Improve Efficiency and Minimize Downtime of Your GC/MS System

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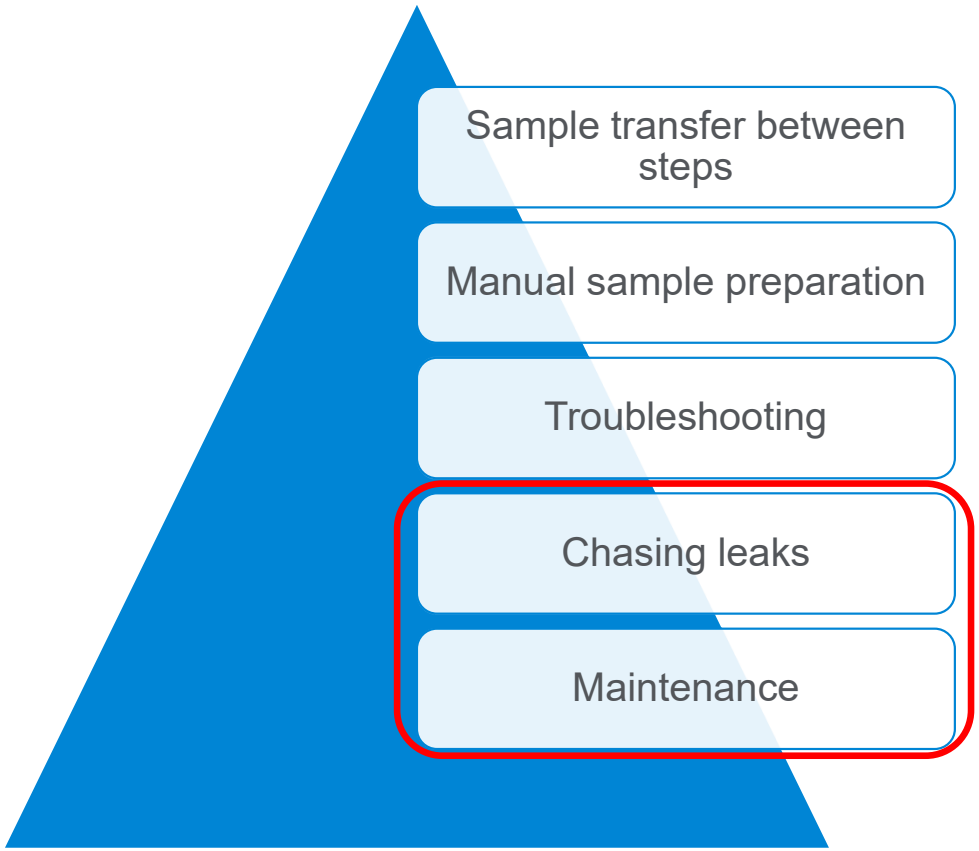
GC Supplies Product Manager

Agilent
Trusted Answers

Where Do We Lose Time in the Lab?



Chasing Leaks

Instrument Maintenance

Daily maintenance

- Wash vials
- Liner

“Every few days” maintenance

- Inlet septum
- Gold seal
- Column trim or guard column replacement
- Syringe

Monthly(ish) maintenance

- Column replacement
- Source cleaning

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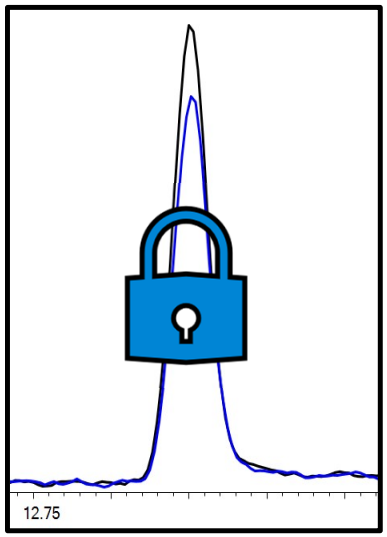
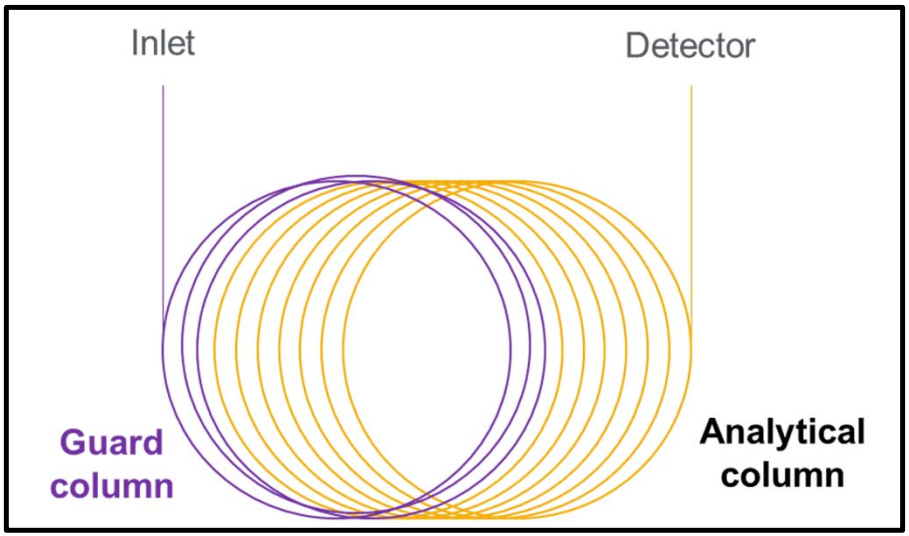
How Can We Minimize Maintenance Downtime and Hassle?



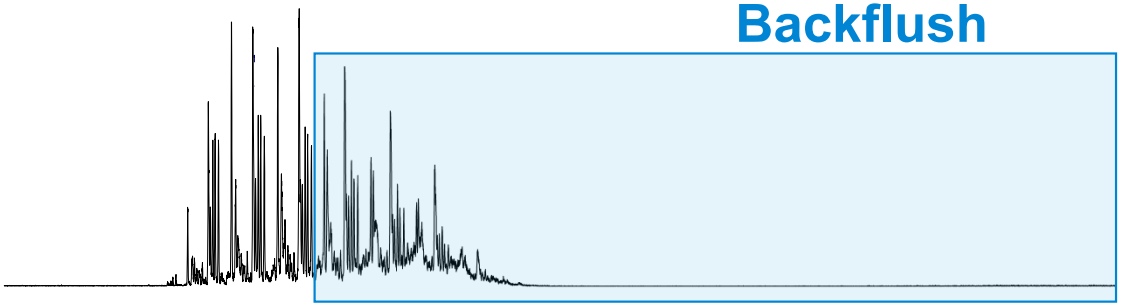


Collared self-tightening nut

Retention time locking

Guard columns

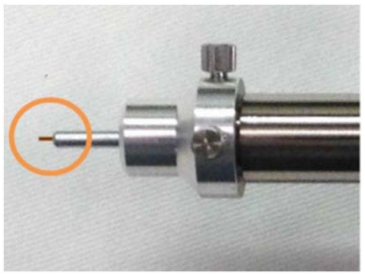
Backflush



When It's Time to Replace the Column…

- What's the installation depth for MSD again?
  - Flush with ceramic o-ring (or 1–2 mm past end of transfer line)*

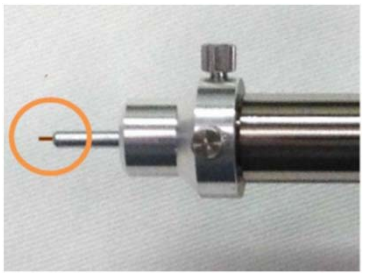
Is this a familiar sight in your lab?



