Get the Most Out of Your MS

Novel Column Chemistry Raises the Bar on Sensitivity and Data Accuracy

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Agilent
Trusted Answers

DE-000108

The Evolution of Gas Chromatography

1950

Packed columns

1960

Glass columns

1970

5830 GC

1980

5890 GC

Founding of J&W Scientific

Fused silica capillary columns

Polyimide coated columns

Agilent Technologies

1990

DB-624

DB-5ms

2000

Agilent acquires J&W Scientific

6890 GC

2010

DB-Wax Ultra Inert

7890 GC

Intuvo GC

DB-5ms Ultra Inert

DB-HeavyWax

2020

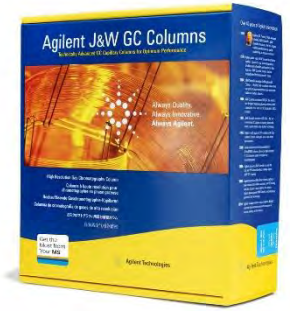
8890 GC

HydroInert ion source

2024

7010D HES 2.0

HP-5Q and DB-5Q



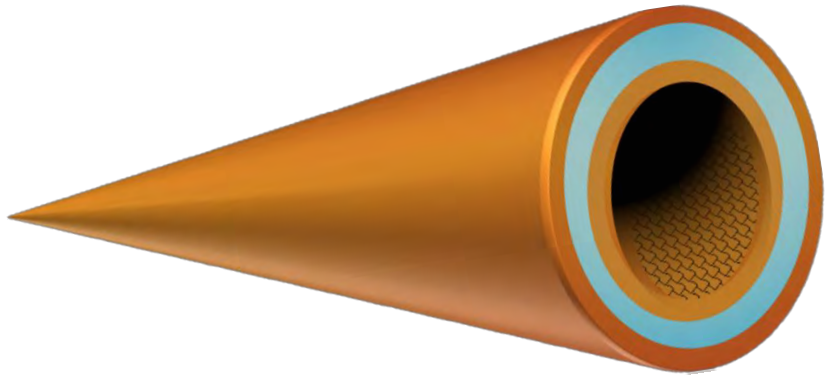
MAOT (Isothermal Versus Programmed)

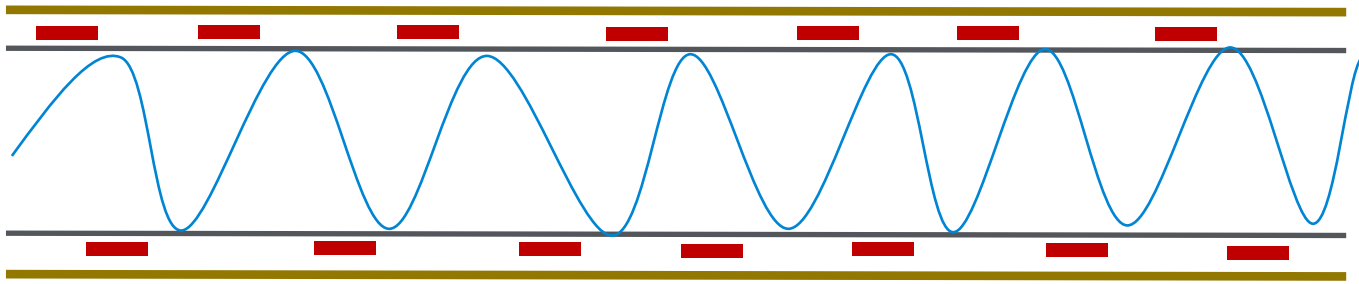
$$k = \frac{t_{compound} - t_{methane}}{t_{methane}}$$

Maximum Allowable Operating Temperature (MAOT)

$$RI = 100 \times \left[n + \frac{\log\left(t'_{r(unknown)}\right) - \log\left(t'_{r(n)}\right)}{\log\left(t'_{r(N)}\right) - \log\left(t'_{r(n)}\right)} \right]$$

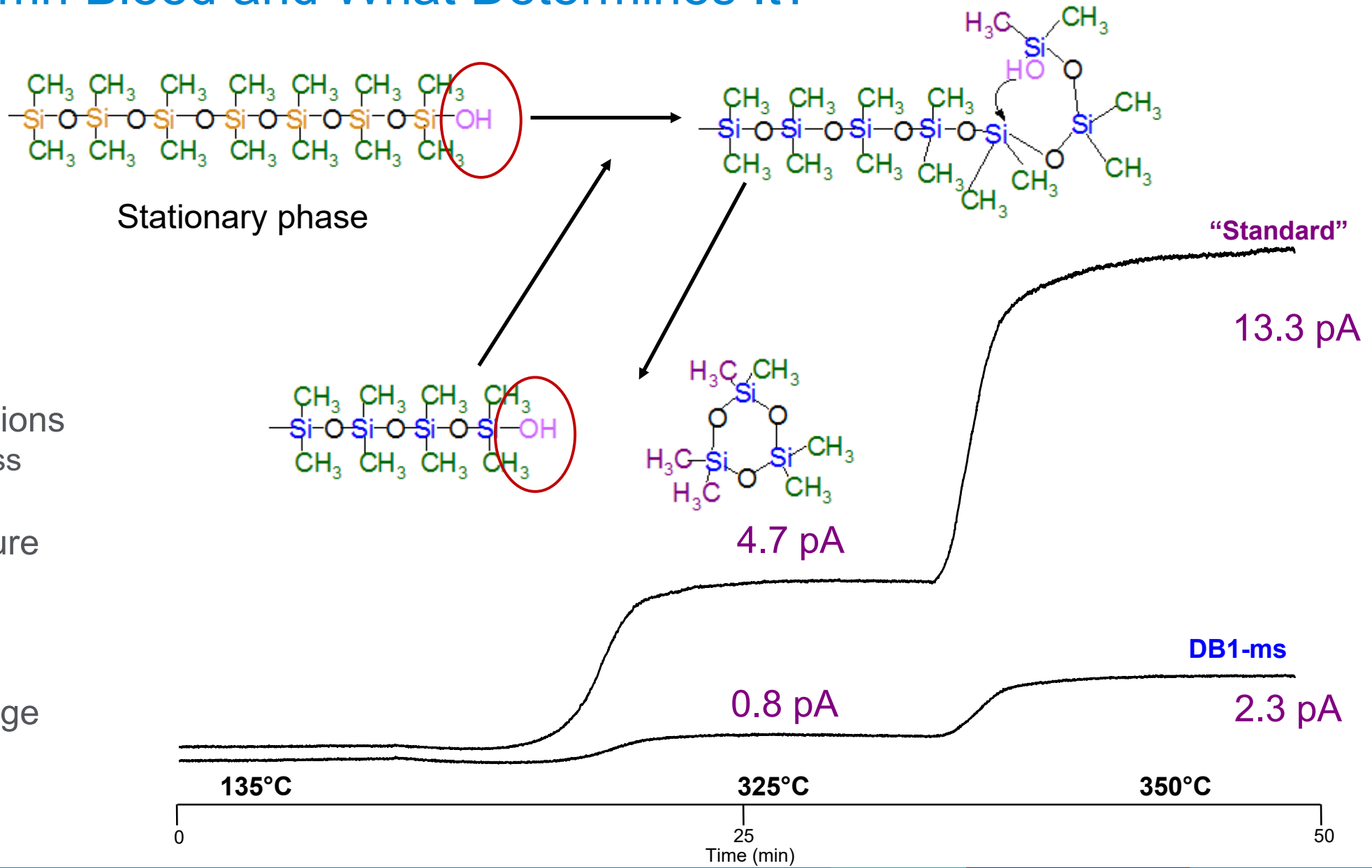
- Who comes up with it?
  - R&D
- How is it determined?
  - Bleed
  - Stability of k, retention index, and theoretical plates
- Why are they different?
  - Long term versus shot term





What Is Column Bleed and What Determines It?

