Two Dimensional GC Using Agilent's Deans Switch 2310-0129

Technical Overview

Introduction

The Agilent Technologies Heart-Cutting Capability for the 6890 Gas Chromatograph (GC) is a full implementation of the Dean's switching technology. In the full implementation of this technology, all branches of the Dean's Switch are fully swept with carrier gas throughout all phases of the analytical process. This continual sweep of all flow paths ensures that there are no pressure or flow fluctuations in any of the switch paths.

Many other implementations used in heart-cut applications do not exhibit this continual flow characteristic. The failure to provide this continual flow means that when flows are switched, a pressure or flow equilibration must be established immediately after the switching operation. This equilibration necessitates that larger fractions must be switched to the analytical column, resulting in less background contamination being eliminated by the heart cut. As such, sometimes the cut volumes are many times the volume of the true analyte peak.

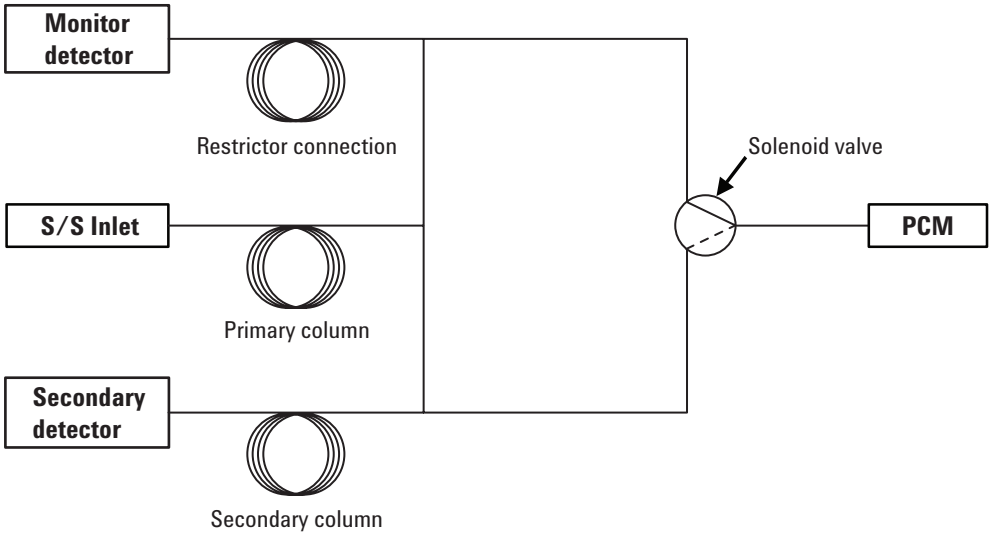
In Agilent Technologies' implementation, only the true volume of the analyte is transferred to the analytical column. As a result, one only needs to resolve truly co-eluting peaks from the precolumn on the analytical column. Agilent Technologies also minimizes active sites by using Restek's Sulfinert™ to treat metal surfaces that contact the sample. All pressure set points are controlled via Agilent Technologies Electronic Pressure Control that maintains the set point to within 0.1 psi. This control assures extremely reproducible retention times on both the monitoring and analytical columns, which again minimizes the actual volume that needs to be diverted to the analytical column.

The addition of a second monitoring detector provides the optimal configuration for method development and troubleshooting, should the need arise. This monitoring detector has also been an option on other implementations of the Dean's Switch. However, the use of the second detector in other systems was not as beneficial due to the lack of continual flow to all legs of the switch.

Some of the many possible applications include: oxygenates and aromatics in gasoline, thiophene in benzene, 4,6-DMDBT in diesel, and chemical warfare agents in various matrices.