When It's Time to Replace the Column…

- What's the installation depth for MSD again?
  - Flush with ceramic o-ring (or 1–2 mm past end of transfer line)*
- Did I close the vent valve?
- Is the nut tight enough?
- Did I check the o-ring?

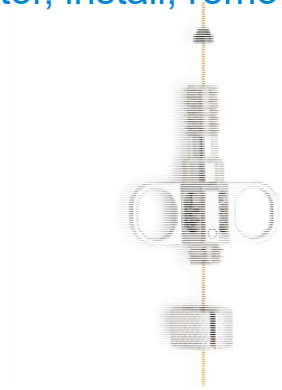
Is this a familiar sight in your lab?



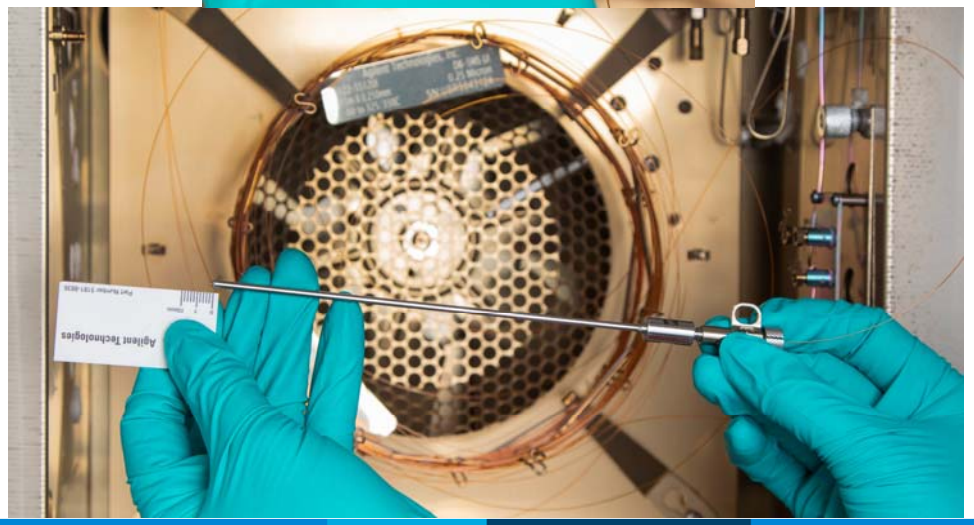
Collared Self-Tightening Column Nuts: Holds Installation Depth

- Spring-driven piston continuously presses against ferrule
- Wing design for finger tightening
- No wrenches needed!
- Collar holds column in place for easy and fast installation
  - Set the depth for inlet or detector, install, remove collar and it's ready to run

For mass spectrometry transfer line



For GC inlet or detector



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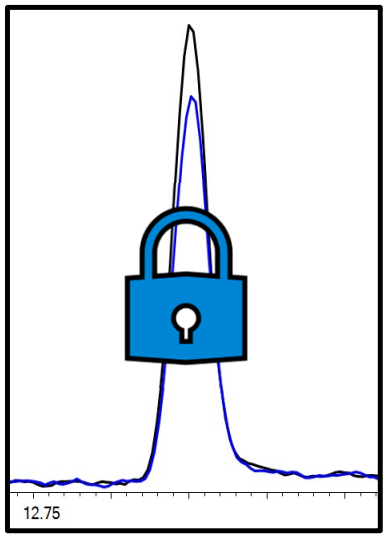