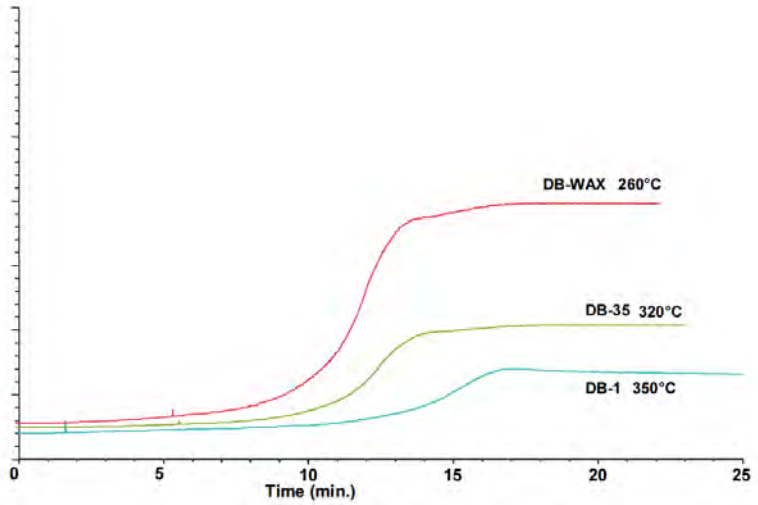
- Phase type
- Column dimensions
  - Film thickness
- Oven temperature
- Oxygen
- Chemical damage

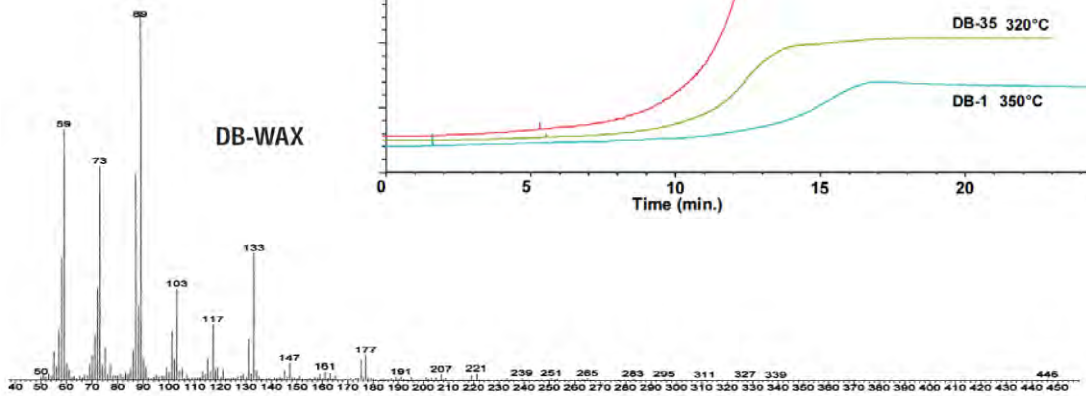


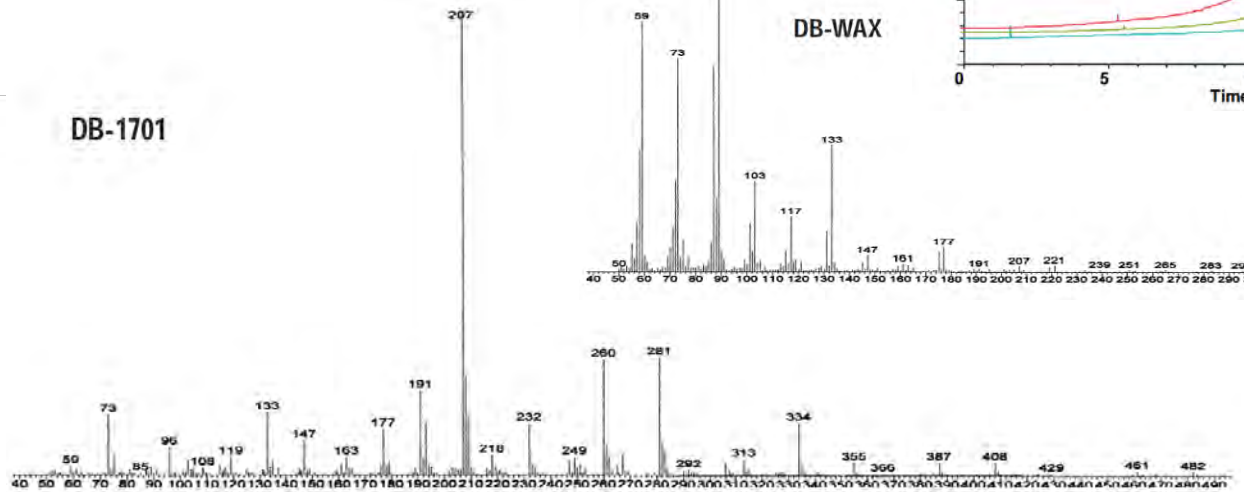
Why Does Column Bleed Matter to My Mass Spectrometer?

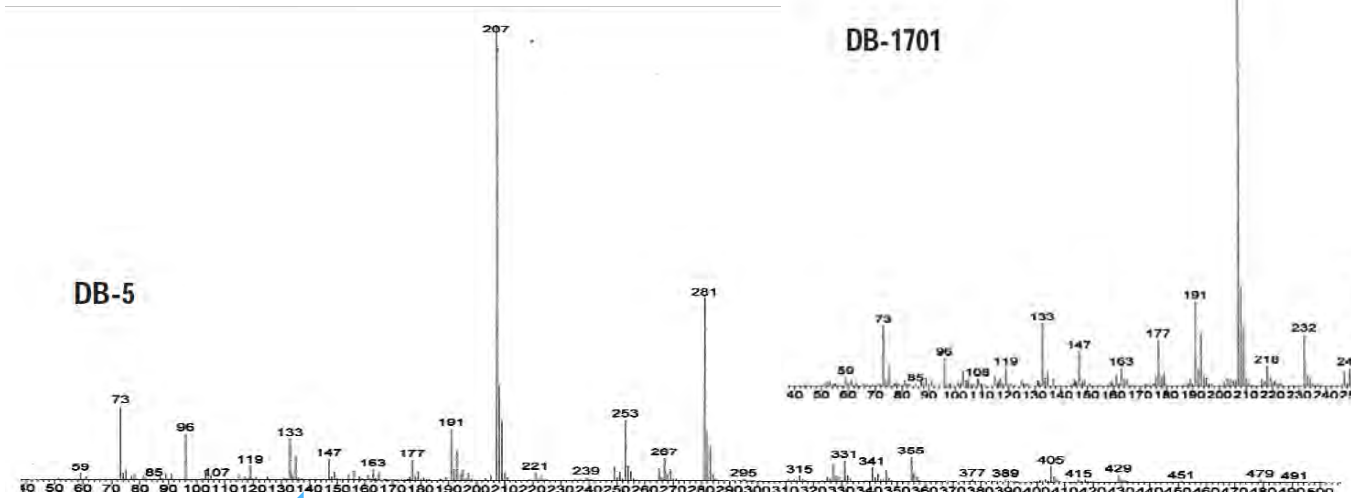
Spectra interference

- The greater the abundance of ions, the greater the bleed
- Thermal stability of phase means less abundance of ions







