Cut maintenance time

from hours to minutes

Capillary Flow Technology

QuickSwap

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Agilent Technologies

A **reliable way** to reduce maintenance time without reducing productivity

Routine operation of any GC/MS system requires occasional maintenance of the inlet and column. At a minimum, this entails cooling the inlet and transfer line to change the liner or clip the column. What's more, changing the column requires the additional steps of shutting down the mass spectrometer to cool the source and venting the vacuum system. Once complete, the system must be restarted, pumped down, and baked out to remove water vapor before samples can be run again. The entire operation can take anywhere from hours to overnight, resulting in significant downtime.

With Agilent's Capillary Flow Technology QuickSwap, however, routine GC/MS maintenance can be conducted without cooling and venting. This leads to improved laboratory productivity, efficiency, and revenue, especially for high-throughput operations.

Agilent's QuickSwap solution represents a significant step forward in GC/MS maintenance technology. Previous attempts to design a flow system that allows operators to change or maintain columns and inlet liners while preserving the vacuum have been flawed.

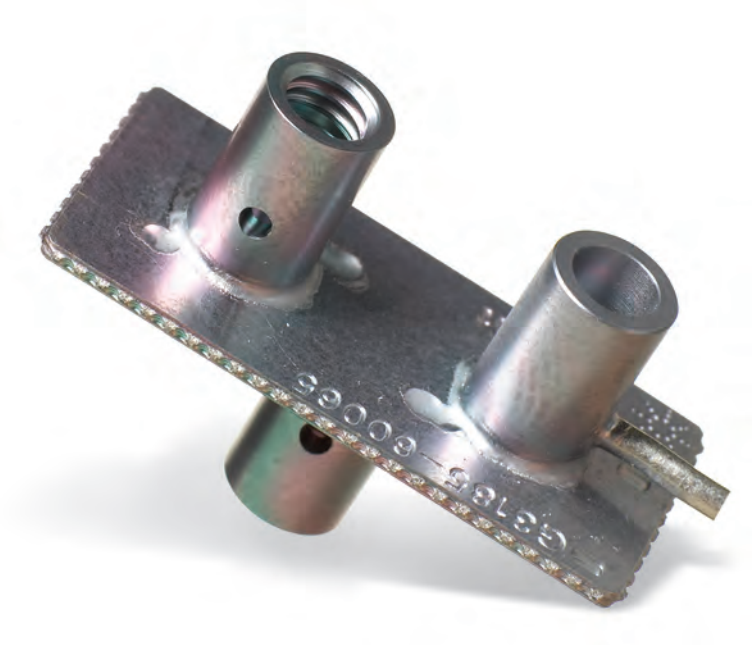
For instance:

- Large metal fittings with high thermal mass do not track oven temperatures well
- Many oven temperature cycles can cause leaks over time, risking damage to the MS source
- Internal surfaces are not inert, leading to peak broadening or loss of analytes

Agilent's Capillary Flow Technology QuickSwap module eliminates these drawbacks while facilitating these advantages:

- Fast column removal or replacement without the need to cool and vent the MSD
- Risk-free inlet and column maintenance by preventing air from entering the MSD
- Shorter analysis times and increased sample throughput by removal of high molecular weight compounds using backflushing mode*

The bottom-line benefit is compelling: routine maintenance can now be performed reliably in a matter of minutes rather than hours.



How does the Agilent Capillary Flow Technology QuickSwap work?

Designed to fully integrate with Agilent's Electronic Pneumatics Control (EPC), QuickSwap is a Capillary Flow Technology module placed between the end of the GC column and the entrance to the MSD transfer line. An Aux EPC or Pressure Control Module (PCM) is used to maintain inert gas flow to the MSD when the column is removed, inlet maintenance is performed, or the column is backflushed.*

With a proper choice of restrictor size, column flow, and purge gas pressure, the purge gas blankets the restrictor entrance – even when the column is removed. This keeps air out of the MSD and makes it possible to trim or remove columns while the MSD is under vacuum. At the same time, the transfer line and the restrictor inside remain hot, saving pump-down and equilibration time.