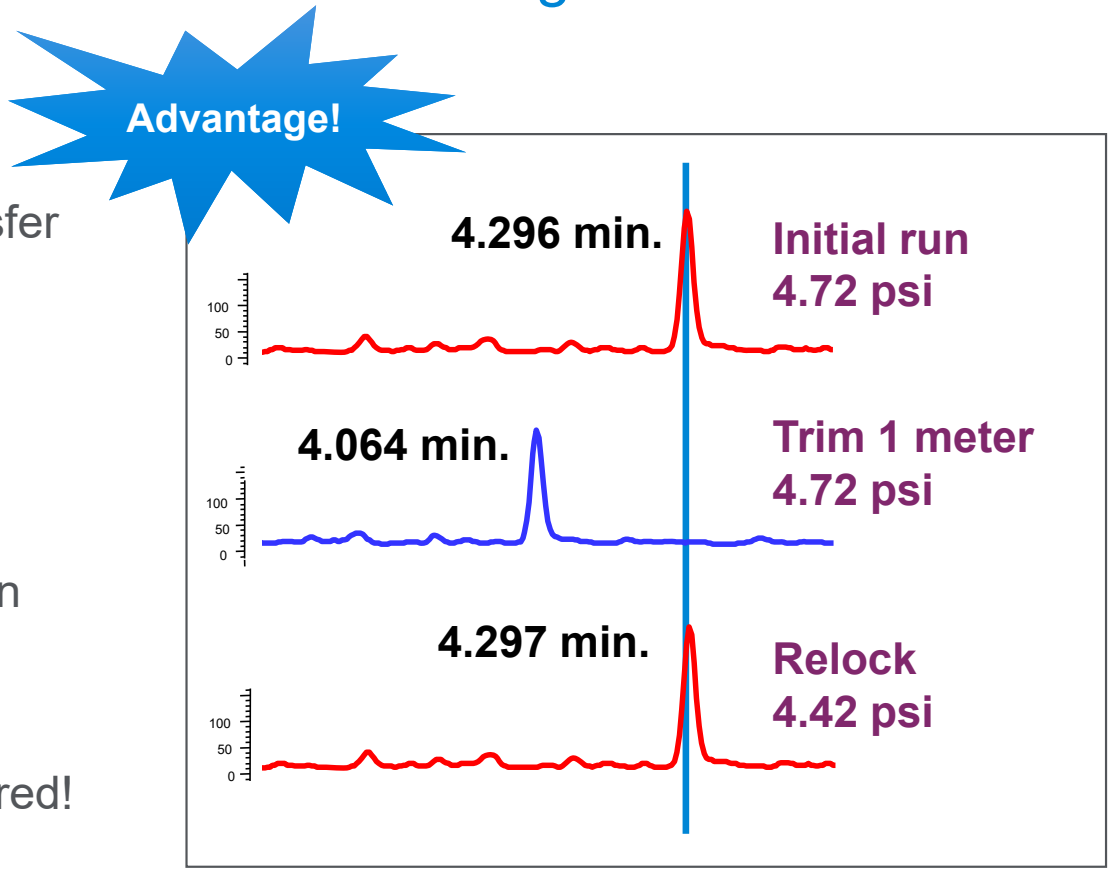
Collared self-tightening nut

Retention time locking

Retention Time Locking—Prevent RTs from Shifting

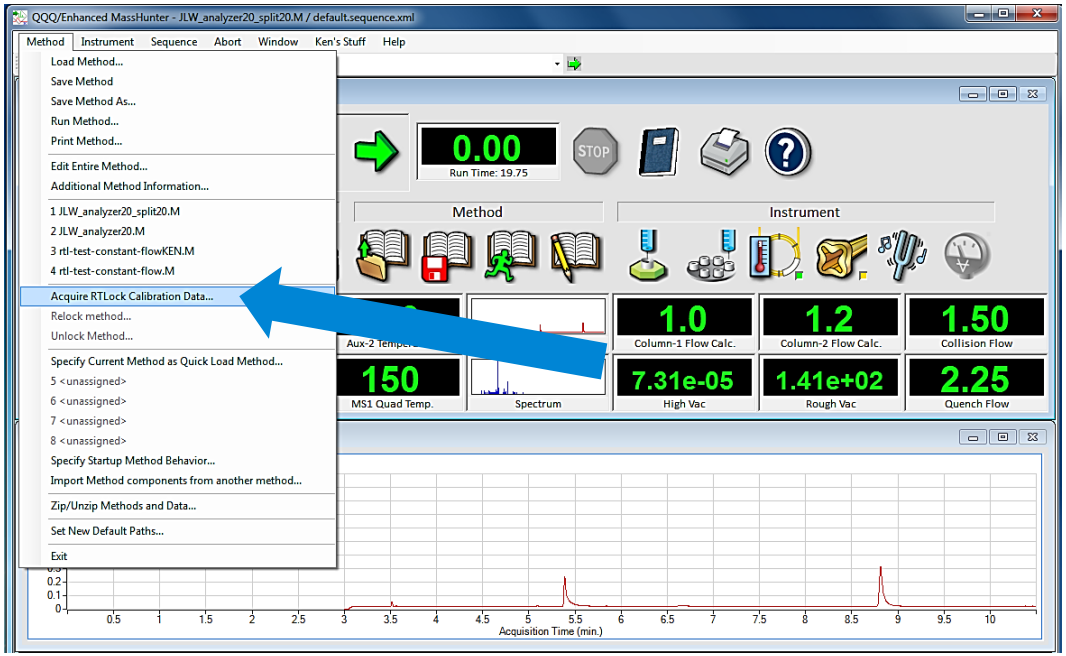
Why use it?

- Easier method development and transfer to other GCs/labs
  - Apples-to-apples comparisons
  - Easily transfer compound libraries
- Stable retention times from system to system and column trims
- Helpful for analyses with RT calibration tables and libraries
- Only run one relock run after a trim!
- No analysis method revalidation required!



How Do I Complete RT Locking?

- Recommendations
  - Have good separation
  - Use a known standard with compound(s) of interest
- Name “locking peak” and enter *m/z* values
- Five runs are automatically made using a known standard
  - Constant pressure or flow methods
- Software IDs peak in each run and calculates RT locking time
- This five-run process is done only once at setup, not daily
  - Run standard to verify expected retention times



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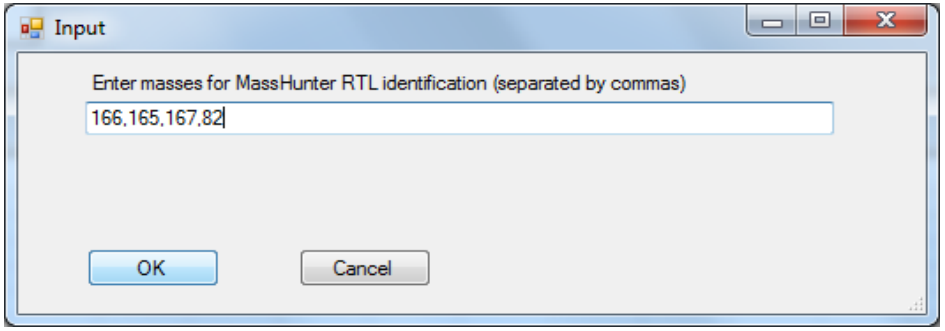

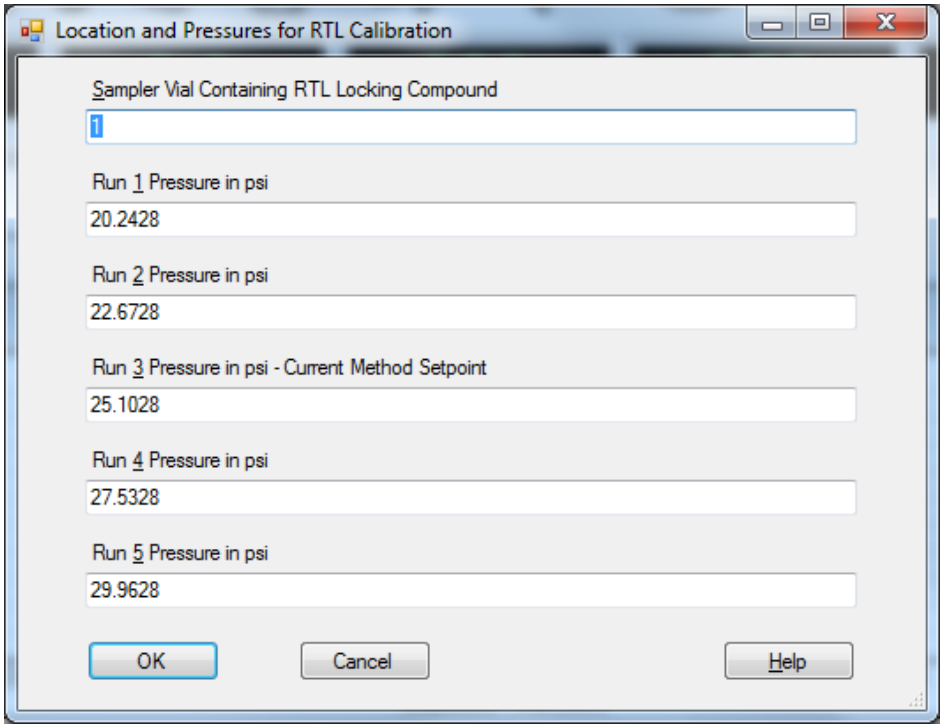

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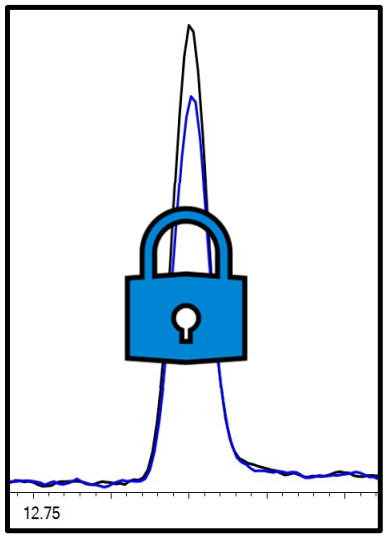
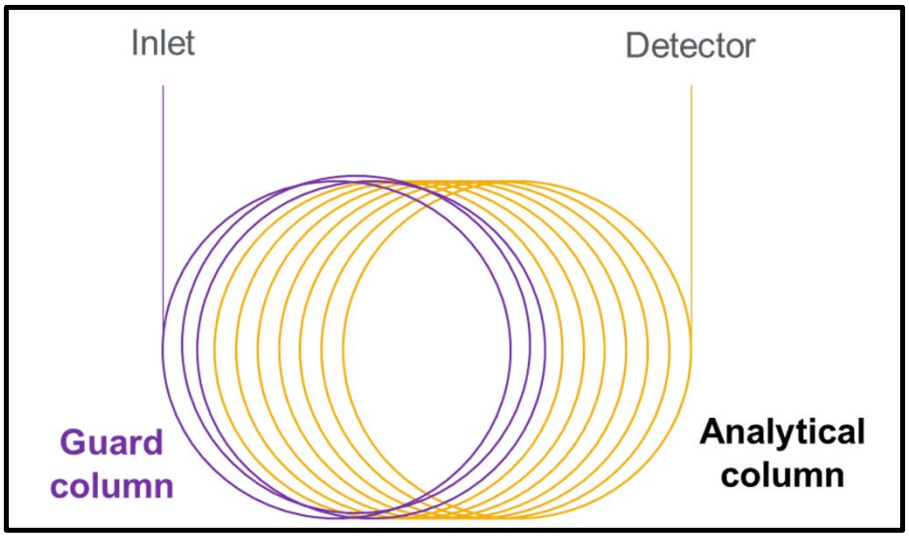