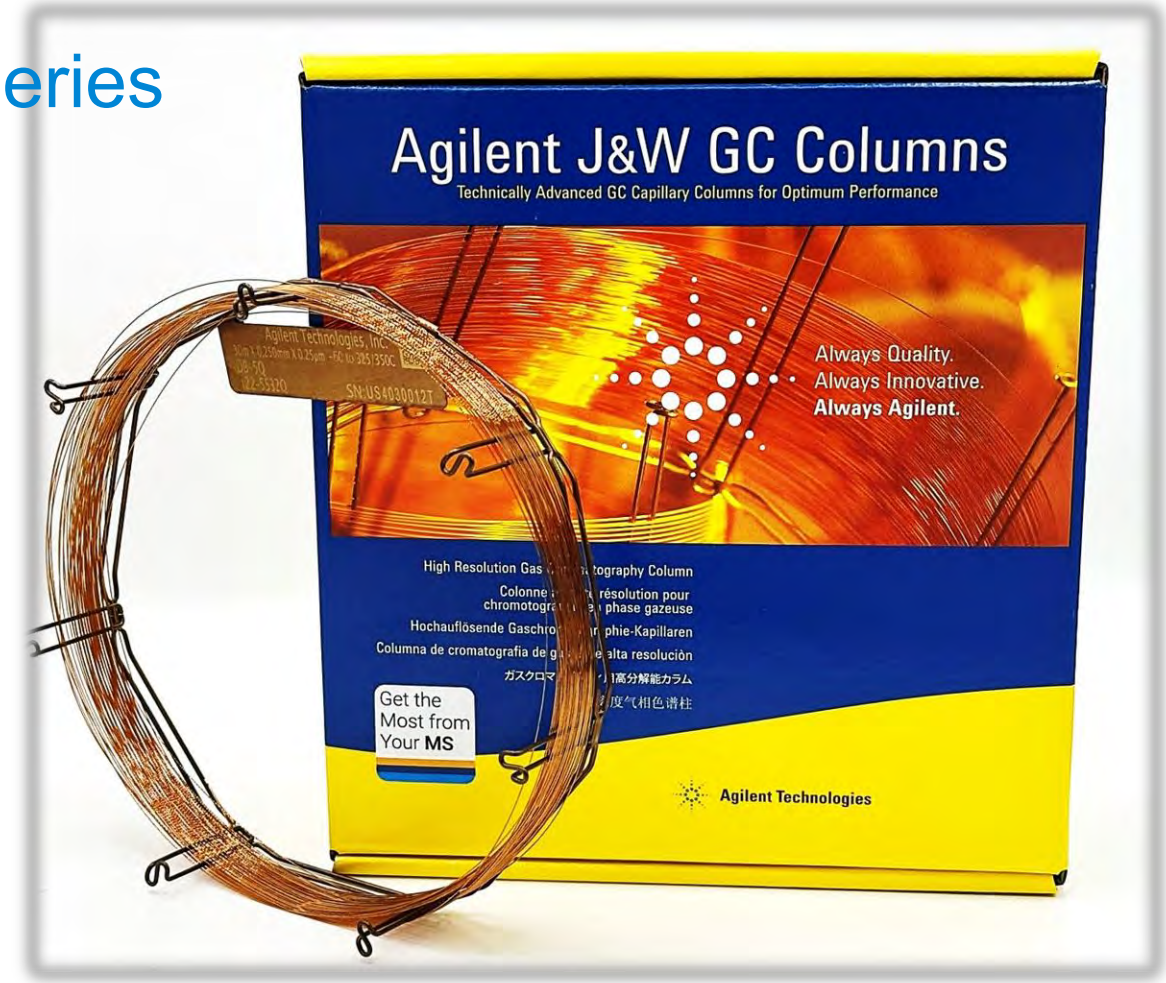


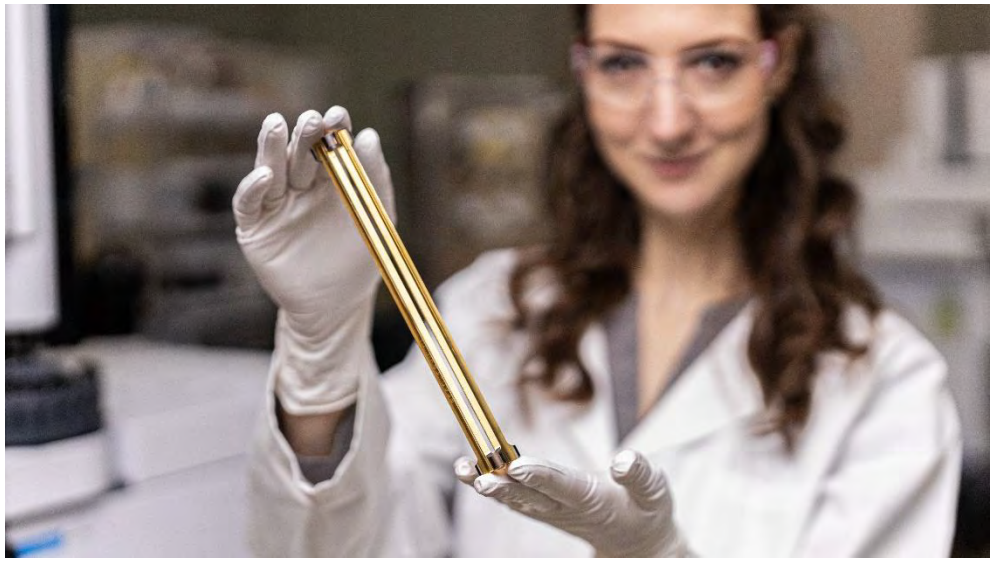
Low polar

High polar

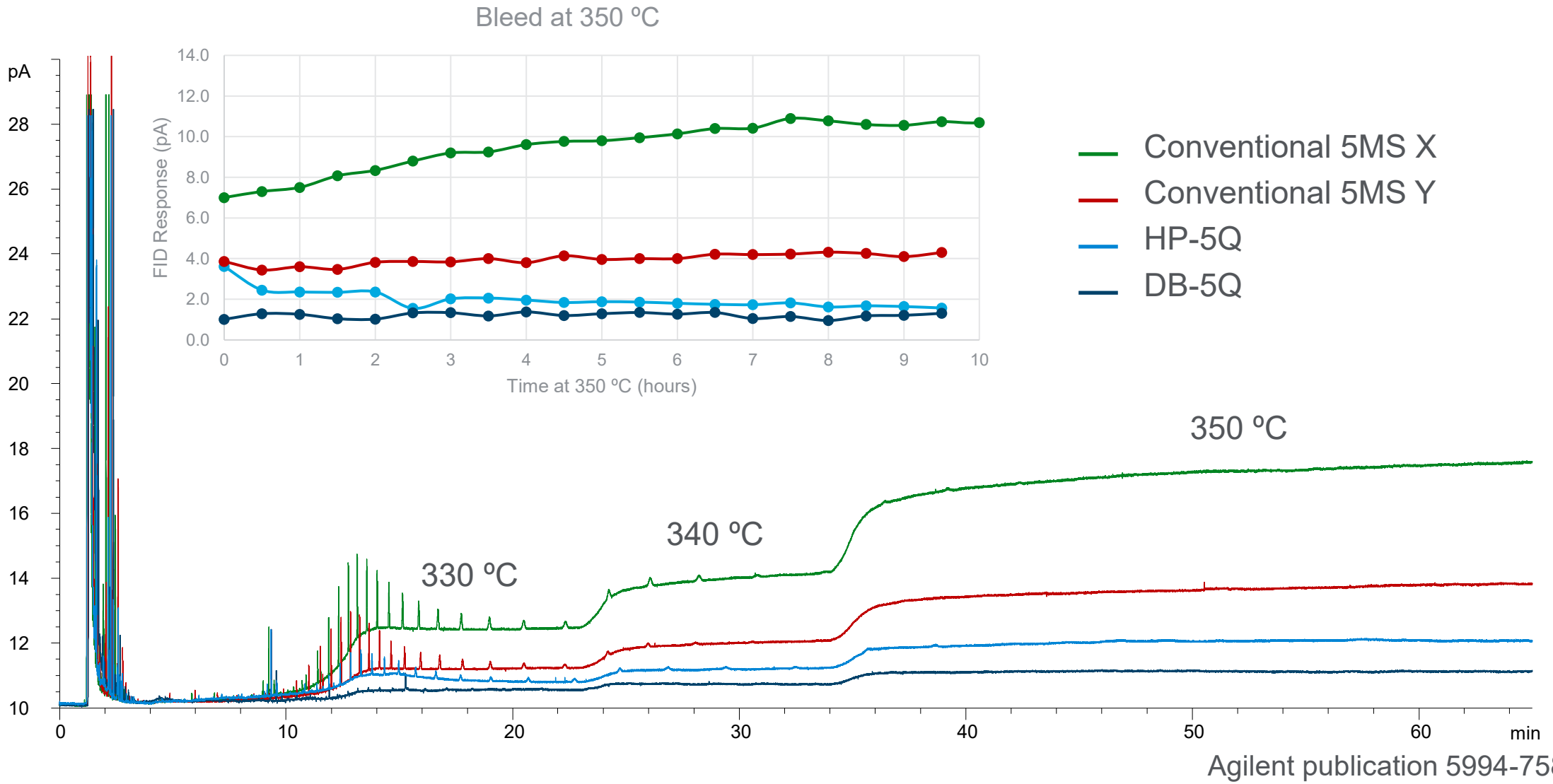
New Ultralow Bleed GC Column: 5Q Series

- Designed with quadrupoles in mind
- Ultra Inert technology combined with new even lower bleed technology
- Best thermal stability available on the market





