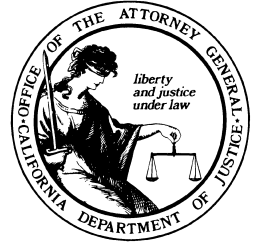




CALIFORNIA DEPARTMENT OF JUSTICE
BUREAU OF FORENSIC SERVICES
PHYSICAL EVIDENCE BULLETIN



COLLECTION OF VOLATILE FLAMMABLES

INTRODUCTION: Combustion requires three elements - heat, oxygen, and fuel. Fire will be extinguished when any one of these three elements is absent. Fire does not burn solids or liquids (in general), but the gases form above them. Heat acts to vaporize the liquid or solid, converting it to a gas, which then combines with oxygen to "burn" above the liquid pool. Thus, when flammable liquids soak into material or run into "cracks" there will be sufficient oxygen to support combustion. In these cases residue of flammable substances can be collected.

A. THE SCENE:

- (1) An arsonist will often pour the volatile flammable in more than one place to be certain that "everything will go". Multiple points of origin are typical.
- (2) An arsonist will generally use more than enough liquid accelerant to be sure he has plenty. This means that frequently some will remain for the careful investigator.

B. LOCATING THE EVIDENCE:

- (1) Points of origin of a fire should be located by an experienced arson investigator combining the use of apparatus (combustible vapor detector), trained canines, and personal observation (appearances and odor). Specialized experience and training are invaluable in determining a correct cause. For example: arsonists have been known to pour a volatile liquid around each electric outlet to make the fire appear as though it was of electrical origin.
- (2) Newspapers, furniture, carpet, and padding, or piled trash may serve to protect an accelerant liquid from heat that would otherwise have vaporized and burned away.
- (3) Remember that if a liquid is poured on a dry surface it will act like water in the sense that it will wet, run, spill, leak, drip, pool, or spread. To some extent it will be absorbed by porous materials.
- (4) It will flow downward into and along cracks and through holes. It may then be protected by cracks and seams of the flooring, the soil, or whatever surface there is below the floor.
- (5) A liquid will protect the surface carrying it until the liquid is vaporized away, causing charring. The unburned areas around and beneath the char may very well still contain the suspected liquid which can often be verified by analysis.

C. COLLECTING THE EVIDENCE:

- (1) After a suspected area is discovered, first document it with proper photographs, sketches, and notes.
- (2) Within reason, collect as much of the suspected material as possible, and place in a sealed container. A clean one-gallon wide mouthed paint can or glass jar is usually sufficient. Do not use a container that has been used previously to hold any volatile flammable, solvent or oil. Do not use plastic bottles or bags; they are porous to volatile flammables.
- (3) Record as a minimum, the following data:

LOCATION - An exact description of where it was found or obtained.

DATE AND TIME. - when it was collected.

NAME OF SUSPECT. - and/or victim.

DEPARTMENT CASE NUMBER

NAME OF FLAMMABLE LIQUID - suspected to have been used.

NAME OF INVESTIGATOR/EVIDENCE COLLECTOR.

- (4) Collect in different areas from each set, placing each sample in a separate labeled container.
Do not overlook other types of physical evidence material to the case; e.g., broken glass, toolmarks, etc.

D. COMPARISON STANDARDS:

- (1) Always attempt to obtain samples (comparison standards) of any liquids that could possibly have been used as the volatile flammable accelerant. Also obtain comparison standards (controls) of other unburned "fuels" such as carpets, drapes, upholstery, etc., as they may contribute to the residues detected.
- (2) In the case of gasoline include samples from the stations where it might have been purchased. If siphoning from a car tank is suspected, include a sample from the vehicle.
- (3) Place each comparison standard in a separate air-tight glass or metal sealed container. Always label each comparison standard as carefully and completely as any other evidence material (See above).
- (4) Always transport in such a way that there can be no question regarding the possible accidental contamination of any of the questioned sample above. A narrative report describing the fire scene, its suppression and follow-up investigation should be included when available.

E. RESULTS:

- (1) The laboratory will identify volatile flammables present. This identification may not be specific due to changes undergone by the liquid during or after the fire. In cases of unusual or extensively burned accelerants, the lack of a comparison standard can make identification difficult.
- (2) The flammable accelerant can be identified as consistent in origin with a submitted control. However, unless unusual contaminants are present, absolute identification to specific origin or batch cannot be established.

Local agencies may wish to consult with the California Department of Forestry & Fire Protection, Office of the State Fire Marshal, Arson and Bomb Investigation by contacting the local CDF Emergency Command Center.