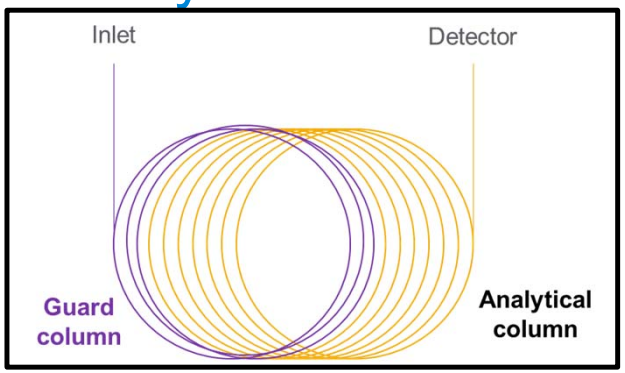


Collared self-tightening nut

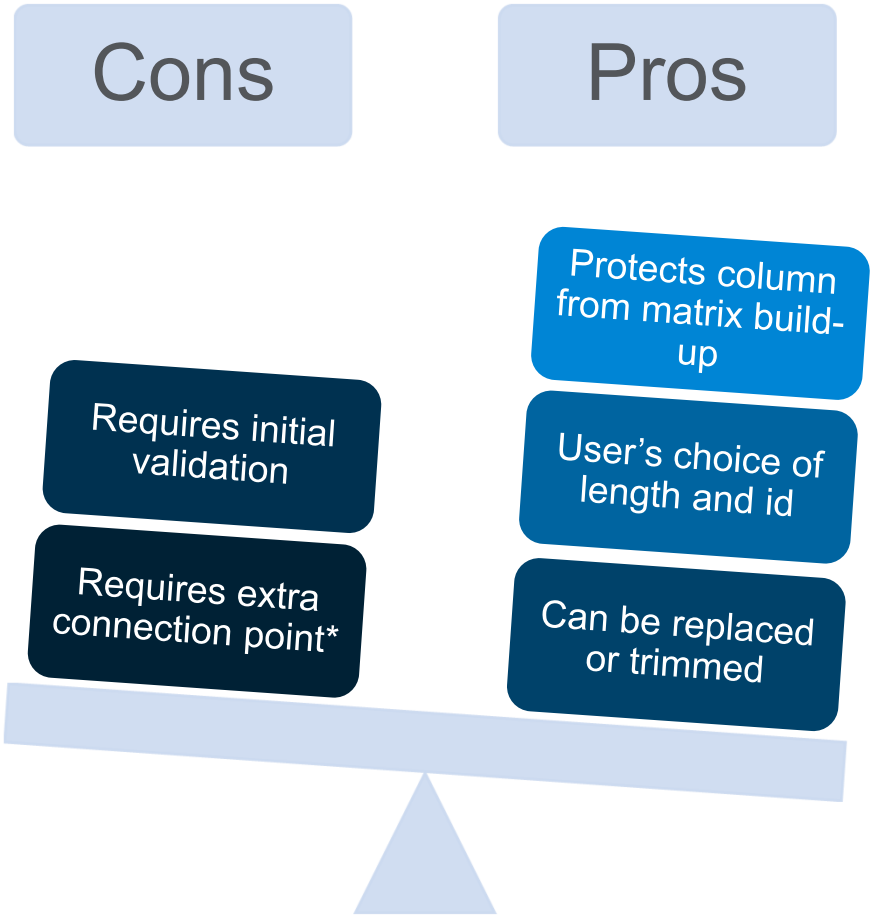
Retention time locking

Guard columns

Why Would I Want a Guard Column?



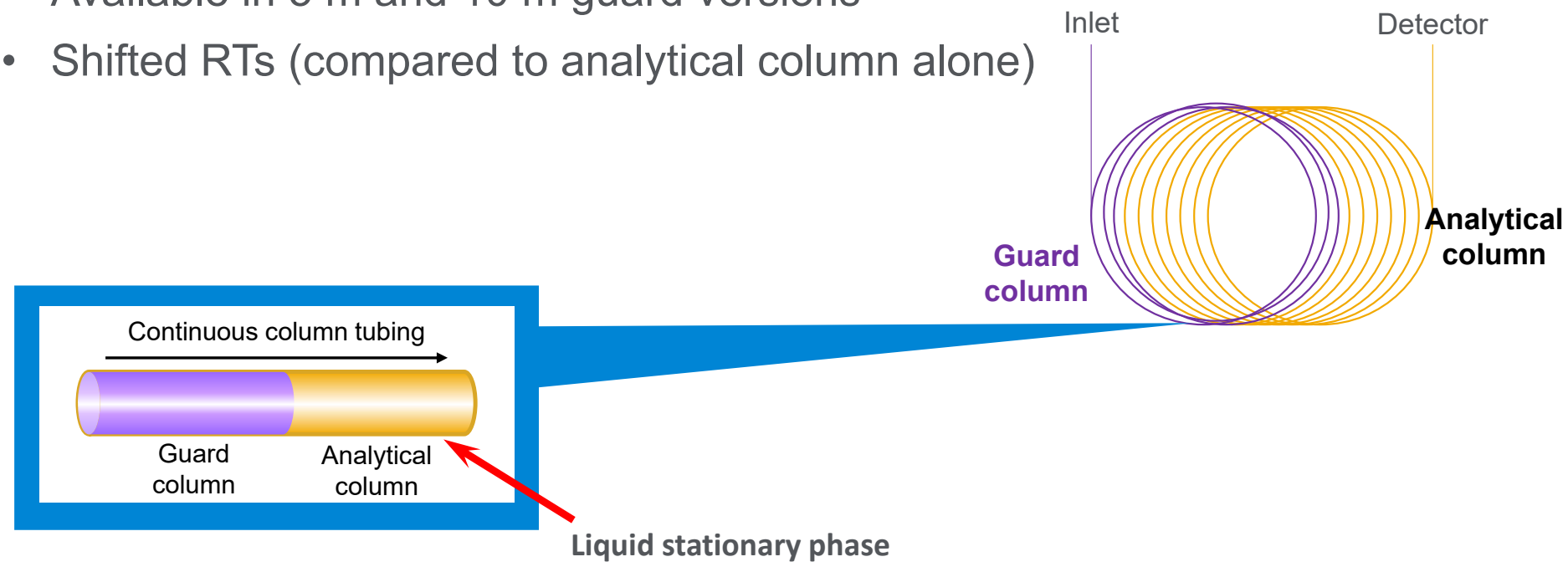
- Could result in leak if not securely connected
- Ensure union is inert
- Need to revalidate method



