

# Fire Debris Evidence Packaging

Indiana State Police Laboratory



# FIRE DEBRIS EVIDENCE

- Evidence collected from a fire scene
  - From accidental or intentional (arson) fires
  - Determine presence or absence of ignitable liquid residues
  - Ignitable liquid residues are volatile (easily evaporated)
    - Must be kept in an airtight container
      - Compounds will escape if container is not airtight
      - Other compounds may enter if container is not airtight



# TYPES OF FIRE DEBRIS EVIDENCE

- Solid debris
- Liquids
- Sharp objects
- Soil samples
- Oversized items
  - Clothing, shoes, etc



# ACCEPTABLE CONTAINERS

- Metal paint cans
  - Airtight when lid is completely closed
  - Puncture proof if debris contains sharp objects
- Glass jars with screw caps
  - Airtight when lid is completely closed
- Nylon & Polyester plastic bags
  - Airtight when sealed with heat seal
  - Fits oversized items (jeans, shoes, jackets, etc.)
- Glass vials with Teflon screw caps
  - Airtight when lid is completely closed



# UNACCEPTABLE CONTAINERS

- Polyethylene plastic bags
  - Zip lock bags, some food storage bags, grocery bags, produce bags, trash bags, etc.
  - Porous/not airtight – any ignitable liquid residues may escape or enter
  - Cannot heat seal – plastic will melt instead
- Paper bags
  - Porous/not airtight – any ignitable liquid residues may escape or enter
  - Will not hold liquids
- Cardboard boxes
  - Porous/not airtight – any ignitable liquid residues may escape or enter
  - Will not hold liquids



# METAL PAINT CANS

- Various sizes
  - Pint, quart, gallon
- Unused and unoiled.
  - Can be lined or unlined.
  - Remove any debris in the rim and make sure lid is completely sealed.
  - Prevents cross contamination
- Only fill to 2/3 full
  - Need 1/3 air space above debris for analysis



\*lab suggests submitting an unused, empty can to the lab to run and make sure it can be used for collection of fire debris evidence



# GLASS JARS WITH SCREW CAPS


- Limited in size
- Breakage may occur
  - Package inside a larger plastic bottle or metal paint can
  - Package with protective padding to prevent breakage
- With screw cap
  - Airtight
  - Prevents cross contamination
- Only fill to 2/3 full
  - Need 1/3 air space above debris for analysis



# NYLON/POLYESTER BAGS

- Flexible in size
  - Can cut to fit oversized items
- Airtight – sealed with heat seals
  - Prevents cross contamination
  - Best to seal with heat seal to ensure a complete seal.
    - If heat seal is unavailable, twist then fold over the opening (create goose neck) before taping the bag up.
    - If tape is used, it may not be completely sealed.
- Only fill to 2/3 full
  - Need air space in bag for analysis
- High melting point
  - Analysis is performed at  $\sim 80^{\circ}\text{C}$
  - Melting Point is  $>200^{\circ}\text{C}$



\*nylon bags make crinkling sounds and are slightly thicker 



# GLASS VIALS

- For liquid samples
- Use vials with Teflon (PTFE) screw scaps
- Package in plastic bottle
  - Prevents leakage and protects glass from breakage
- Only need ~1oz of liquid; no more than  $\frac{1}{4}$  cup is needed.



