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.

*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.
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](http://www.agilent.com/chem/flowcalculator) and [www.agilent.com/chem/mts](http://www.agilent.com/chem/mts)

Use these part numbers for easy ordering

<table>
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<th>Description</th>
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<tr>
<td>QuickSwap Accessory for 7890A or 6890N GCs</td>
<td>G3185B</td>
</tr>
<tr>
<td>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.</td>
<td>G3440A Option 885</td>
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<tr>
<td>PCM for 7890A GC</td>
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<td>Aux EPC Accessory for Existing 7890A GCs</td>
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<td>G1570A</td>
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<tr>
<td>SilTite Metal Ferrules (for 0.10-0.25 mm id columns); 10/pack</td>
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<tr>
<td>92 μm id QuickSwap Restrictor, 4/pack</td>
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<td>100 μm id QuickSwap Restrictor, 4/pack</td>
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<td>110 μm id QuickSwap Restrictor, 4/pack</td>
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<td>120 μm id QuickSwap Restrictor, 4/pack</td>
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<td>Variety Pack QuickSwap Restrictors, 8/pack (2 each of 92, 100, 110, and 120 μm id)</td>
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<td>Swaging Nut</td>
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<td>Internal Nut</td>
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<td>Column Install Tool</td>
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**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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