



Designation: E 1412 – 00 (Reapproved 2005)

Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration With Activated Charcoal¹

This standard is issued under the fixed designation E 1412; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the procedure for removing small quantities of ignitable liquid residue from samples of fire debris using an adsorbent material to extract the residue from the static headspace above the sample, then eluting the adsorbent with a solvent.

1.2 While this practice is suitable for successfully extracting ignitable liquid residues over the entire range of concentration, the headspace concentration methods are best used when a high level of sensitivity is required due to a very low concentration of ignitable liquid residues in the sample.

1.2.1 Unlike other methods of separation and concentration, this practice is essentially nondestructive.

1.3 Alternate separation and concentration procedures are listed in the referenced documents. (see Practices).

1.4 *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:

D 1193 Specification for Reagent Water

E 752 Practice for Safety and Health Requirements Relating to Occupational Exposure to Carbon Disulfide

E 1387 Test Method for Ignitable Liquid Residues in Extracts from Samples of Fire Debris by Gas Chromatography

E 1459 Guide for Physical Evidence Labeling and Related Documentation

E 1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory

E 1618 Guide for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry

3. Summary of Practice

3.1 Charcoal in some form of an adsorption package is placed in the sample container to adsorb ignitable liquid residues. The container may be heated or left at ambient temperature. The charcoal is removed and eluted with CS₂ or diethyl ether.

4. Significance and Use

4.1 This practice is useful for preparing extracts from fire debris for later analysis by gas chromatography, GC/MS, or GC/IR.

4.2 This is a very sensitive separation procedure, capable of isolating quantities smaller than 1/10 μ L of ignitable liquid residue from a sample.

5. Apparatus

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

5.1.1 An oven is recommended to achieve a constant temperature throughout the system.

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

5.3 *Adsorption Package*.

5.3.1 Commercial charcoal adsorption packages are available from several companies. These packages, in the form of polymer strips or small charcoal canisters or “C bags,” are used to adsorb organic vapors.

5.3.1.1 The minimum recommended polymer strip size is 10 mm by 10 mm, or 100 mm².

5.3.2 *Non-Commercial Adsorption Packages*.

5.3.2.1 *C-Bags*—Prepare C-bags by encapsulating 0.2 g of activated charcoal within a folded sheet of high strength, light weight, high porosity tissue paper, such as that commonly used for making tea bags.²

5.3.3 *Storage of Adsorption Packages*— To prevent contamination, store all adsorption packages away from any sources of organic vapors prior to and after use for sampling.

¹ 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 May 1, 2005. Published September 2005. Originally approved in 1991. Last previous edition approved in 2000 as E 1412 – 00.

² Dietz, W. R., “Improved Charcoal Packaging for Accelerant Recovery by Passive Diffusion,” *Journal of Forensic Sciences*, Vol 35, 1991, pp. 111–121. (Unk)