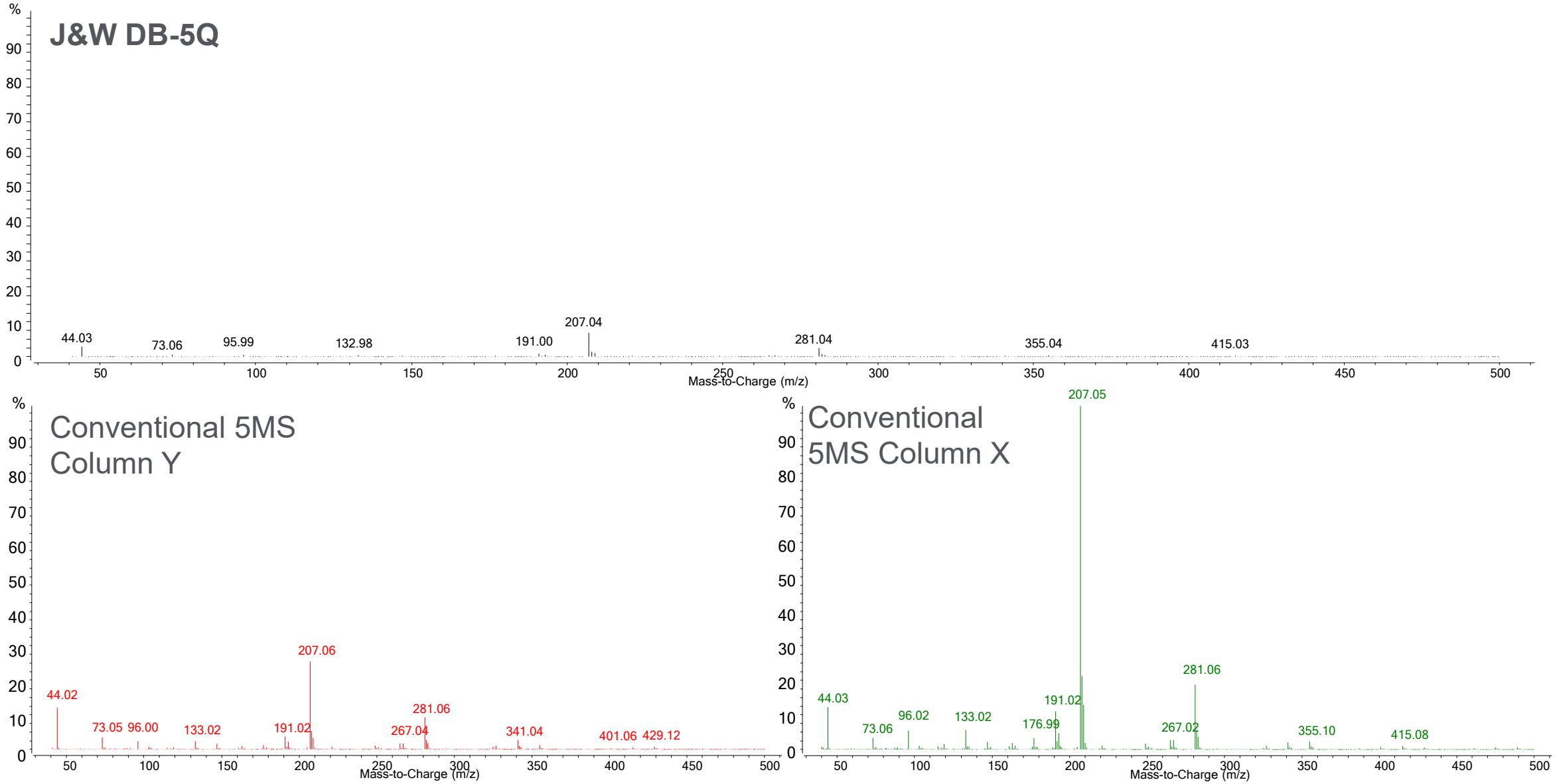
Low Bleed Even at Maximum Temperatures



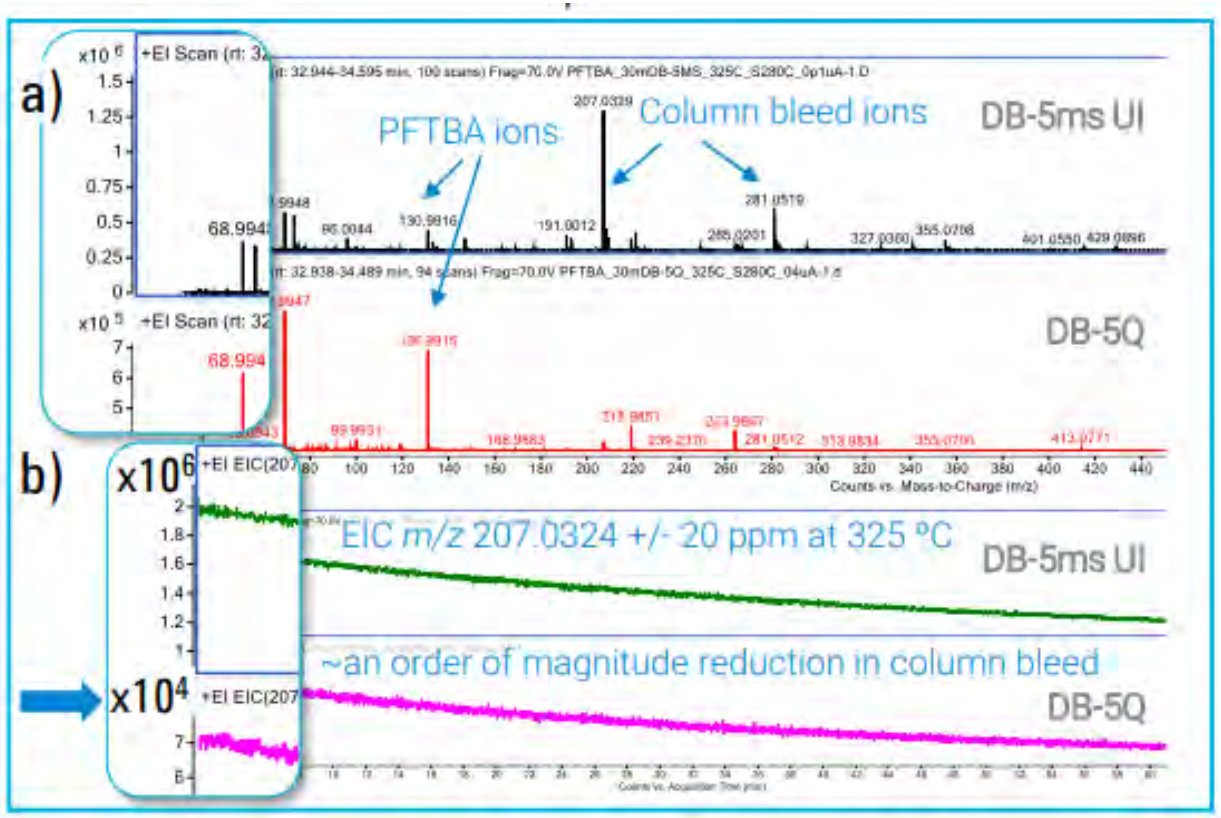
Agilent publication 5994-7586EN

Decreased Spectral Interference at 330 °C

Agilent publication 5994-7586EN



Optimal Selection for Use with GC/QTOF



[GC/MS Approach for Analysis of Extractables and Leachables (E&L) in Complex Matrices Using Spectral Deconvolution and Retention Indices (Agilent.com)]

Get the most from your Q-TOF