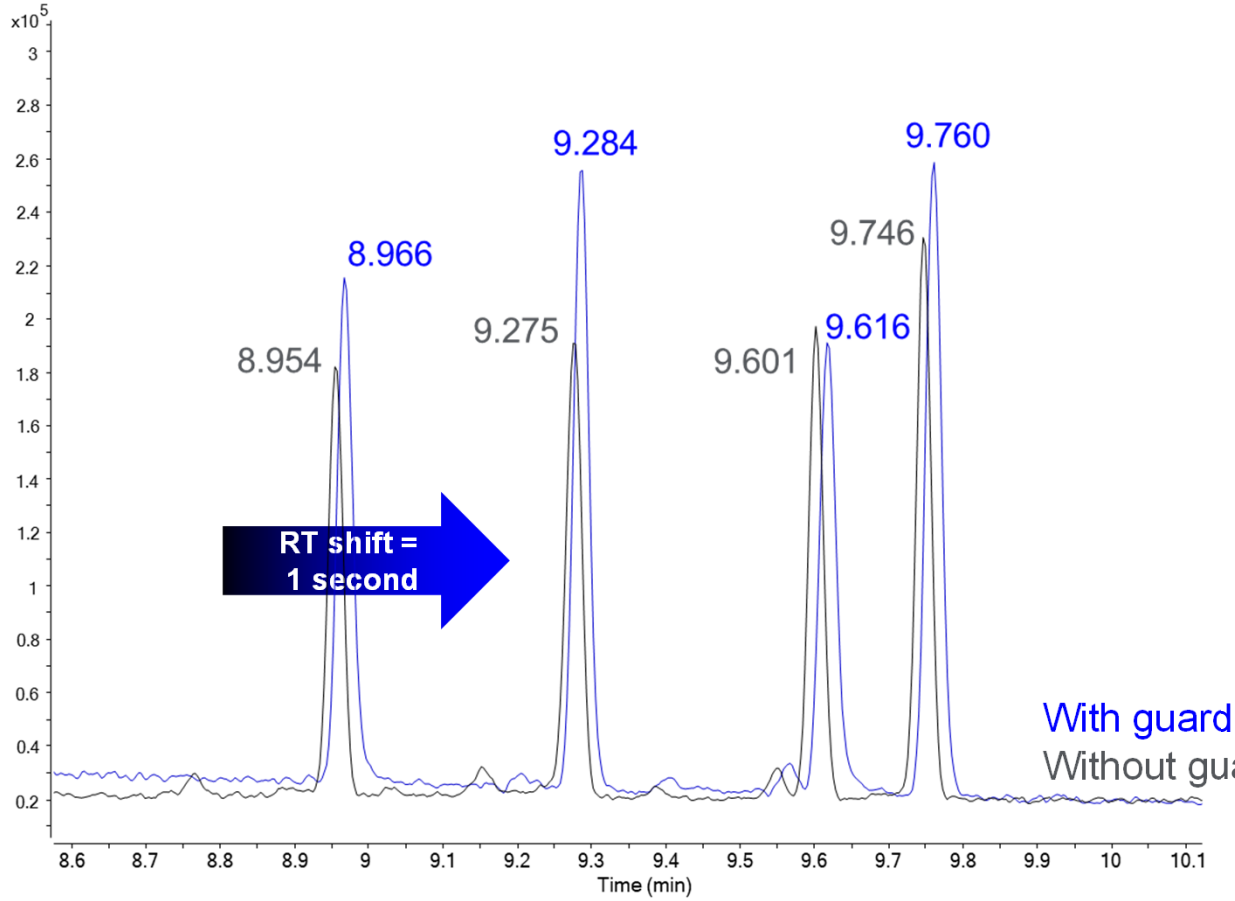
- Easily maintained
- Longer column lifetime
- Tailor to application and sample type
- Integrated guard columns available
- Replacement → no change to retention time
- Reduce or eliminate column trimming

Integrated Guard Columns

- Prevent pollution of analytical column
- One length of fused silica without connectors
- Available in 5 m and 10 m guard versions
- Shifted RTs (compared to analytical column alone)



How Much Does a 1 m Guard Column Shift the Retention Time?

