



INDIANA STATE POLICE FORENSIC SERVICES DIVISION

PHYSICAL EVIDENCE BULLETIN

FIRE DEBRIS EVIDENCE

I. INTRODUCTION

- A.** Fire debris evidence is analyzed by the Forensic Services Division (FSD) to determine if any ignitable liquid residues are present in the submitted sample.
- B.** If a fire is intentionally set, large quantities of an ignitable liquid may be used to ensure that there is enough fuel present to start a fire. This means that some fuel may remain for an investigator to collect.
- C.** The point(s) of origin of a fire should be located by a fire investigator. Specialized experience and training are invaluable in determining the location of the point(s) of origin for a fire and the cause of the fire.
- D.** Multiple points of origin are commonly found in an intentionally set fire. At least one sample from each point of origin should be collected from any areas in which an ignitable liquid was suspected of being used.

II. COLLECTING EVIDENCE

- A.** Evidence should be collected as soon after the fire as possible and packaged in an appropriately sealed airtight container to avoid evaporation and contamination.
- B.** Appropriate air-tight containers to package fire debris evidence include:
 - a. Clean, non-oiled paint cans (lined or unlined);
 - b. Heat sealed fire debris bags (nylon or polyester bags); and
 - c. Glass canning jars (should be packaged to avoid breakage).
- C.** Within reason, collect as much of the suspected material as possible. Collect in different areas from each point of origin, placing samples from each point of origin in separate containers.

- D. Wipe the equipment and tools clean with a disposable towel between collection of each sample.
- E. Package, seal, and label each container per the requirements in FSD's Physical Evidence Bulletin #20 *Evidence Packaging and Submissions Guidelines* after collection.
- F. Do not place any additional materials (e.g., gloves used during collection) in the container.
- G. Do not package fire debris evidence in a container used previously to hold any ignitable liquid, solvent, oil, or other product.
- H. Do not package fire debris evidence in plastic bottles, re-sealable zipper storage bags (e.g., Ziploc® bags), plastic bags, or paper bags. These types of packages are not airtight and can allow evaporation and/or contamination of the evidence. Inappropriately packaged fire debris evidence shall not be accepted or analyzed.
- I. Approximately one ounce representative of liquid samples to be analyzed for the presence of ignitable liquids shall be submitted in clear glass bottles or jars and packaged in such a way as to prevent breakage. Liquid samples shall not be sent through the United States Postal Service (USPS) or a commercial delivery company.
- J. Collect possible sources of physical evidence that may be associated directly with the fire scene. Physical evidence (e.g., fusee, Molotov cocktail evidence, etc.) may be submitted for analysis.
- K. Look for other types of physical evidence material at the scene that may be relevant to the case (e.g., broken glass, toolmarks, footwear impression, etc.).

III. SUBMITTING EVIDENCE

- A. Approximately one ounce of a representative comparison sample of an ignitable liquid that could possibly have been used to start, spread, or sustain the fire may be submitted for analysis.
- B. Control samples of burned or unburned materials that are similar to the matrix of the questioned sample, but are most likely untouched by an ignitable liquid, may be submitted for analysis.
- C. Always label and package each sample as any other evidence material per the requirements in [Section II](#).
- D. Always collect, package, store, and transport evidence in such a way to prevent accidental contamination or loss of any evidence.

- E. Submit fire debris evidence to the FSD as soon as possible.
- F. Ignitable liquid residues that may be present in samples can be degraded by microbial degradation.
 - 1. When this occurs, an ignitable liquid residue may not be able to be detected.
 - 2. This can occur on a wide variety of sample matrices that may contain microbes, but most often occurs in evidence containing soil.
 - 3. Storing samples in a refrigerator or freezer after collection can help prevent microbial degradation.
- G. If a light petroleum product (e.g., ethanol) is suspected this should be noted on the Request for Laboratory Examination Form.

IV. EXPLANATION OF RESULTS FROM LABORATORY EXAMINATION OF IGNITABLE LIQUID RESIDUES

- A. The Microanalysis (Trace) Unit will attempt to identify any ignitable liquids present.
- B. When identified, ignitable liquid residues will be classified based upon the chemical components present following the ASTM 1618 – “Standard Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry” classification scheme.
- C. An ignitable liquid residue can be identified as consistent with a submitted ignitable liquid comparison sample.
- D. Identification of an ignitable liquid residue may not be possible due to unusual or high level of background, low ignitable liquid residue levels, or weathering of samples.

V. CONTACT INFORMATION

Agencies may consult with the Indiana State Fire Marshal or a local Fire Marshal for assistance. For further information please contact the Indiana State Police Forensic Services Division Microanalysis Unit at 1-866-855-2840 or 317-921-5300.