FACTSHEET FOR ANSI/ASTM STANDARD PRACTICE E1386-23

Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction

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 standard describes the procedure for the separation of ignitable liquid residues from fire debris samples by solvent extraction. 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.

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 E1388-17, ANSI/ASTM E1412-19, ANSI/ASTM E1413-19, ANSI/ASTM E2154-15a, and ANSI/ASTM E3189-19. For guidance related to considerations involved in the selection of an extraction procedure, refer to ANSI/ASTM E3245-20e1.

WHAT MAKES THIS STANDARD IMPORTANT? WHAT BENEFITS DOES IT PROVIDE?

This standard provides forensic science service providers (FSSPs) with a process for sample preparation to be used to identify ignitable liquid residues that is appropriate for use in a systematic analytical framework.

It is suitable for extracting ignitable liquid residues over a wide range of concentrations and reduces the risk of fractionation during solvent extraction, which helps preserve the chemical profile of ignitable liquid residues in fire debris and improves differentiation between various grades of fuel oil.

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

This standard provides instructions for a sample preparation technique that can isolate small quantities of ignitable liquid residues over a range of concentrations present in fire debris samples that have been submitted to FSSPs as evidence.

The standard covers both the limitations and strengths of this sample preparation procedure. Limitations include a lack of specificity to separate and isolate ignitable liquids from interfering compounds, the unsuitability for the extraction of extremely volatile compounds, and the destructive nature of the technique. This procedure is useful for extracting ignitable liquid residues that can't be extracted with a passive headspace concentration procedure (ANSI/ASTM E1412-19) and for extraction from non-porous surfaces, such as glass or the interior of burned containers.

The key procedural elements within the standard are:

- Sample handling
- Sample and container selection
- Sample extraction with solvent
- Extract evaporation and dilution, if required
- Extract preservation and storage
- Quality control and quality assurance
- Documentation

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