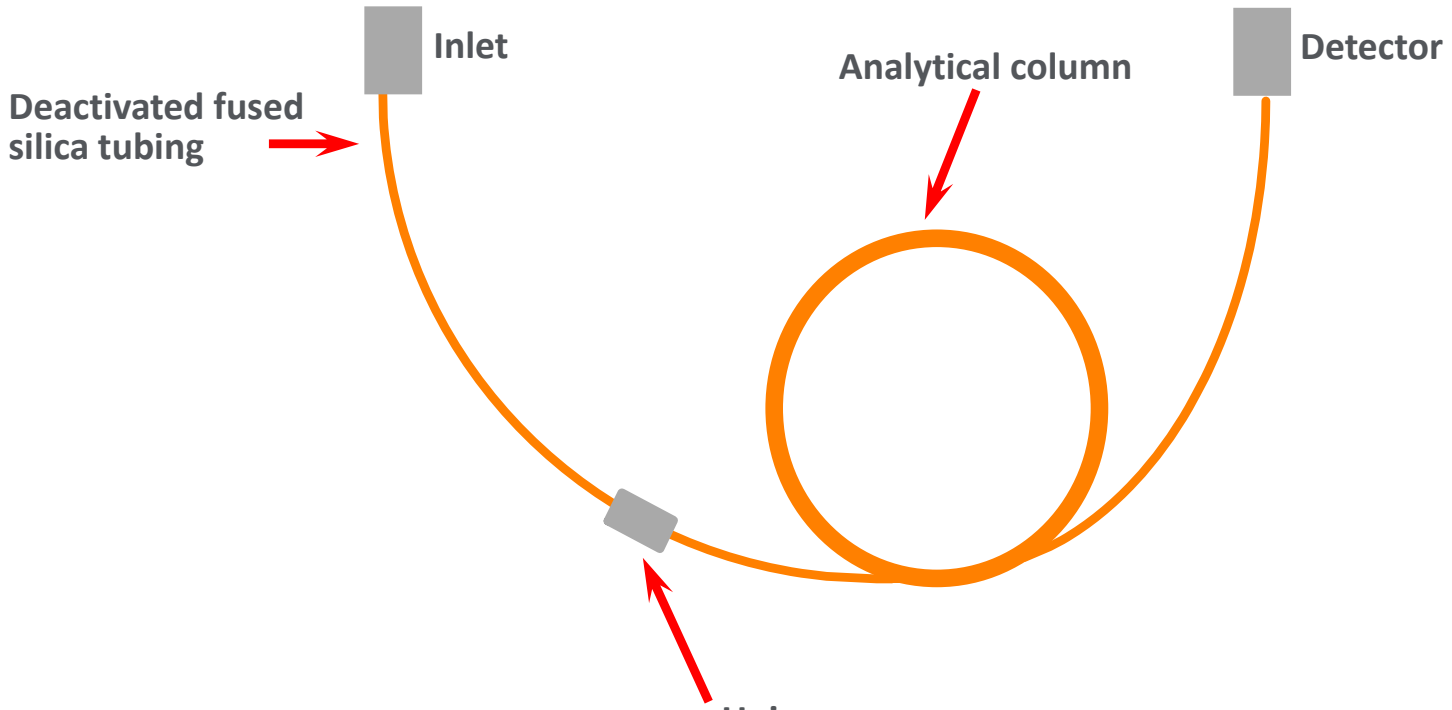


With guard column: 1 m × 0.53 mm

Without guard column

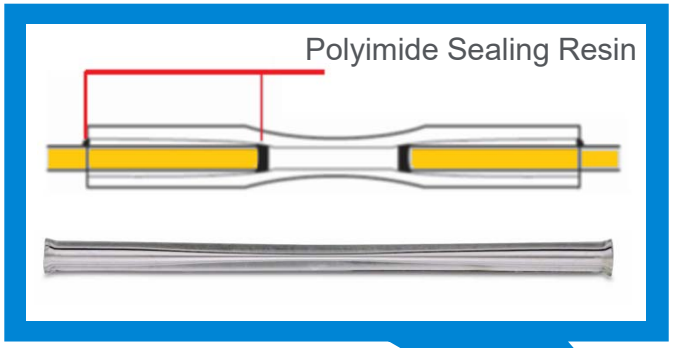
Pesticides analysis by GC/MS: 30 m × 0.25 mm × 0.25 µm DB-5ms UI

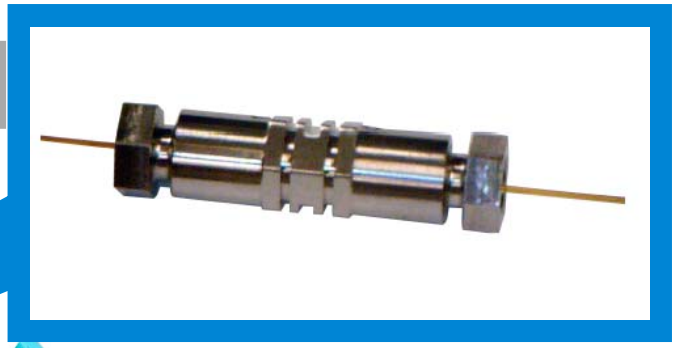
Guard Column Connections



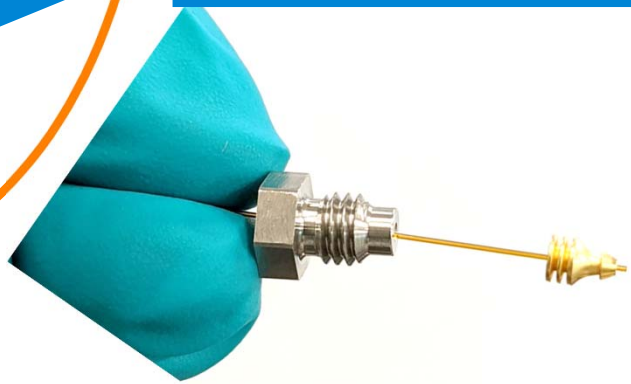
- Glass Press-fit or Deactivated Metal Union
- Connects guard and analytical columns

Guard Column Connections





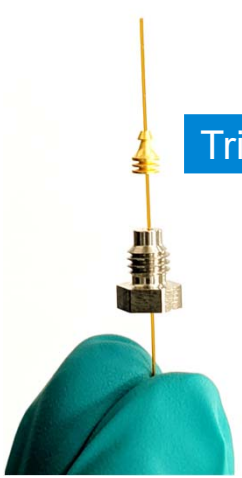
Analytical column



Union

- Glass Press-fit or Deactivated Metal Union
- Connects guard and analytical columns

Pre-Swaging CFT Connections



Trim column

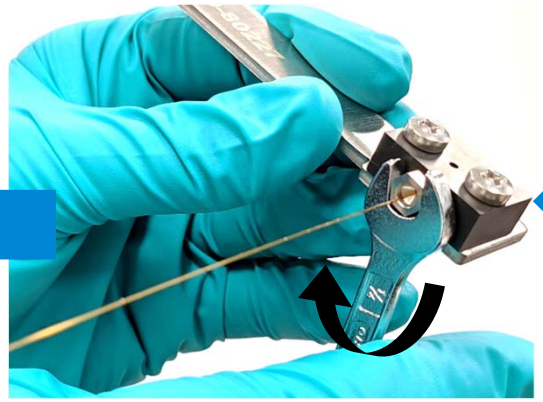
Insert in tool

Pre-Swaging CFT Connections

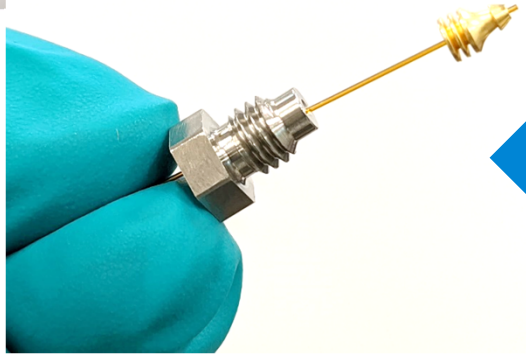
Trim column

Insert in tool

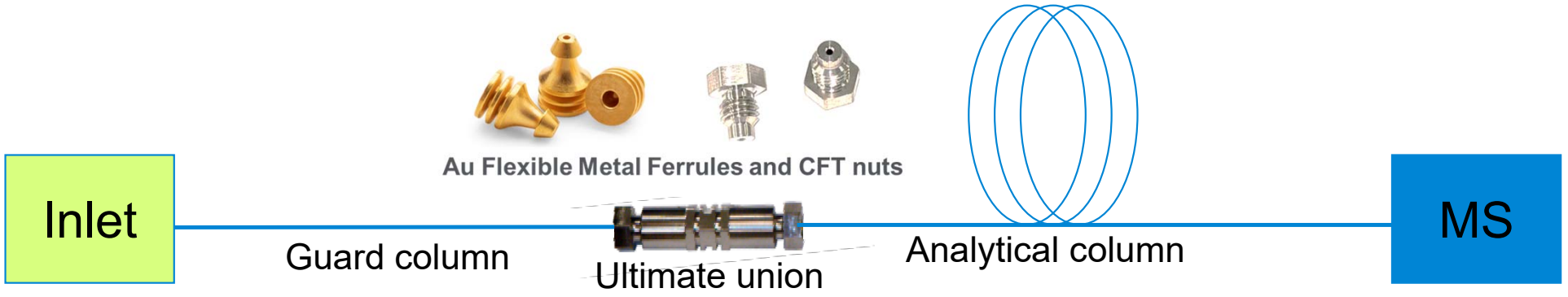
Tighten



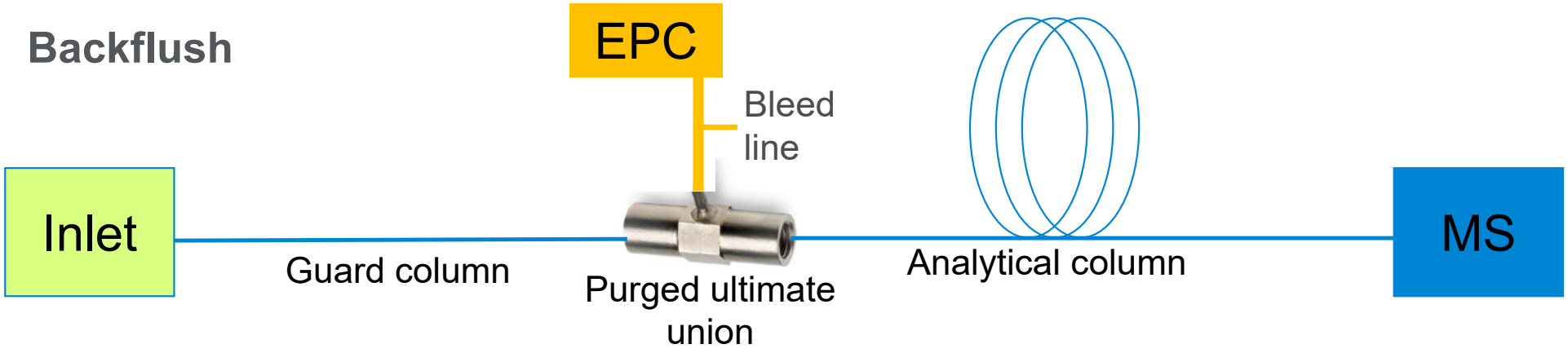
Done!