# HOW TO PACKAGE... SOLID DEBRIS

- Package in...
  - Metal paint cans
  - Glass jars
  - Nylon or polyester bags

»» **Make sure it is only 2/3 full**

- Do not use...
  - Paper bags\*
  - Polyethylene bags\*
  - Cardboard boxes\*

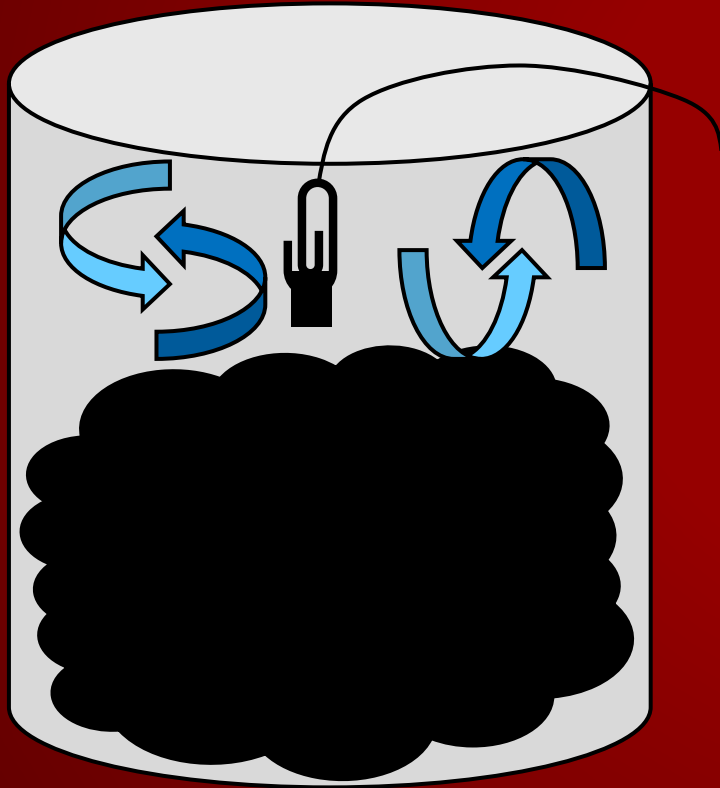


Paper, wood planks, fabric, plastic, glass, metal, charred debris, twigs, etc.

\*These are porous (not airtight) packaging and will allow compounds to escape or enter, resulting in cross contamination

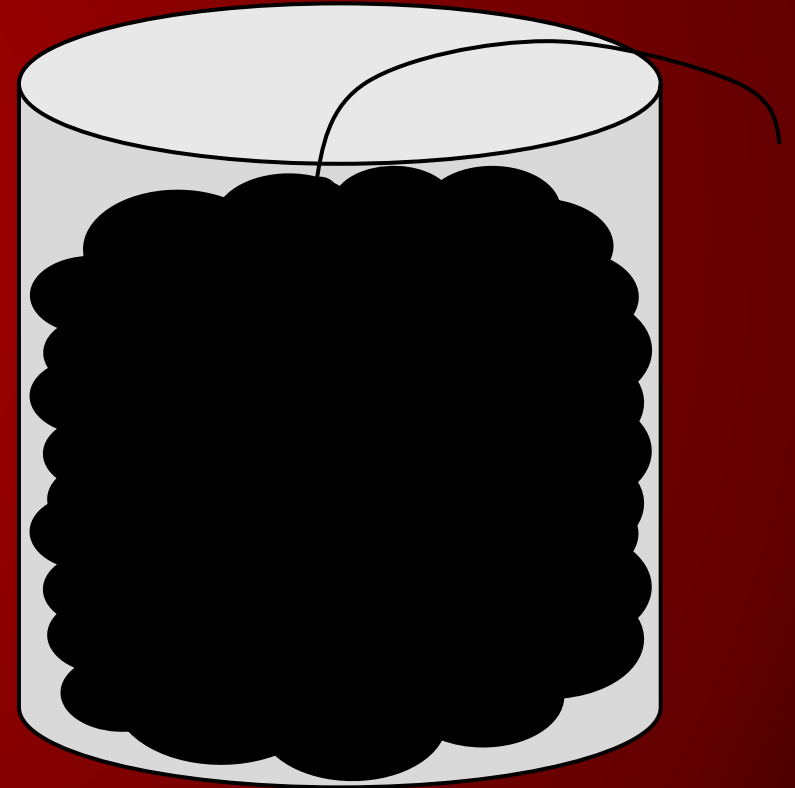


# HOW FULL IS 2/3 FULL?



2/3 Full

Container needs air space above the debris for air flow



Too Full



# HOW TO PACKAGE... LIQUID SAMPLES

- Package in...
  - Glass vials, placed in a plastic bottle
  - Glass jars
- Do not use...
  - Metal cans (can cause rusting)
    - If glass vials or jars are unavailable, metal cans can be used - sample can still be analyzed
  - Paper bags^
  - Cardboard boxes^
  - Polyethylene bags\*
  - Nylon or polyester bags\*