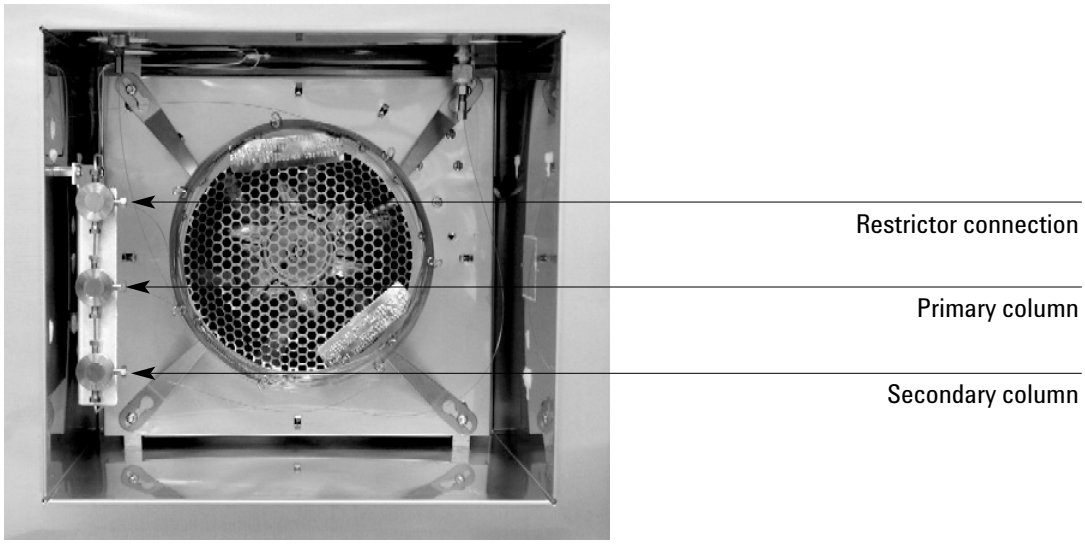
Application Highlights

- Hardware is supplied that will enable a sample that is injected onto a 'primary' column to have the effluent of this column switched over to a secondary column of different polarity. All metal surfaces in contact with the sample are Sulfinert treated.
- GC must have capillary inlet (112), two detectors and pneumatics control module (PCM) module (309). An autosampler and ChemStation are recommended.
- Special option includes Deans switching hardware CD-ROM containing program to enable set up and users manual.



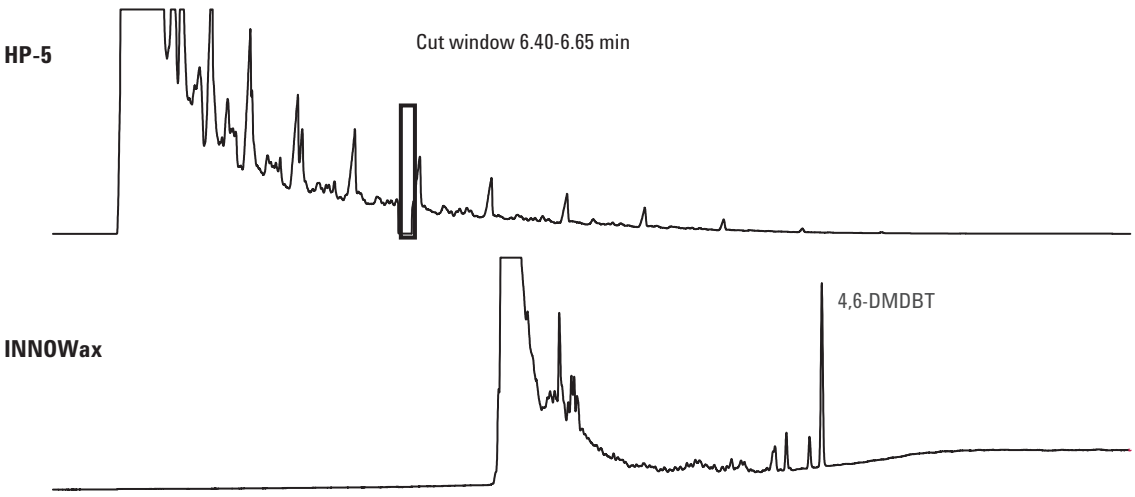
Deans switching system diagram.