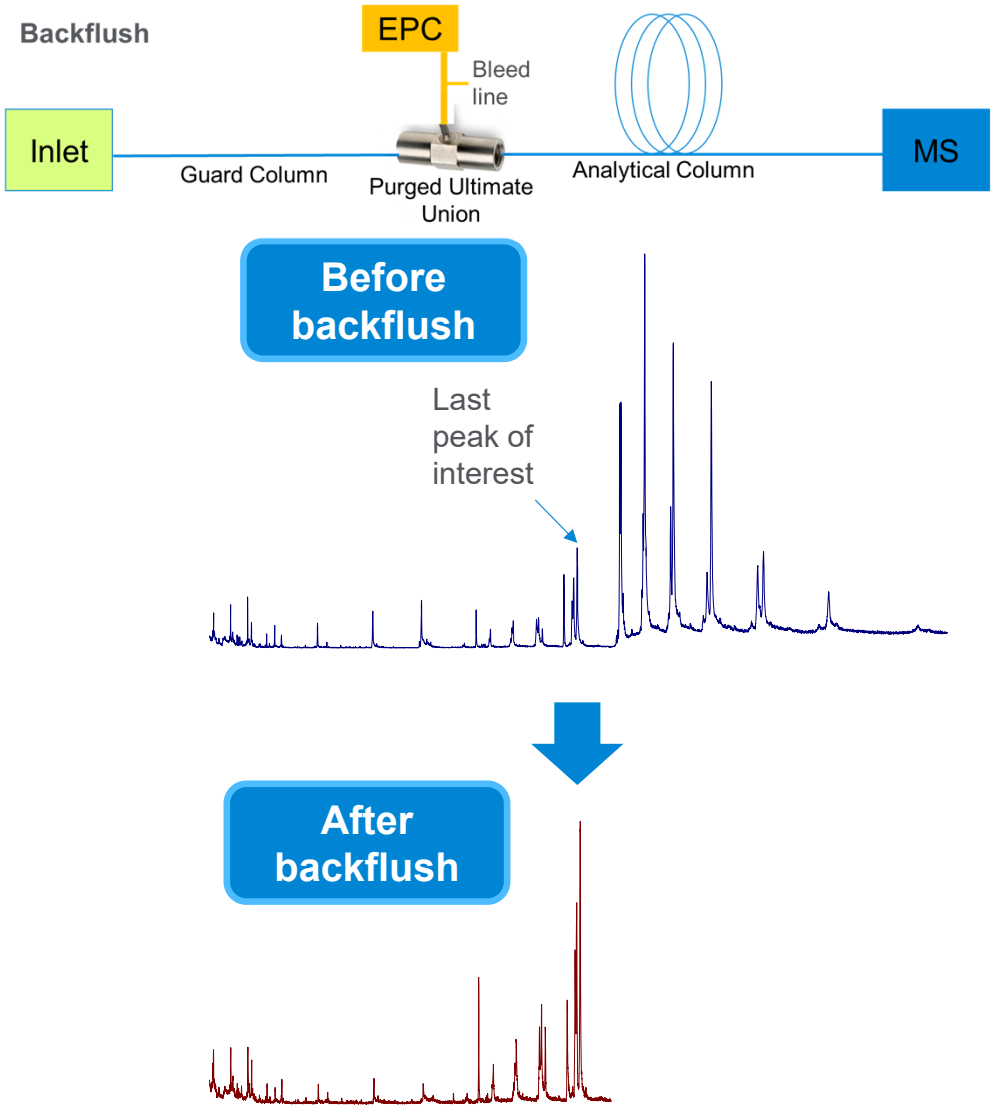
Are There Other Improvements I Could Make with CFT?



Backflush



Keep It Clean with Backflush



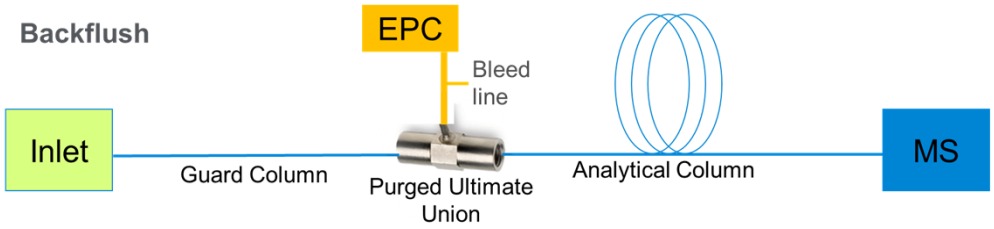
Keep It Clean with Backflush

Cons

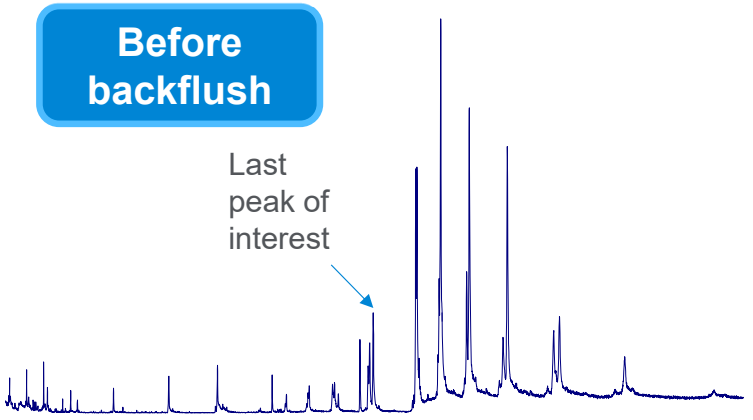
- Requires method validation
- Requires 2nd pressure module/ connection point

Pros

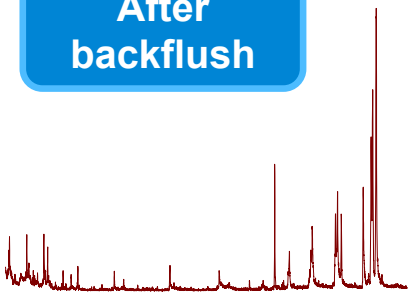
- Shorter run times*
- Protects column from matrix build-up
- Vent-free maintenance
- Reduced source cleaning*



