B100 Performance Testing of Commercial Containers for Collection and Storage of Fire Debris Evidence

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The objective of this paper is to present to the forensic science community results from recent studies on the performance of commercial containers in the retention of ignitable liquids.

This presentation will provide important information concerning the proper handling and analysis of fire debris evidence and the viability of commercial sample containers.

Long-term storage of samples in suspected arson cases requires that the evidence containers be free from leaks that can result in total loss of the volatiles or evaporative aging of the sample, leading to an altered hydrocarbon profile. Previous investigations have reported significant leak rates for various commercial containers, primarily paint cans and polymer bags. This research project undertakes a study of the vapor retention properties of commercial containers through repeated removal of small (c.a. 20 micro-L) vapor samples from large (c.a. 1 gal.) containers, and an investigation into the dynamic behavior of hydrocarbon vapors in the closed container.

The dynamic behavior of a mix of volatile hydrocarbons inside a closed container complicates analyte sampling and analysis, while at the same time revealing important properties of the vapor which can significantly impact the interpretation of analytical data. Depth profiling of recovered hydrocarbons within closed containers by collection on standard carbon strips will be presented for a set of hydrocarbons, and the practical implications of the data for sampling methodology and source determination will be discussed.

Results from a long-term study of hydrocarbon retention by one gallon commercial paint cans will be presented. Data revealing the leak rate of the containers and the dynamic behavior of the hydrocarbon vapors will be discussed along with the significance of these results for methods of fire debris sample analysis

Fire Debris, Ignitable Liquids, Trace Evidence

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