Deans Switching Hardware 2310-0129

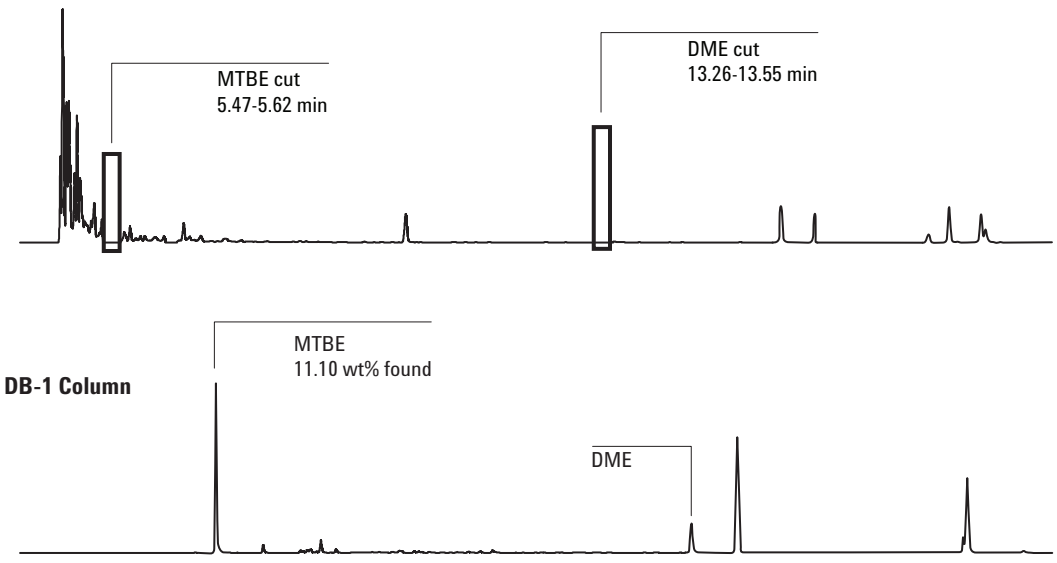


Oven column inlet connections.

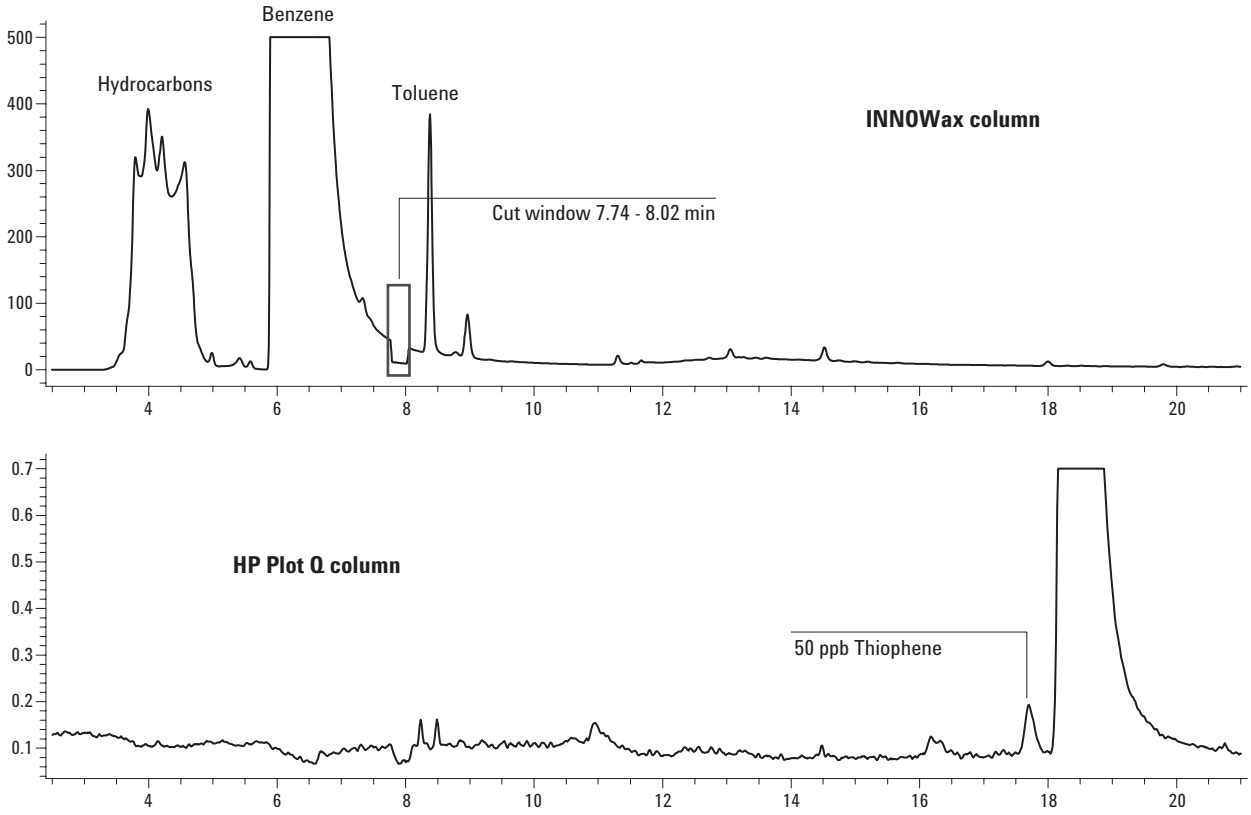
Example application one: 4,6-DMDBT in diesel.



Example application two: Trace oxygenates in gasoline.



Example application three: Trace thiophene in benzene.



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Printed in the USA
May 9, 2003
5988-9530EN

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