



Designation: E1388 – 12

# Standard Practice for Sampling of Headspace Vapors from Fire Debris Samples<sup>1</sup>

This standard is issued under the fixed designation E1388; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This practice describes the procedure for removing small quantities of ignitable liquid vapor from samples of fire debris by sampling the headspace of the debris container.

1.2 Separation and concentration procedures are listed in the referenced documents. (See Practices E1386, E1412, E1413, and E2154.)

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

E1386 Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction

E1412 Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration With Activated Charcoal

E1413 Practice for Separation and Concentration of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration

E1459 Guide for Physical Evidence Labeling and Related Documentation

E1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory

E1618 Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry

E2154 Practice for Separation and Concentration of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Solid Phase Microextraction (SPME)

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.01 on Criminalistics. Current edition approved Feb. 1, 2012. Published March 2012. Originally approved in 1990. Last previous edition approved in 2005 as E1388 – 05. DOI: 10.1520/E1388-12.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 3. Summary of Practice

3.1 The sample, preferably in its original container, is heated in order to volatilize any ignitable liquid residues present in the debris. After heating, the headspace is sampled and analyzed by gas chromatography-mass spectrometry.

## 4. Significance and Use

4.1 This procedure is particularly useful for screening fire debris samples to determine relative ignitable liquid concentrations and possible ignitable liquid class prior to extraction with other techniques.

4.2 This practice is useful when volatile oxygenated products such as alcohols or lacquer thinners are suspected.

4.3 This practice is the least sensitive of the sample preparation techniques and may not detect quantities of less than 10  $\mu$ L of an ignitable liquid.

4.4 Because this separation takes place in a closed container, the sample remains in approximately the same condition in which it was submitted. Repeat and interlaboratory analyses are therefore possible.

4.5 Due to variables in the debris sample condition prior to headspace sampling, complete reproducibility of chromatograms may be difficult to obtain.

4.5.1 To obtain greater reproducibility, use one of the separation procedures which results in a solution of the ignitable liquid residue (see Practices E1386, E1412, and E1413).

4.5.2 To obtain greater sensitivity for petroleum distillates and oxygenated products, use solid phase microextraction. (See Practice E2154.)

4.6 High concentrations of highly volatile compounds may swamp the headspace, inhibiting the recovery of less volatile components.

## 5. Apparatus

5.1 *Heating System*—An oven, heating mantle or hot plate designed to fit the evidence container.

5.2 *Temperature Measuring Device*—A thermometer or thermocouple capable of measuring temperatures in the range from 40 to 150°C.