

AGILENT CAPILLARY FLOW TECHNOLOGY

MULTIPLY YOUR GC AND GC/MS
CAPABILITIES AND DIMENSIONS

Capillary Flow Technology (CFT) solves a problem that chromatographers have wrestled with for decades: creating inert, leak-free capillary connections that withstand the extreme temperatures of a modern GC oven.

CFT devices are part of the Inert Flow Path, with low thermal mass and small dead volume. When used with the UltiMetal Plus Flexible metal ferrules, they provide the most secure connections while precisely diverting your gas flows.

This opens the door to techniques that can expand analytical capabilities, improve your results, and conserve both time and resources.

Visit agilent.com/chem/CapillaryFlowTechnology to learn how to increase productivity and solve difficult application problems

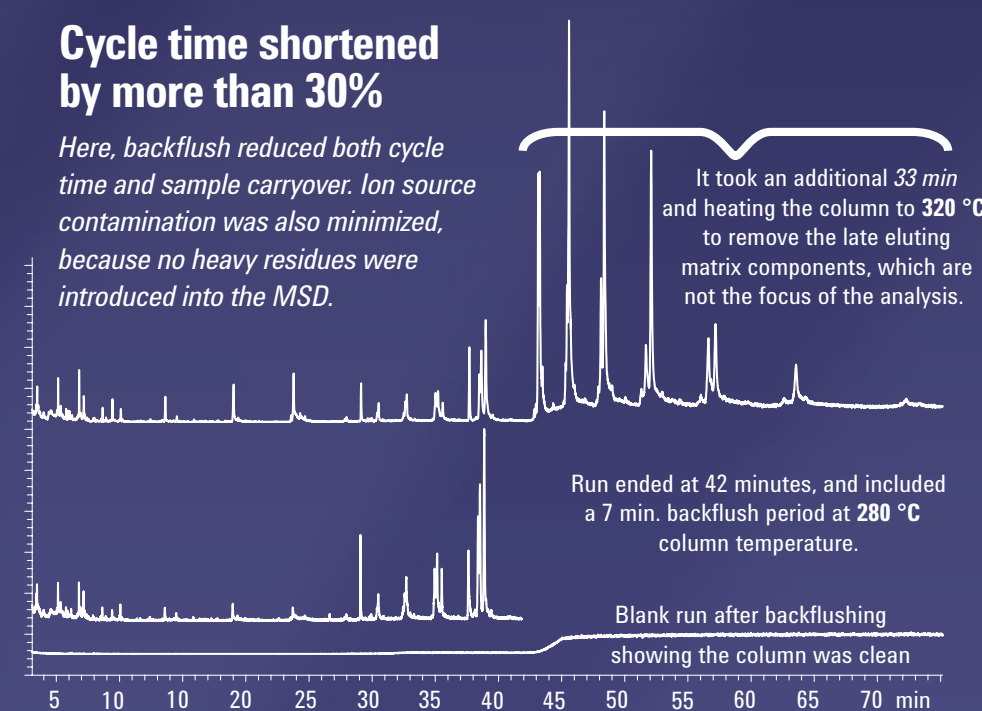
The Measure of Confidence



CFT BACKFLUSH Reduce run time and increase throughput

High-boiling sample matrix components must be fully eluted before starting your next run. This usually means adding a bakeout routine to the end of your method – which can dramatically increase cycle times. Using Agilent CFT Backflush configurations eliminates the need for bakeout by reversing column flow, resulting in:

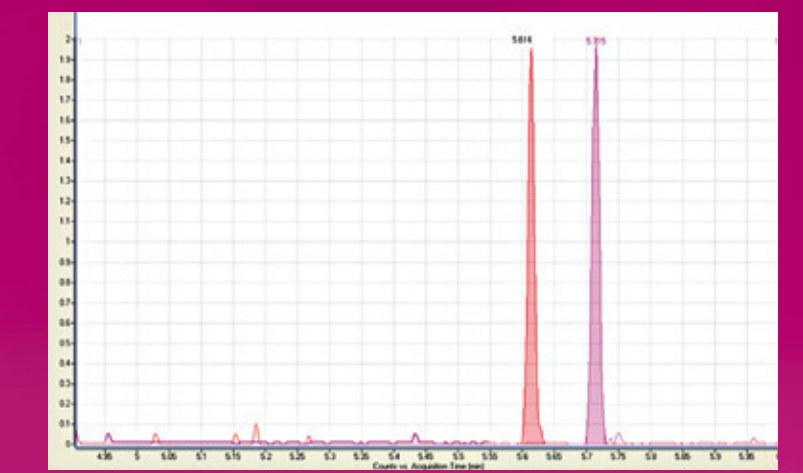
- **Higher productivity** through shorter analytical run times
- **Less maintenance:** Removing high boilers reduces the need for column trimming, detector maintenance, and recalibration
- **Lower operating costs:** Columns last longer when they are not exposed to high-temperature bakeout routines – or the build-up of high-boiling compounds
- **Better data:** Continual system contamination is minimized to ensure long term data quality



