# Water-Only Separation of Glycols Using the Aquachrom™ "Green Machine" with Universal Flame Ionization Detection

## Introduction

Glycols are colorless, odorless liquids with properties that make them useful as chemical intermediates in the manufacture of ester-based plastics and textiles. Ethylene glycol is used as an anti-freeze, and in the production of inks, pesticides, air conditioning and solar energy systems. Propylene glycol is used as a non-toxic antifreeze in dairies and breweries, and in the production of varnishes and resins. It is also used in drug production. Traditionally, the analysis of glycols has been difficult to achieve. Analyzing glycols is also extremely difficult because they are polar compounds. Furthermore, they have a very high boiling point and are only soluble in alcohol and water. They also lack a chromophore and cannot be detected by UV. When analyzed by GC or HPLC they must be derivatized. This makes them ideal candidates for superheated water analysis with flame ionization detection.

Selerity Technologies have applied the principles of gas chromatography theory to develop the Aquachrom™. Using this instrument, glycols can now be analyzed by using temperature programming with the FID and pure water. Water presents an attractive mobile phase for these types of separations because it shows no significant response in the FID and has the added benefit of being an environmentally-friendly solvent.

Table 1:
Conditions for Analysis of Glycols Using Water and FID Detection

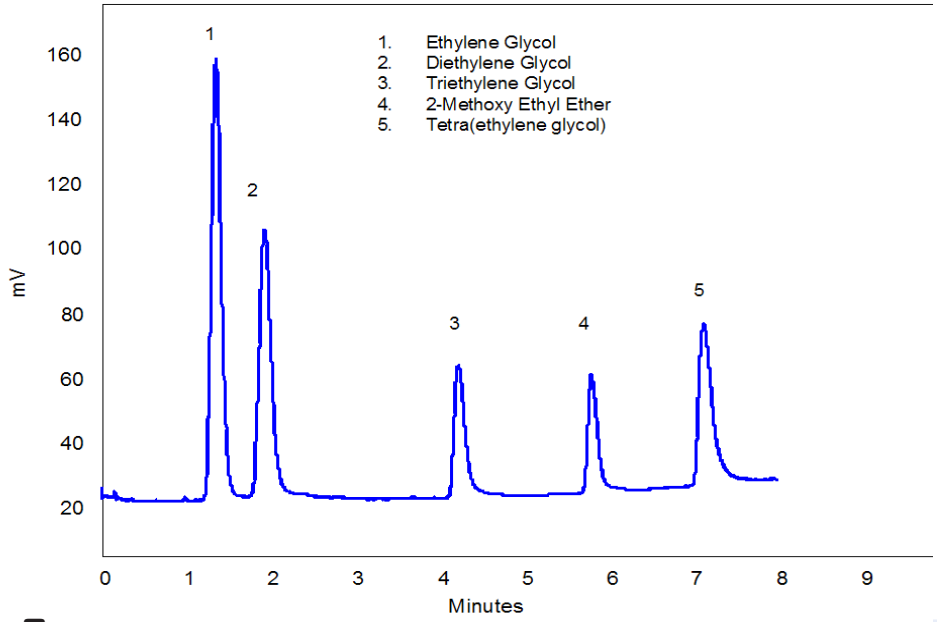
| | |
|---|---|
| Column: | Thermo-Electron Hypercarb, 1.0 x 100 mm, 3µm |
| Mobile Phase: | Water |
| Pump Flow: | 75 µL/min |
| Detection: | FID @ 400°C |
| Oven Profile: | 50°C ramp to 165°C at 25°C/min hold 10 mins |
| Injection: | 5 µL |

## Experimental

Conditions are summarized in Table 1. A Selerity Technologies Aquachrom Green Machine was combined with an Eldex syringe pump to perform the analysis.

## Results

Figure 1 shows the separation of glycols using the Aquachrom with water as the mobile phase and FID detection.




## Conclusions

Sensitive detection of glycols was achieved using water as the mobile phase and flame ionization detection. Samples that lack a chromophore can be separated using elevated temperature, eliminating organic modifier and using the universal detection of the FID.