

ANALYSIS OF VOLATILE ORGANIC POLLUTANTS ON A NEW VOLATILES GC COLUMN

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INTRODUCTION

Analysis of waterways such as rivers, lakes and dams for the presence of volatile contaminants discharged from industry is an ongoing issue, which is being strictly monitored by environmental regulating bodies around the world. As more information comes to light as to the toxicological properties of many of the compounds discharged into the environment from industry so the allowable limits are being reduced by various government environmental protection authorities (EPA). The lowering of limits ensures that the quality of water supplies is maintained and the risk to public health and the environment is reduced. This in-turn makes the analysis of volatile organic compounds in water more challenging for the chromatographer. Achieving resolution requirements and detection limits of these volatile organic compounds is not easy.

THE BPX-VOLATILES ADVANTAGE

The volatile organic contaminants that are commonly screened from wastewater and in lakes, rivers and dams have a large range of chemical properties both in terms of polarity and boiling points. Many of these compounds are extremely volatile making resolution of these compounds challenging. The volatile nature of these compounds requires that the analysis be performed on a specifically designed volatile column. These types of capillary columns are usually thick-film and have low thermal stability. The low thermal stability of these custom-designed volatile columns usually results in higher bleed levels in the later part of the chromatogram when eluting the higher boiling volatile organic contaminants. As a consequence detection limits are higher than desirable. A move to more thermally stable phases such as 5% phenyl phases does not provide the same separation of the various components that the volatile columns achieve.

The new BPX-Volatiles capillary column from SGE has been specifically designed to solve these problems. The BPX-Volatiles column is one of the highest temperature volatile capillary columns available. The maximum temperature limit of 280°C provides added flexibility to the chromatographer not previously available with other volatile columns. The thick film and

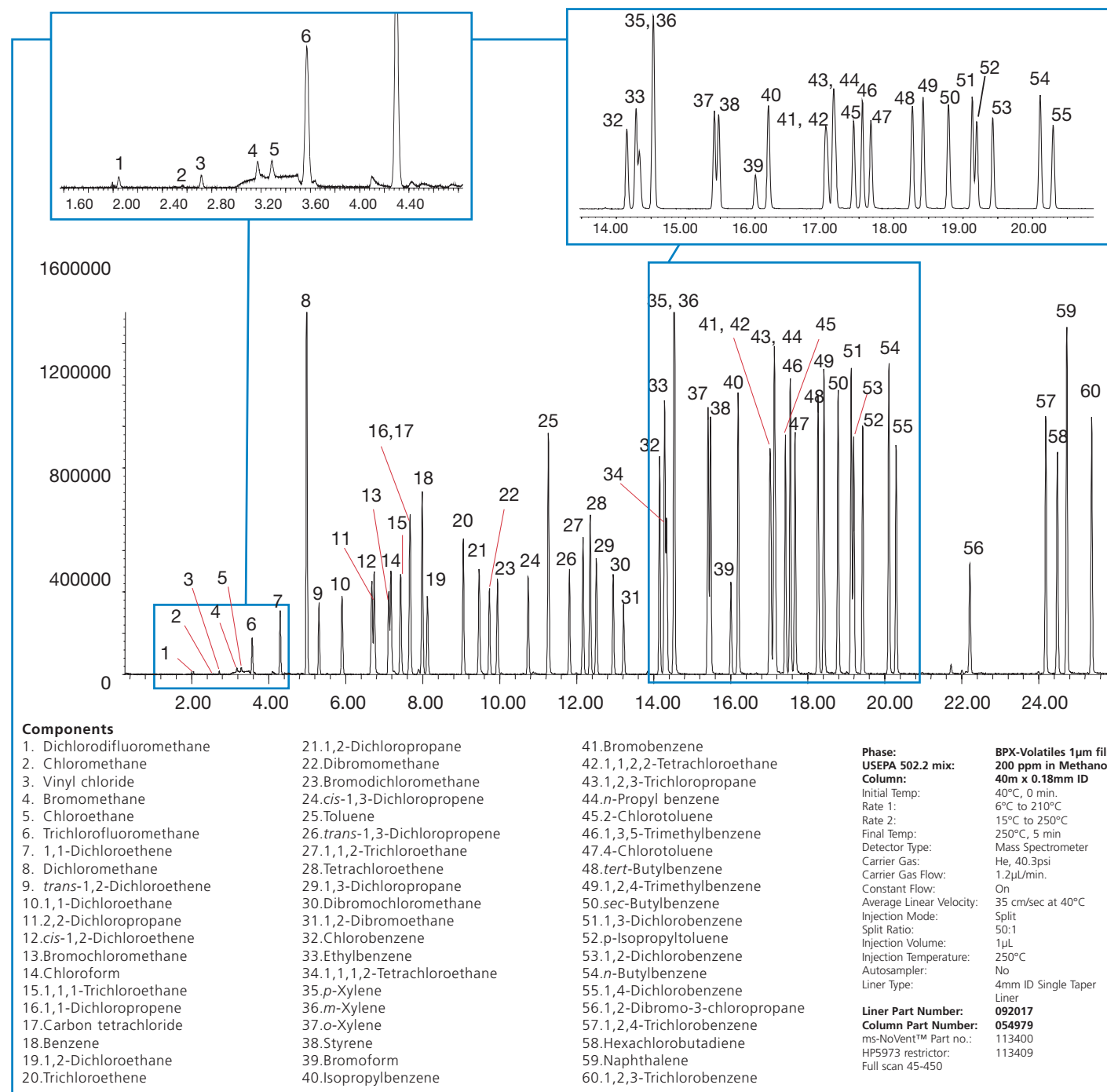


Figure 1. Chromatogram showing analysis of commonly screened volatile organic pollutants

excellent inertness combine to give excellent separation and peak shape of difficult-to-analyze components. Lower signal-to-noise ratios allow for lower detection limits at temperatures where most volatile capillary columns are reaching their maximum temperatures. The increased thermal stability also allows the chromatographer to bake

out any high boiling contaminants that may interfere with future analyses.

The excellent partitioning properties of BPX-Volatiles can be seen in Figure 1. The early eluting components are easily resolved while still maintaining excellent separation on a flat baseline for the late eluting components.

THE ANALYSIS

The analysis of volatile organic contaminants in water is a challenging application. The most difficult aspect of this application is the resolution of the early eluting components. These extremely volatile components are barely retained by the capillary column phase making resolution of the 7 or 8 very early eluting components difficult to obtain. The BPX-Volatiles easily baseline resolves these early eluting components such as chloromethane, dichlorodifluoromethane, vinyl chloride and bromomethane making it ideal for this type of analysis. The BPX-Volatiles gives excellent resolution of the middle to late eluting peaks in particular the baseline separation of the difficult to separate benzene and 1,2-dichloroethane. There are only 3 coelutions within these 60 commonly screened volatile organic contaminants, and the peak shape of these components is excellent. At 250°C, the upper temperature limit for this method, the baseline has not moved providing improved sensitivity for low-level analyses.

SUMMARY

The BPX-Volatiles has been specifically designed for the analysis of volatile mixtures. With a maximum temperature limit of 280°C the BPX-Volatiles is among the highest temperature volatiles columns available giving the chromatographer a great deal of flexibility when performing analyses. The high thermal stability of the phase results in a low bleed column ideal for low-level analyses. The BPX-Volatiles column is ideal for the analysis of volatile organic contaminants. The separation of these components is excellent on the BPX-Volatiles column. The separation coupled with the low detection limits make the BPX-Volatiles the first choice for the analysis of volatile organic contaminants.



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