^Won't hold liquid

\*These are porous (not airtight) packaging and will allow compounds to escape or enter, resulting in cross contamination

**>>> DO NOT SEND  
LIQUID SAMPLES  
THROUGH THE MAIL**



# HOW TO PACKAGE... LIQUID SAMPLES



Place glass vial  
inside a plastic  
bottle to protect it  
from breakage



# HOW TO PACKAGE... SHARP OBJECTS

- Package in...
  - Metal cans
  - Glass jars<sup>#</sup>
    - If cans are unavailable.
- Do not use...
  - Paper bags<sup>^\*</sup>
  - Polyethylene bags<sup>^\*</sup>
  - Cardboard boxes<sup>^</sup>
  - Nylon or polyester bags<sup>\*</sup>



<sup>#</sup>Sharp objects can scratch glass jars and may cause cracks and breakage

<sup>^</sup>These are porous (not airtight) packaging and will allow compounds to escape or enter, resulting in cross contamination

<sup>\*</sup>Sharp objects may puncture the bags



# HOW TO PACKAGE... SOIL SAMPLES



**>>> Freeze (preferred) or refrigerate soil samples to prevent microbial degradation**

- Package in...
  - Glass jars
  - Metal cans
  - Nylon or polyester bags (only if glass jars and metal cans are unavailable)
    - The non-rigidness of the bags will make analysis difficult with soil samples
- Do not use...
  - Paper bags\*
  - Cardboard boxes\*
  - Polyethylene bags\*

**\*These are porous (not airtight) packaging and will allow compounds to escape or enter, resulting in cross contamination**



# HOW TO PACKAGE... OVERSIZED ITEMS

- Package in...
  - Nylon or polyester bags
- Do not use...
  - Metal cans
  - Glass jars
  - Paper bags
  - Polyethylene bags



If bags are not available and object does not fit into can/jar, it can be cut or broken to fit into multiple cans/jars. **DO NOT STUFF IT ALL INTO ONE CONTAINER – NEED 1/3 AIR SPACE ABOVE DEBRIS FOR ANALYSIS**





# WHERE TO GET CONTAINERS

- Metal Cans
  - Online evidence websites
    - Sirchie, Evident, Forensic Source, Arrowhead Forensics, etc.
  - Local hardware/home improvement stores
- Glass Jars (with screw caps)
  - Local hardware/home improvement stores
  - Local retail stores
- Glass Vials (with screw caps and is Teflon lined)
  - Fisher Scientific: <http://www.fishersci.ca/>
  - Thomas Scientific: <https://www.thomassci.com/>
  - Online evidence websites



# WHERE TO GET CONTAINERS

- Nylon Bags
  - Grand River:
    - 313-701-8851
    - JohnFVis@gmail.com
  - Arrowhead
    - <https://www.arrowheadforensics.com>
  - Forensics Source
    - <https://forensicssource.com>
  - Sirchie
    - <https://www.sirchie.com>
  - Ampac
    - <https://store.proampac.com>
  - Latent Forensic Services
    - <https://www.latentforensics.com>



# IS MY CONTAINER SUITABLE FOR PACKAGING FIRE DEBRIS EVIDENCE?

- The best way to know is to test the unused, empty container
- The laboratory will test unused, empty containers for contributors to ensure proper packaging is used for fire debris evidence
  - Containers that have compounds also found in commonly found ignitable liquids may not be used