QuickSwap also can be used to perform column backflushing. This technique can shorten analysis time, increase instrument uptime by reducing the frequency of source cleaning, and reduce the contamination of the MSD by high-boiling sample components.

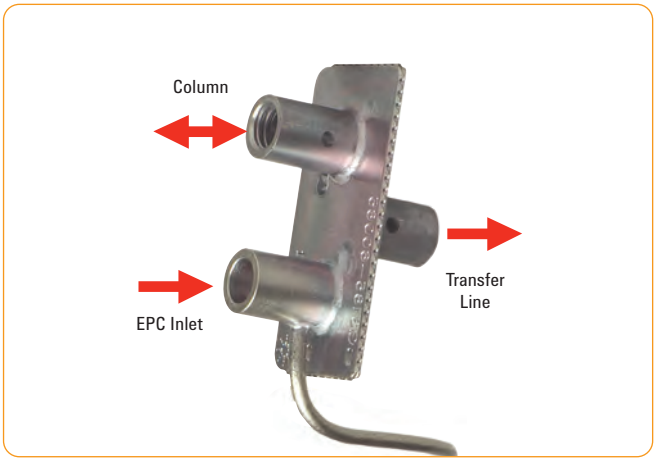


Figure 1. *QuickSwap – Capillary Flow Technology module for removing columns without venting MSD*

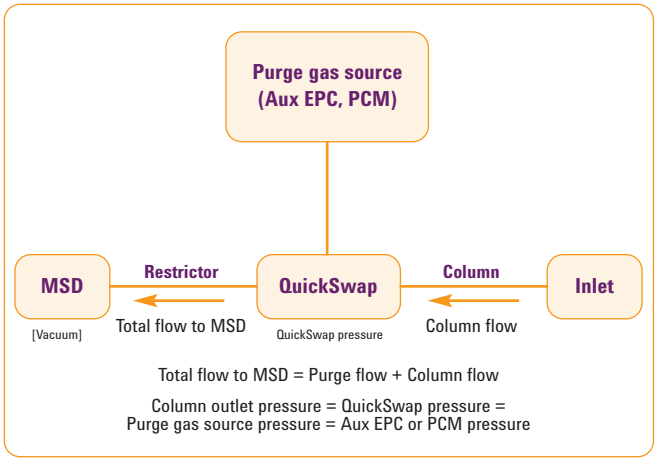


Figure 2. *QuickSwap flows and pressures*

***Caution**

Due to the possibility of exceeding pump flow limits, backflush is *not* supported on MSD systems with a diffusion pump. Backflushing is possible *only* with a turbo pump MSD.

Due to the dilution effect of the purge gas, use of the QuickSwap device will result in some loss in sensitivity. For applications that require maximum sensitivity, the QuickSwap device should not be used.

Data acquisition *must* be turned off when backflushing.

Backflushing should *only* be done with a split/splitless or PTV inlet.

See how QuickSwap **reduces downtime** and **increases productivity**

These examples show the advantages of using the Agilent Capillary Flow Technology QuickSwap module for backflush.

A typical 8270 sample may have heavy hydrocarbons that elute over a long period of time, even with a high-temperature bakeout step in the method. These materials are eluted into the mass spectrometer. In this application brief, an Agilent Capillary Flow Technology QuickSwap module was used to backflush the hydrocarbons through the split vent line by raising the pressure in the QuickSwap and lowering the inlet pressure. This reduced the overall run time by 20 minutes while still meeting criteria for System Performance Check Compounds (SPCCs) and Continuing Calibration Compounds (CCCs).