Stable baselines for accurate integration of low s/n analytes

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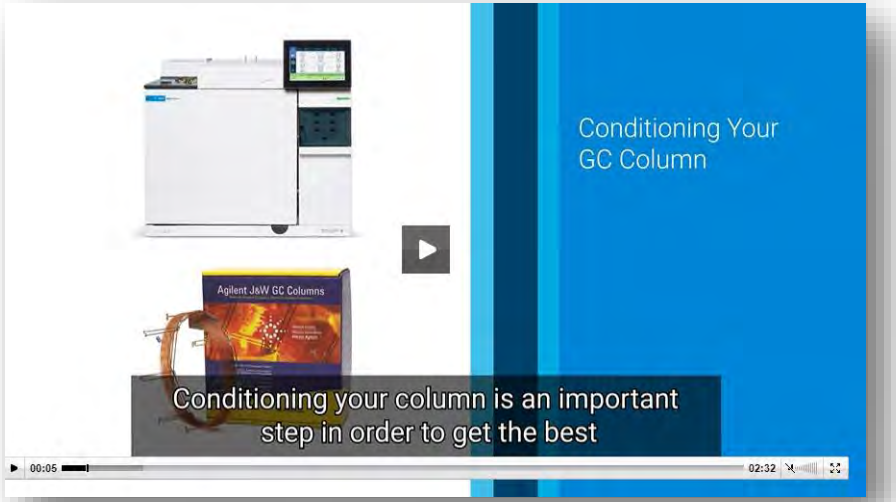
Reduced interferences for higher spectral fidelity

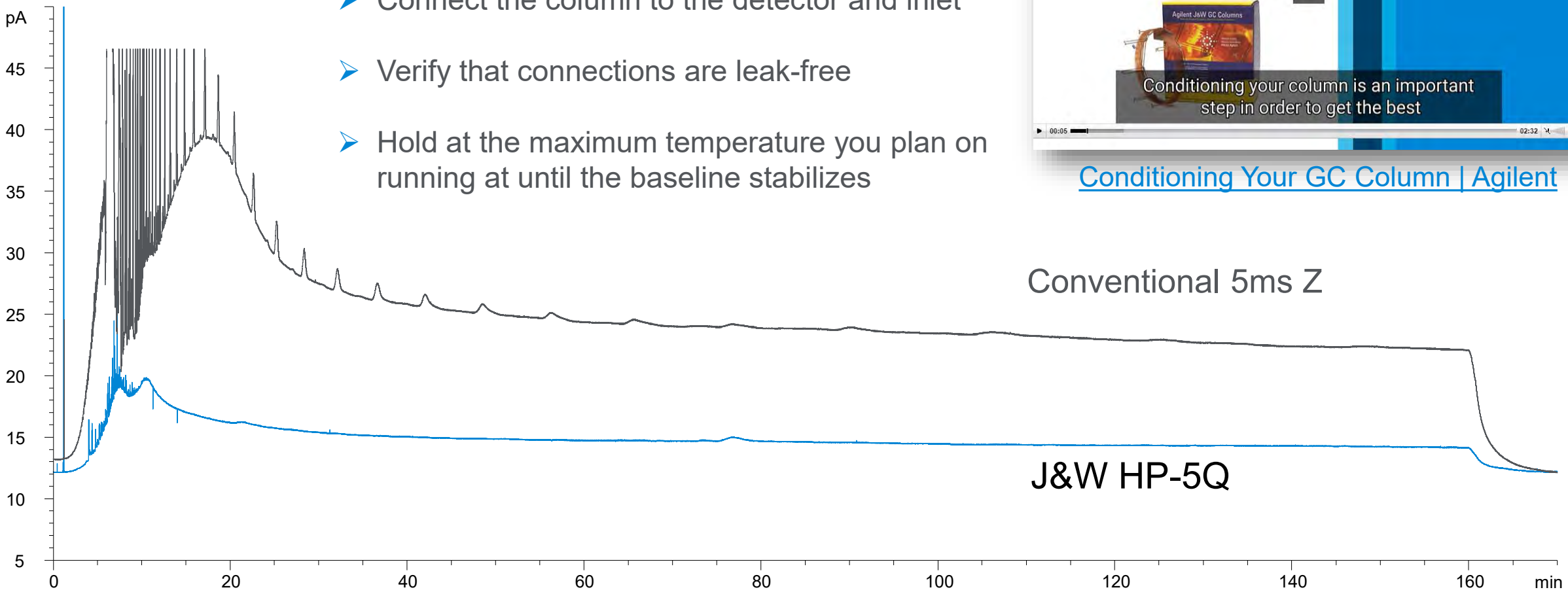
Get Back to Running Samples Faster

Condition your column in less than 1 hour

- Connect the column to the detector and inlet
- Verify that connections are leak-free
- Hold at the maximum temperature you plan on running at until the baseline stabilizes



