

[Analysis of phthalates in polymeric substrates](#)

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Abstract:

Phthalates have been used as additives in plastic to make them more flexible for many years. Several phthalates are regulated on a global scale, and several analytical techniques can be used for phthalates analysis.

Phthalates have become a hot environmental topic and critical research area for many manufacturers and product consumers. Many analytical laboratories and scientists around the world are seeking new technologies and developments that can analyze phthalates qualitatively and quantitatively. The analysis of phthalates is critical in many industries, such as food safety, children's toys, electronics and consumer products.

All past methodologies for the determination of the regulated phthalates are based on solvent extraction, filtration and concentration. These traditional techniques are cumbersome, time-consuming and suffer from analyst-to-analyst variability while producing data of limited value. Also, polymers often contain many other plasticizers which co-elute with the phthalates of interest. This so called matrix interference leads to either false positives or false negatives and makes the accurate determination of the co-eluting phthalates impractical.

In response to these analytical challenges and in conjunction with the ASTM, Frontier Lab developed a technique using a multi-mode pyrolyzer coupled with a GC-MS system for analyzing phthalates in polyvinyl chloride. This technique provides the analyst with a "method map" for identifying phthalates both qualitatively and quantitatively.

First evolved gas analysis (EGA)-MS is used for each type of polymer to be analyzed to determine the optimal thermal zone in which the target compounds evolve as the sample is heated. Then thermal desorption (TD)-GC/MS, which is a simple, one-step technique, is used for the analysis. ASTM D7823-16 is based on the thermal desorption (thermal "extraction") of the phthalates from a polymeric substrate.

This article is a discussion of the central factors that influence data quality when using ASTM D7823-16¹ for the determination of phthalates in polymeric substrates.

* Excerpted from online journal website (Click the title)

Frontier Labs Products used:

Multi-Shot Pyrolyzer (EGA/PY-3030D), Auto-Shot Sampler (AS-1020E), Ultra ALLOY+-5