Significant Cycle Time Reduction Using the Agilent 7890A/5975C GC/MSD for EPA Method 8270

Agilent Application Brief 5989-6026EN

Industries:
Environmental

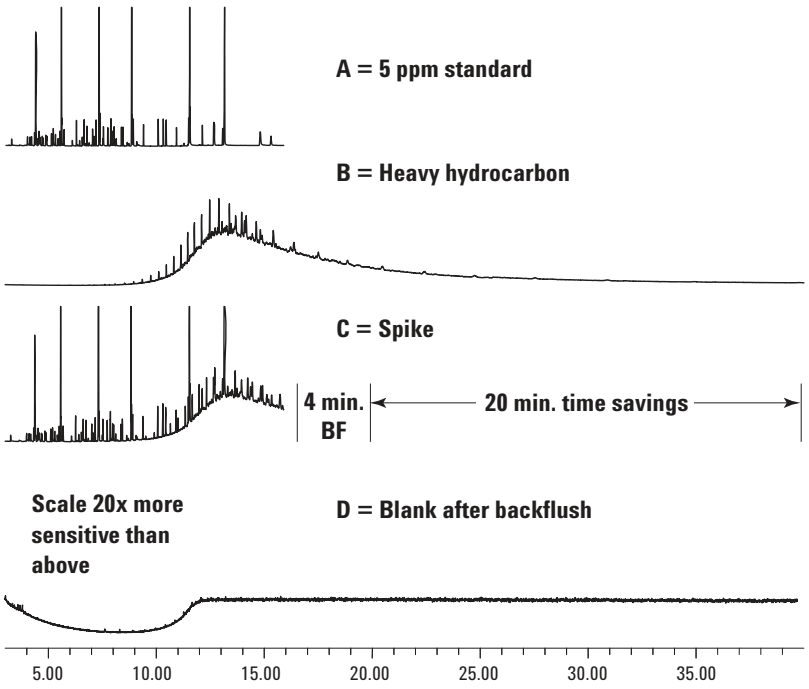


Figure 3. *Time savings using backflush. Note that the heavy hydrocarbon matrix is not on the column nor in the liner as shown in trace D.*

Flavor and fragrance allergens are determined in cosmetics using GC-MS. After simple sample preparation by nonselective extraction/dilution, extracts were injected and analyzed under fast screening conditions and locked retention times. After elution of the target solutes, the low-volatility matrix constituents, such as detergents, were effectively removed using capillary column backflush. As a result, column and detector contamination were strongly reduced and sample throughput was significantly increased.

Analysis of Suspected Flavor and Fragrance Allergens in Cosmetics Using the 7890A GC and Capillary Column Backflush

Agilent Application Brief 5989-6460EN

Industries:
Foods, Consumer Products

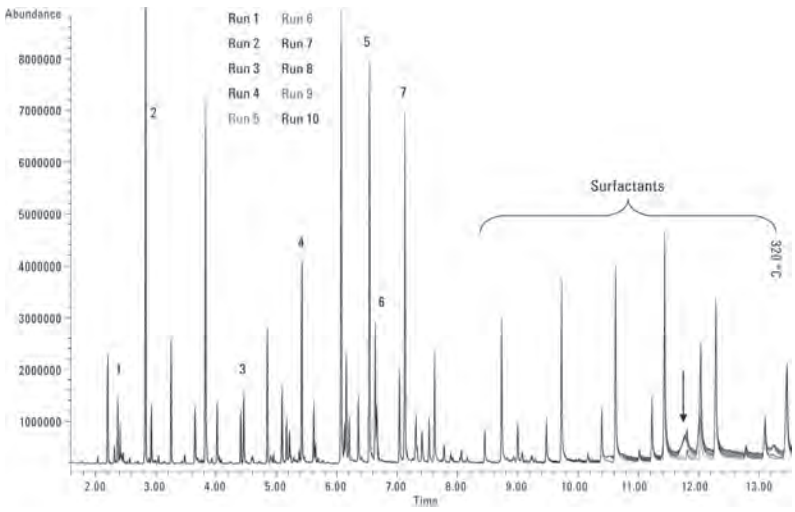


Figure 4. *Overlay of 10 consecutive analyses of shampoo extract with no backflush*