Conditioning Your GC Column | Agilent

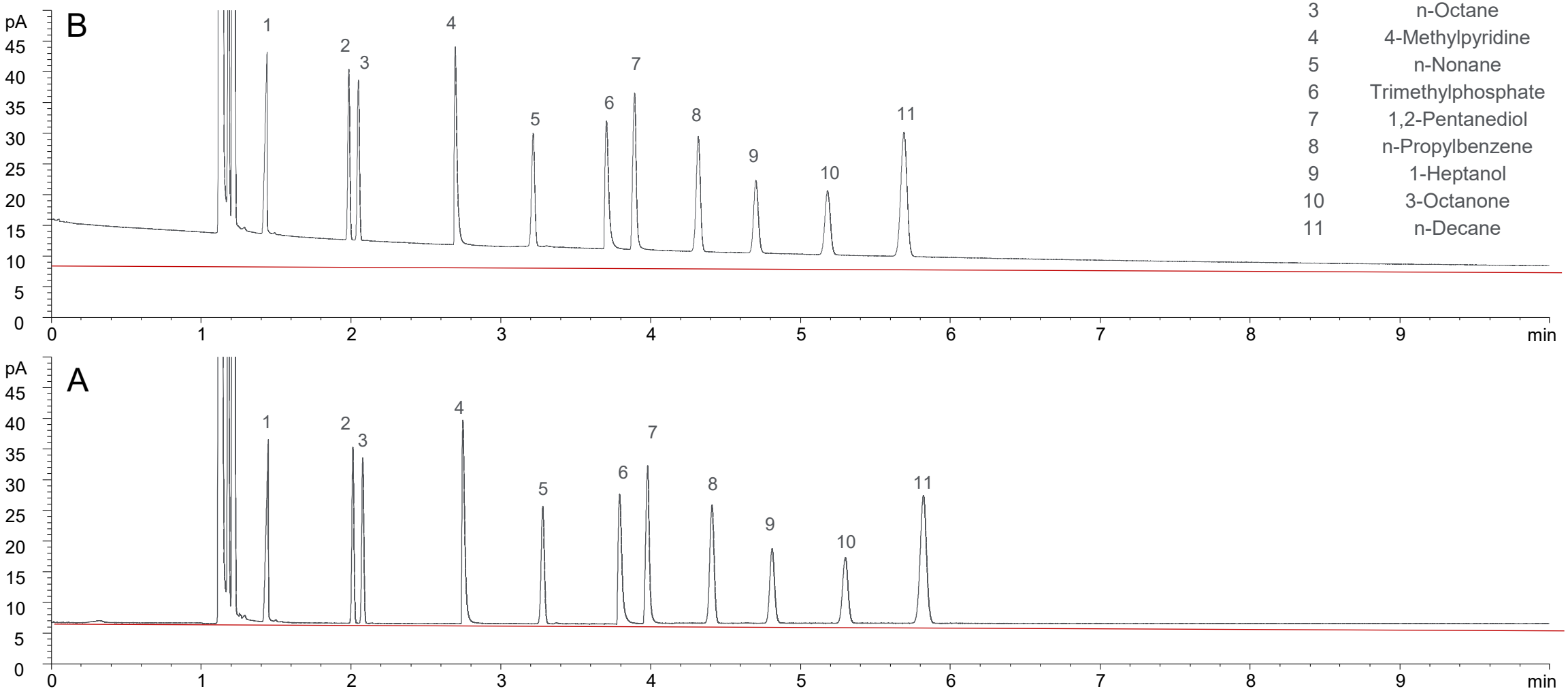


Agilent publication 5994-7586EN

Agilent

Just Because Your GC Is Ready Doesn't Mean Your Column Is…

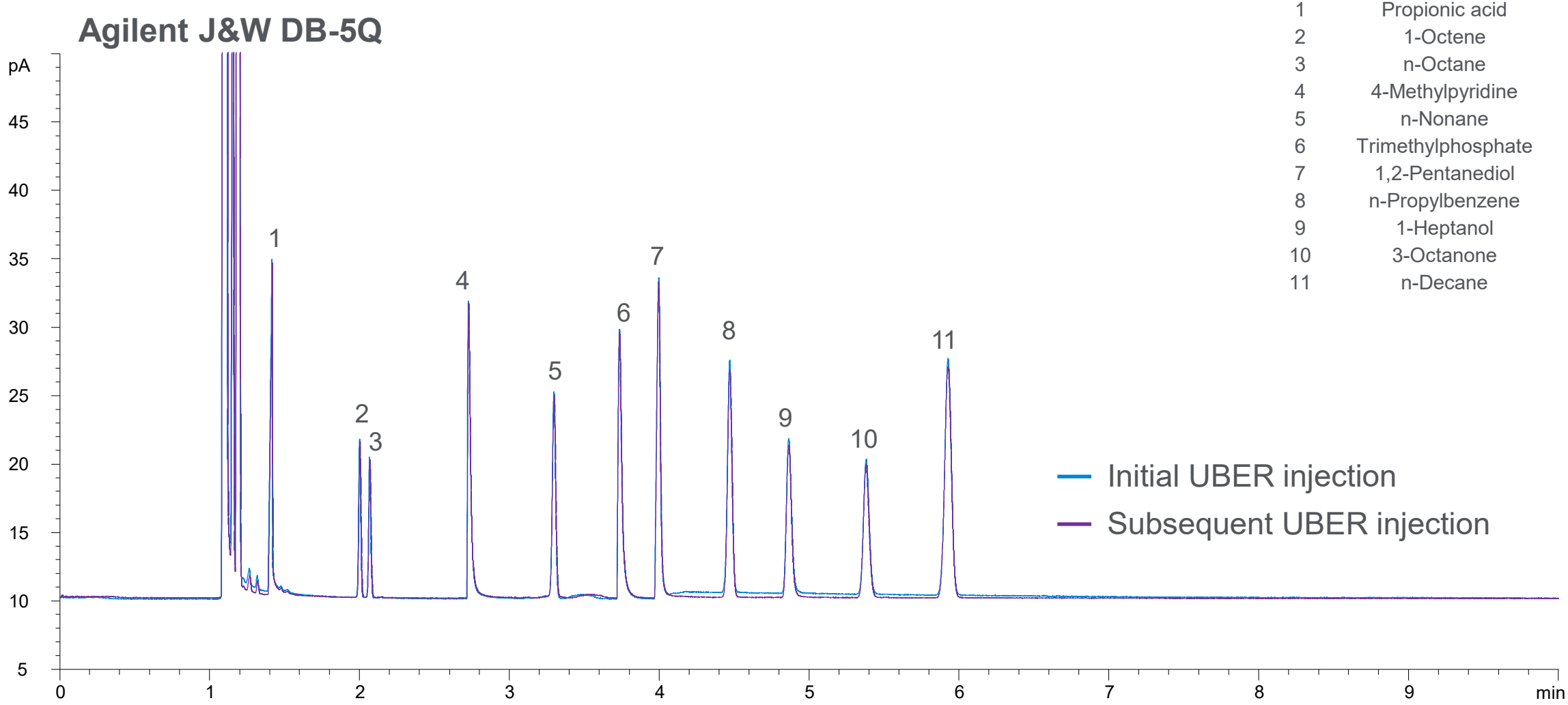
Peak	Compound
1	Propionic acid
2	1-Octene
3	n-Octane
4	4-Methylpyridine
5	n-Nonane
6	Trimethylphosphate
7	1,2-Pentanediol
8	n-Propylbenzene
9	1-Heptanol
10	3-Octanone
11	n-Decane



Agilent publication 5994-7586EN

Don’t Let Your Column Bleed Be Your Rate Limiting Step

Peak	Compound
1	Propionic acid
2	1-Octene
3	n-Octane
4	4-Methylpyridine
5	n-Nonane
6	Trimethylphosphate
7	1,2-Pentanediol
8	n-Propylbenzene
9	1-Heptanol
10	3-Octanone
11	n-Decane



