FACTSHEET FOR ANSI/ASTM STANDARD PRACTICE E1412-19

Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Activated Charcoal

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 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.

This practice describes the procedure for the separation of small quantities of ignitable liquid residues from samples of fire debris using an adsorbent material, such as activated charcoal, to extract the residue from the static headspace above the sample, then eluting the adsorbent with a solvent.

WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

This standard provides instructions for a highly sensitive extraction procedure using an adsorption package within a closed container of fire debris evidence. It describes the apparatus, materials, procedure, and quality assurance practices involved in the extraction process. This type of extraction concentrates any ignitable liquid residues present in the evidence container by separating them from many otherwise interfering compounds arising from the debris. This standard is applicable for low to high molecular weight (e.g., ethanol to heavy petroleum distillates) ignitable liquids.

Extractions from this procedure can be reproduced and preserved.

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

This standard provides instructions on how to perform a highly sensitive technique to isolate residues of ignitable liquids that may be present in fire debris samples submitted to forensic science service providers (FSSPs) as evidence. Unlike some other methods of separation and concentration, this practice is essentially nondestructive.

This standard establishes a range of parameters for use with this extraction procedure, which can vary based on the entire analytical scheme or the needs of an individual sample. These parameters include the extraction time and temperature and elution solvent selection and volume. The advantages and disadvantages of each choice are presented. The extraction procedure can be performed alone, as part of an analytical scheme described in ANSI/ASTM E3245-20e1 or with other extraction procedures, such as ANSI/ASTM E1388-17 or ANSI/ASTM E1386-15.

This standard includes quality assurance instructions that will allow the FSSP to detect and identify the source of any contaminants. These instructions will also help determine if the adsorption packages and dilution solvents are fit for purpose.

This standard presents basic guidance for the documentation of this procedure.

The product of this standard is an extract that requires analysis with Gas Chromatography-Mass Spectrometry and interpretation using ANSI/ASTM E1618-19.

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