PURGED UNIONS Fast routine maintenance and simple backflush

During GC/MS inlet and column maintenance, shutting down the MS for system cooling and venting can cause significant downtime. The Agilent Purged Ultimate Union eliminates the need for cooling and venting by providing simple backflush capabilities to an existing GC or GC/MS method. This enables:

- **Simple leak-free connections**, part of the Inert Flow Path
- **Risk-free inlet and column maintenance** by preventing air from entering the MSD
- **Simple backflush resulting in shorter analysis times and increased throughput** by removing matrix contamination from the system



Purged Ultimate Union configuration for rapid and universal GC/MS backflushing, applied to selected reaction monitoring.

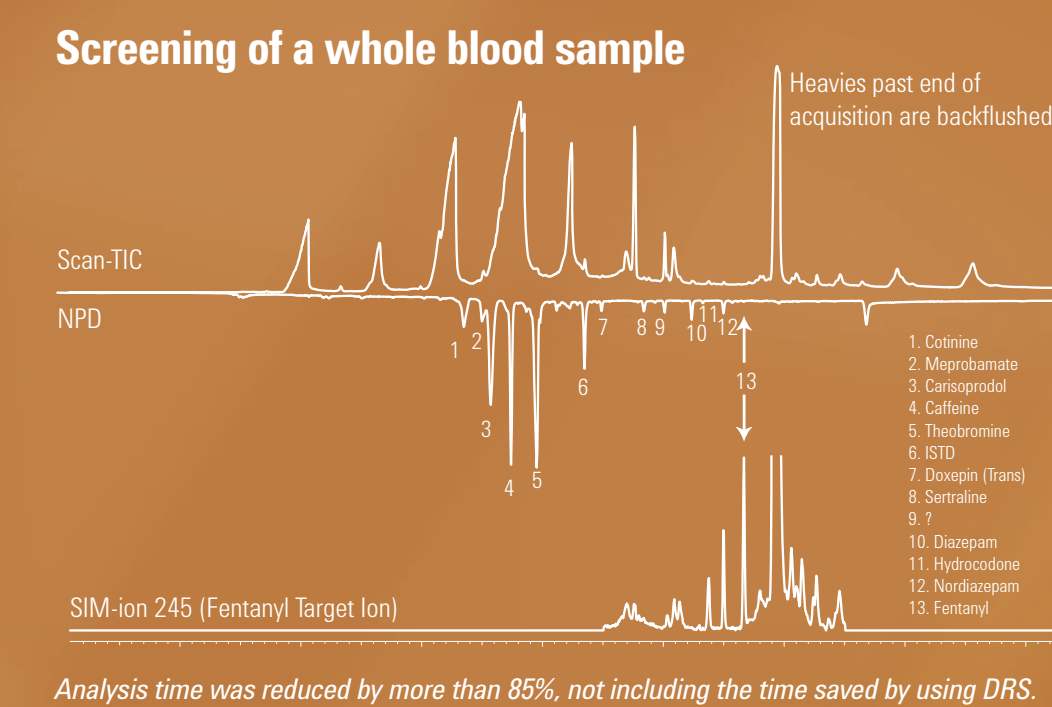
Control the backflush flow during inlet and column maintenance to avoid venting the MS.

FLOW SPLITTERS Gather more data in less time

Analyzing complex samples may require using different GC detectors to meet detection limits, overcome matrix interferences, or confirm unknown peaks.

A CFT splitter – which splits effluent from a single column to two or three detectors on the same GC – is a time-saving alternative. However, this technique can be hampered by technical limitations of the splitting hardware. Agilent CFT Splitters solve these challenges with leading-edge innovations like these:

- **The column and restrictors attach to the module** using UltiMetal Plus Flexible metal ferrules that do not outgas, shed, detach, or leak – even after multiple oven cycles
- **All surfaces are deactivated** as part of the Inert Flow Path
- **Aux EPC allows for optimal flow** to GC and MS detectors on the same system
- **Calculator determines the correct restrictor dimensions** for a specific split ratio



