materials and apparatus required for proper implementation of the technique, is included in the standard for enhanced clarity.

The dynamic headspace concentration technique can be more sensitive than the static headspace technique ([ANSI/ASTM E1388-17](#)) and the static headspace concentration technique ([ANSI/ASTM E3189-19](#)); however, it alters the composition of the fire debris sample because a portion of the original headspace is removed and exchanged with other vapors.

This is a standard practice. Additional procedural steps beyond those required in the standard may be necessary.

### WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

Adherence to the standard ensures that the sample preparation procedure results in a fire debris extract that is fit-for-purpose within a systematic analytical scheme for of identifying Ignitable liquid residues.

Forensic science service providers that prepare extracts from fire debris samples using the technique of dynamic headspace concentration onto an adsorbent tube are encouraged to meet or exceed the requirements set forth in this standard.