**I. Scope:** This policy and procedure guideline establishes a standard method for sampling headspace vapors from fire debris evidence. Simple Headspace is not suitable for low concentrations of ignitable liquids or heavy petroleum products. Due to the limitations of this technique, it may be necessary to perform additional extractions such as **Passive Charcoal Adsorption (FD-4)** or **Dynamic Charcoal Adsorption (FD-5).**

**II. References:**

ASTM 1388 - Standard Practice for Sampling of Headspace Vapors from Fire Debris.

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

**III. Apparatus/Reagents**

- New disposable syringe, approximately 3cc volume or airtight syringes
- Tape
- Rubber sleeve stopper
- Punch
- Analytical Oven

**IV. Safety Precautions:**

Exercise caution while handling hot cans.

**V. Procedures:**

A. **Cans -** A small hole will be punched in the container lid. Cover the hole with tape. Alternatively, a rubber sleeve stopper may be placed in the hole. If deemed necessary, place the sample container in the oven at approximately 65°C until an estimated thermal equilibrium is reached.

Remove the container from the oven. Push the syringe needle through the tape or rubber sleeve stopper into the hole in the container lid and slowly pump the syringe three times, withdraw sample from the container, and inject up to 2.0 mL of sample vapor directly into the injection port of the gas chromatograph/mass spectrometer. Seal the hole with tape to prevent vapors from escaping the container.

B. **Fire Debris Suitable Bags -** If possible transfer debris to a can, otherwise heat the bag in an oven at 65°C until approximate thermal equilibrium is reached.

Remove the bag from the oven and push the syringe needle in to the bag. Slowly pump the syringe three times. Inject up to 2.0 mL of sample vapors into the injection port of the GC-MS.

C. **Vial containing Liquid –** Open vial. Place syringe over the headspace and slowly pump the syringe three times, withdraw sample from vial, and inject up to 2mL of sample vapors into the injection port of the GC-MS.

## VI. Quality Control:

A positive control using an appropriate ignitable liquid shall be run prior to sampling any exhibits.

A syringe/air blank will be run prior to sampling each exhibit. The syringe to be used for sampling an exhibit will be pumped three times and a sample of room air collected and injected into the injection port of the gas chromatograph/mass spectrometer. Documentation of air blanks will be maintained in the appropriate case jacket.

**Extract Storage** - Sample preservation is not feasible when using this technique.