Agilent publication 5994-7586EN

Similar Selectivity, Less Time Revalidating Methods

Designed for easy implementation into RTL methods

DB-5Q

DB-5ms UI

SVM-8270-1

Peak	Compound
1	N-Nitrosodimethylamine
2	Phenol
3	2-Chlorophenol
4	1,3-Dichlorobenzene
5	1,4-Dichlorobenzene
6	1,2-Dichlorobenzene
7	N-Nitrosodi-n-propylamine
8	o-Cresol
9	Bis(2-chloroisopropyl) ether
10	p-Cresol
11	Hexachloroethane
12	Nitrobenzene
13	Isophorone
14	2-Nitrophenol
15	2,4-Dimethylphenol
16	Bis(2-chloroethoxy)methane
17	2,4-Dichlorophenol
18	1,2,4-Trichlorobenzene
19	Naphthalene
20	4-Chloroaniline
21	Hexachlorobutadiene
22	4-Chloro-3-methylphenol
23	2-Methylnaphthalene
24	Hexachlorocyclopentadiene
25	2,4,6-Trichlorophenol
26	2,4,5-Trichlorophenol
27	2-Chloronaphthalene
28	2-Nitroaniline
29	Dimethyl phthalate
30	2,6-Dinitrotoluene
31	Acenaphthylene
32	3-Nitroaniline
33	Acenaphthene
34	2,4-Dinitrophenol
35	4-Nitrophenol
36	Dibenzofuran
37	2,4-Dinitrotoluene
38	Diethyl phthalate
39	Fluorene
40	4-Chlorophenyl phenyl ether
41	4-Nitroaniline
42	2-Methyl-4,6-dinitrophenol
43	Azobenzene
44	4-Bromophenyl phenyl ether
45	Hexachlorobenzene
46	Pentachlorophenol
47	Phenanthrene
48	Anthracene
49	Carbazole
50	Di-n-butyl phthalate
51	Fluoranthene
52	Pyrene
53	Butyl benzyl phthalate
54	Benz[a]anthracene
55	Chrysene
56	Bis(2-ethylhexyl) phthalate
57	Di-n-octyl phthalate
58	Benzo[b]fluoranthene
59	Benzo[k]fluoranthene
60	Benzo[a]pyrene
61	Indeno(1,2,3-cd)pyrene
62	Dibenz[a,h]anthracene
63	Benzo[ghi]perylene

Agilent 7010D Triple Quadrupole GC/MS
High-performing, sensitive, robust

- **User-driven engineering**
  Attogram-level sensitivity
  Exceptional stability
  Industry-leading uptime with complex matrices

- **Built-in GC/TQ intelligence**
  Smart Alerts
  Early maintenance feedback
  SWARM autotune
  GC intelligence

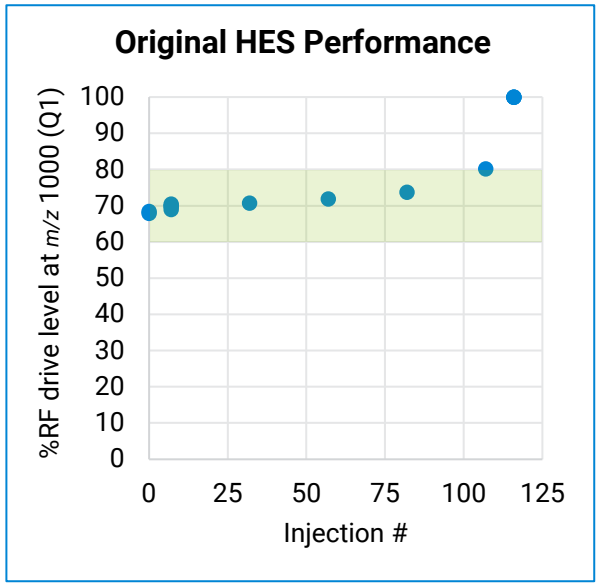
- **MassHunter Acquisition software 13.0**
  Modernized data integrity and compliance tools
  Refreshed user interface
  Same familiar user experience

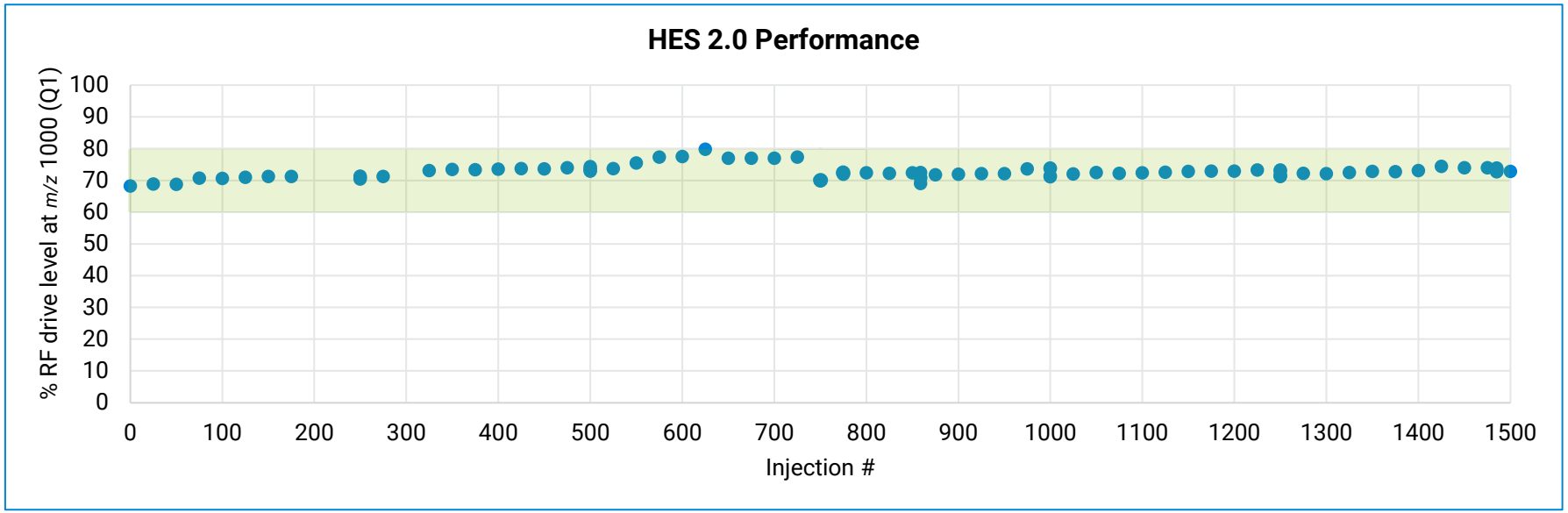
Agilent 7010D GC/TQ

Improved Robustness for Supreme Uptime

HES 2.0

Artificially demanding conditions to maximize stress to the system beyond typical users
(1% v/v diesel in isooctane, MS1 scan 600-800 m/z)