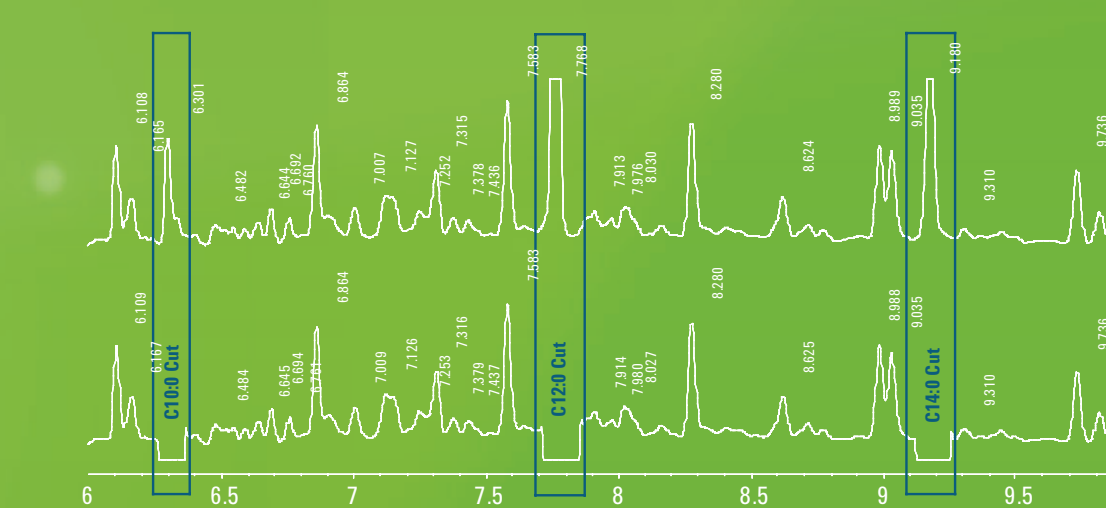
DEANS SWITCH Increase the resolving power of your GC

Complex matrices often have too many overlapping compounds to properly resolve analytes of interest. In these cases, additional selectivity is needed.

A Deans Switch is an easy – and affordable – way to further resolve multiple components using two different columns in the same analytical run on the same instrument. Additional selectivity can be achieved with two separate detectors. The Agilent CFT Deans Switch offers several unique benefits, including:

- **Low thermal mass** that allows the Deans Switch to closely follow the oven ramp
- **Small dead volumes** that eliminate peak broadening
- **UltiMetal Plus Flexible metal ferrules and fittings** that keep leaks in check, even after many oven temperature cycles
- **Inert surfaces** that prevent peak tailing and analyte loss
- **Backflush capabilities** that can reduce run times and prolong column life

Analysis of FAME content and distribution in biodiesel blends using heart-cutting 2D gas chromatography



Top: Biodiesel separation on the primary column before the heart-cuts. Bottom: Separation after the heart-cuts.

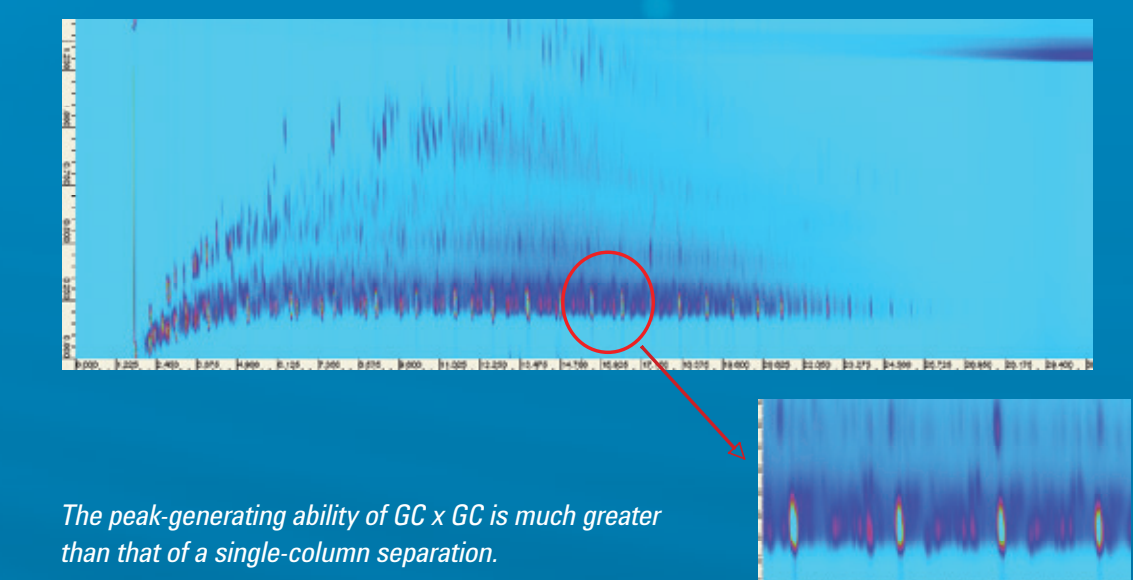
GC X GC FLOW MODULATOR 2D data for complex mixtures

Two-dimensional GC (GC x GC) is a powerful technique that can separate very complex mixtures – such as those found in hydrocarbon processing, environmental, and food/fragrance applications.

The Agilent GC x GC method uses two columns, typically of very different polarities, installed in series with a differential flow modulator between them. Four key properties of the modulator are:

- **Requires no cryo-cooling to re-focus**, providing significant savings to the lab
- **Collects the material from the first column**, dividing the peak into several cuts
- **Focuses the material collected** from each cut into a narrow band
- **Introduces the bands sequentially** into the second column

Flow modulation applied to a gas oil feedstock



The peak-generating ability of GC x GC is much greater than that of a single-column separation.