Before backflush

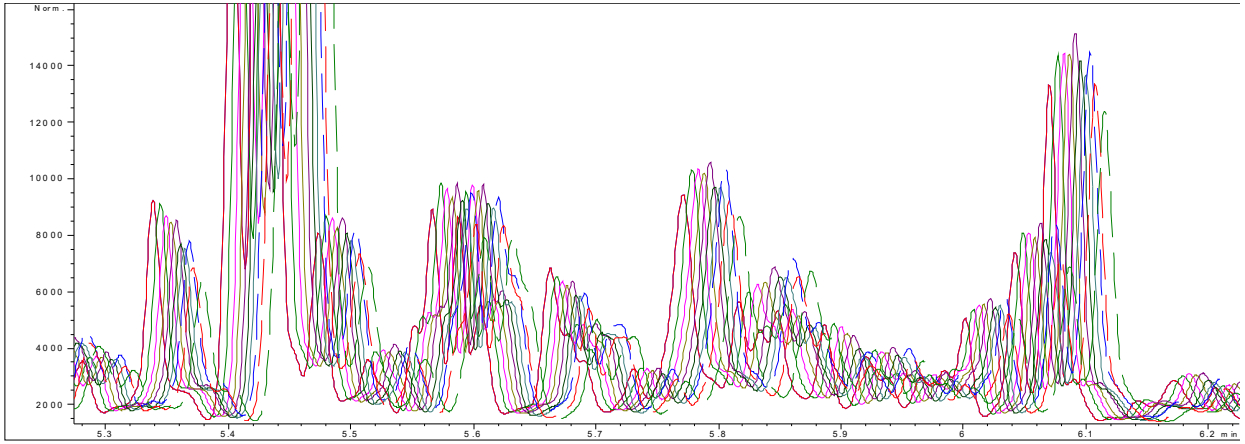


After backflush

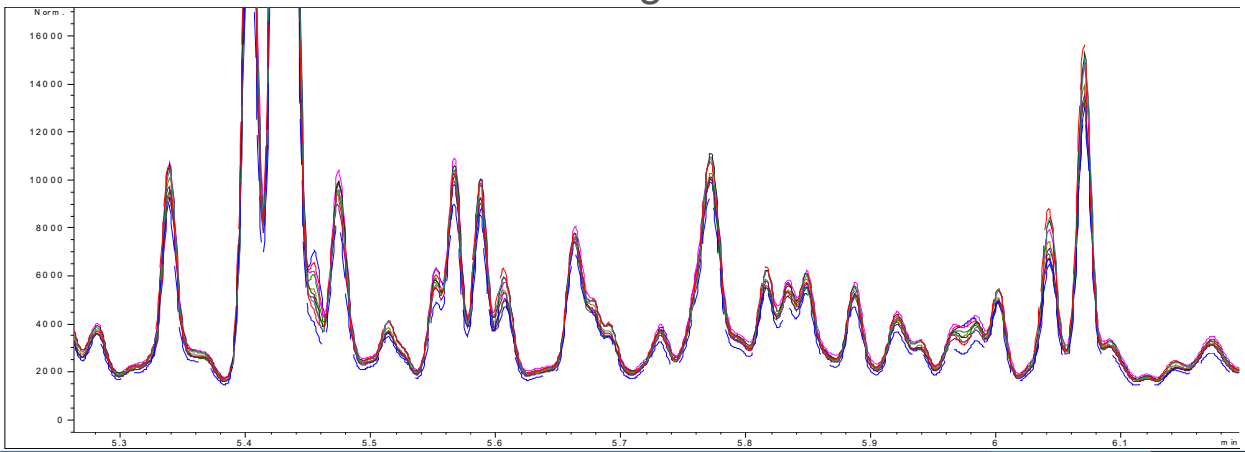


10% Fish Oil in Acetone: Benefits of Backflushing

10 runs without backflushing: Retention times shift ~4–5 sec during 10 runs



10 runs with backflushing: RT shift eliminated



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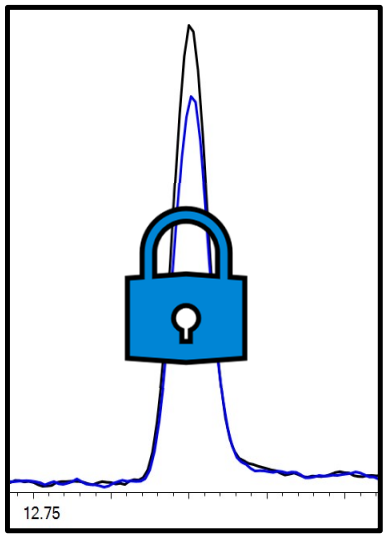

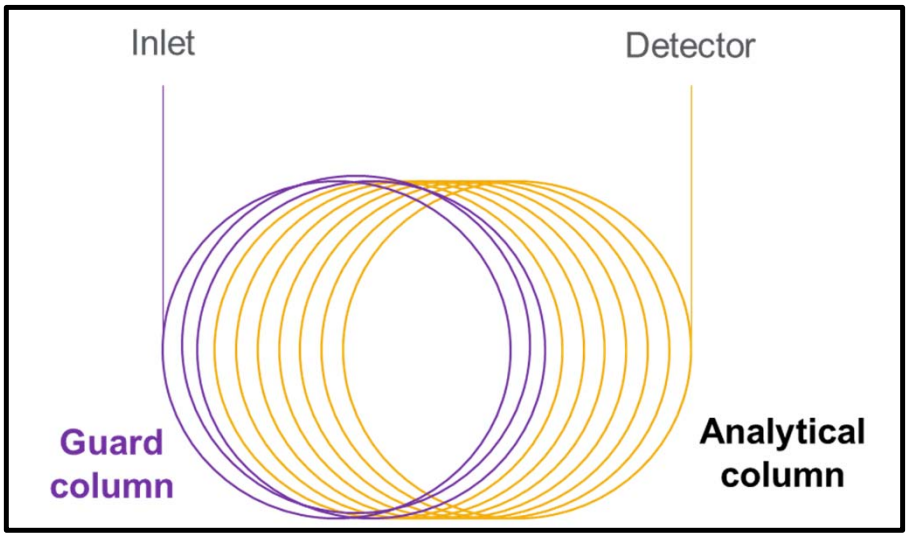

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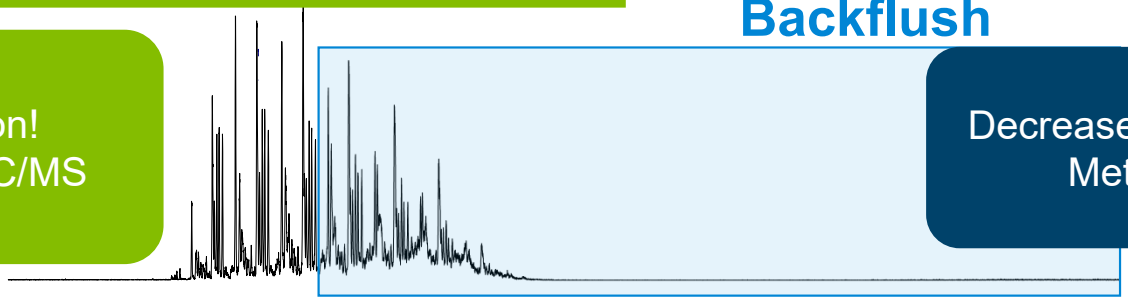

Easy changes
No method revalidation!
Applicable to GC and GC/MS methods

Decrease column maintenance
Method revalidation

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Thank you!

Any questions?