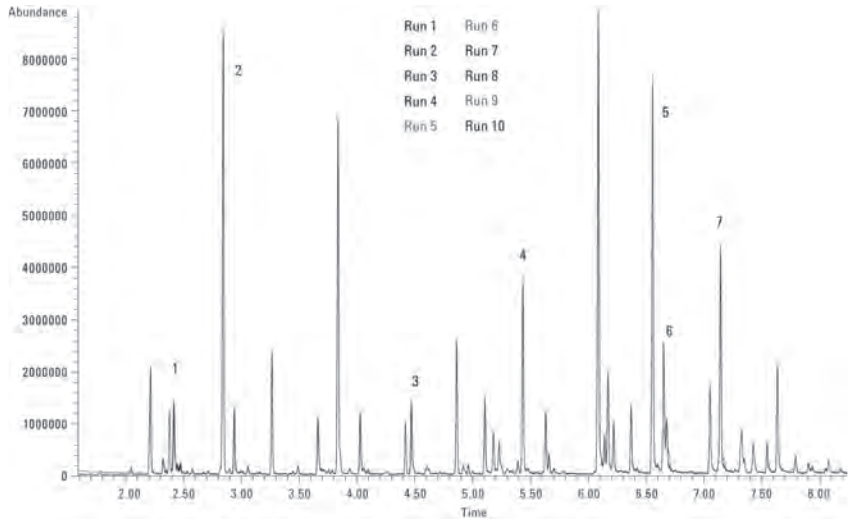


Figure 5. *Overlay of 10 consecutive analyses of shampoo extract with backflush. Note the absence of carryover of heavy compounds*

Here's **what you need** to conduct faster and more efficient GC/MS maintenance

7890A GC or 6890N GC with 5975 Series MSD

QuickSwap accessory

- On-site installation and verification are strongly recommended

Aux EPC module

- PCM can be used in place of Aux EPC

High-temperature SilTite ferrules and fittings (included with QuickSwap option and accessory)

Restrictor (2 each of 100 and 110 µm id restrictors included with QuickSwap option and accessory)

Flow Calculator or Method Translation Software (included with QuickSwap option and accessory)

- Also available online at **www.agilent.com/chem/flowcalculator** and **www.agilent.com/chem/mts**

Use these part numbers for easy ordering

Description	Part Number
QuickSwap Accessory for 7890A or 6890N GCs	G3185B
7890A GC with Aux EPC for QuickSwap. Three-channel Aux EPC installed and ready for QuickSwap with one aux channel tubing routed to the GC oven, optimized restrictor and calibration provided.	G3440A Option 885
PCM for 7890A GC	G3440A Option 309
PCM Accessory for Existing 7890A GCs	G3471A
PCM Accessory for Existing 6890N GCs	G2317A
Aux EPC Accessory for Existing 7890A GCs	G3470A
Aux EPC Accessory for Existing 6890N GCs	G1570A
SilTite Metal Ferrules (for 0.10-0.25 mm id columns); 10/pack	5188-5361
SilTite Metal Ferrules (for 0.32 mm id columns); 10/pack	5188-5362
SilTite Metal Ferrules (for 0.53 mm id columns); 10/pack	5188-5363
92 µm id QuickSwap Restrictor, 4/pack	G3185-60361
100 µm id QuickSwap Restrictor, 4/pack	G3185-60362
110 µm id QuickSwap Restrictor, 4/pack	G3185-60363
120 µm id QuickSwap Restrictor, 4/pack	G3185-60364
Variety Pack QuickSwap Restrictors, 8/pack (2 each of 92, 100, 110, and 120 µm id)	G3185-60300
Swaging Nut	G2855-20555
Internal Nut	G2855-20530
Column Install Tool	G1099-20030

For more information

Read:

A Column-Flow Independent Configuration for QuickSwap
Agilent Application Note, Publication Number 5989-6702EN

Simplified Backflush Using Agilent 6890 GC
Agilent Application Note, Publication Number 5989-5111EN

Agilent G3185B QuickSwap Accessory Installation and Setup
Agilent Manual, Publication Number G3180-90100

Agilent G3185B QuickSwap Accessory Reference Manual
Agilent Manual, Publication Number G3185-90101

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