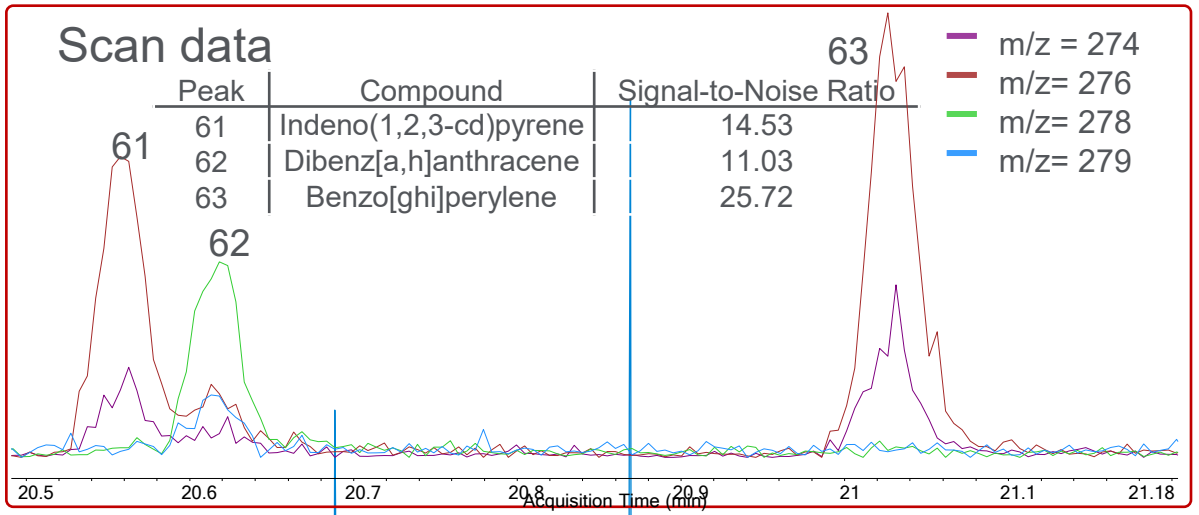
Instrument operated for 116 injections

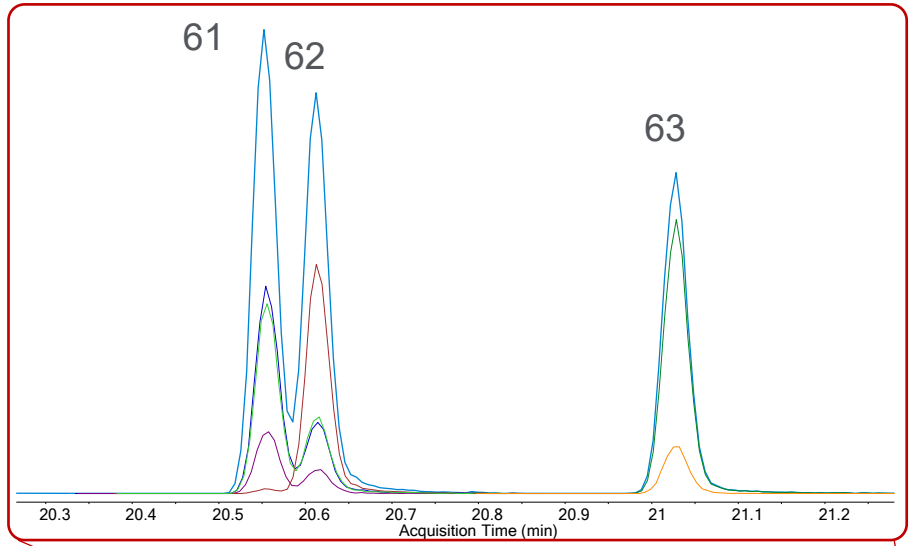
HES 2.0 exceeded >10x previous lifetime without performance degradation

Collect Targeted and Nontargeted Data in One Injection

dMRM/scan collection with MassHunter 13

Peak	Compound	Signal-to-Noise Ratio
61	Indeno(1,2,3-cd)pyrene	157.8
62	Dibenz[a,h]anthracene	81.9
63	Benzo[ghi]perylene	208.5



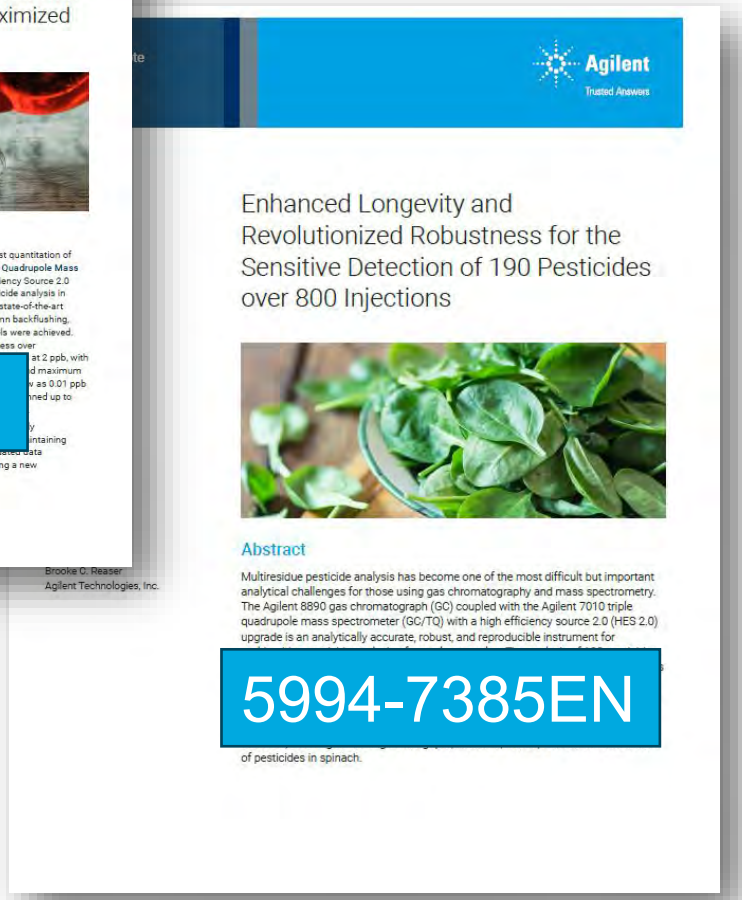


Agilent

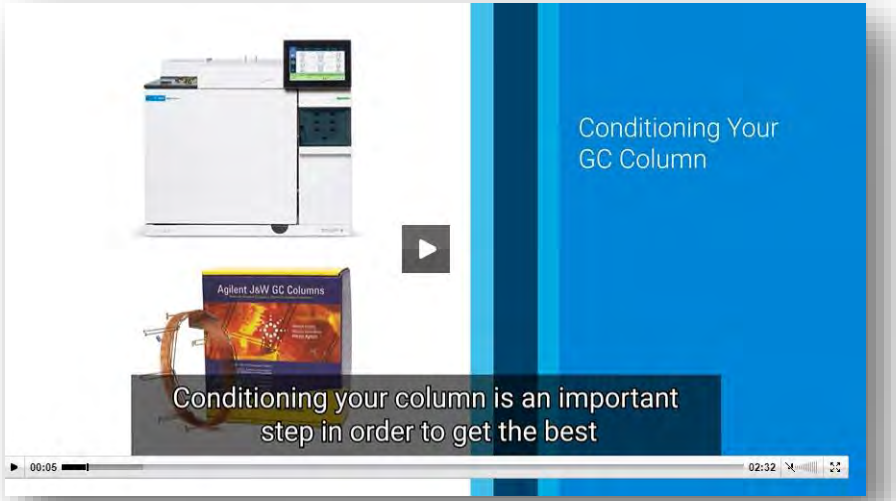
7010D GC/TQ Featuring a New Second-generation High-efficiency Source 2.0 (HES 2.0)

- Trace-level sensitivity (0.01 ppb)
- Dynamic range (five orders)
- Robustness with complex matrices (black tea, spinach)
- Ruggedness (800 injections at 2 ppb)
- New RT locking in MassHunter Acquisition 13
- GC/TQ intelligence

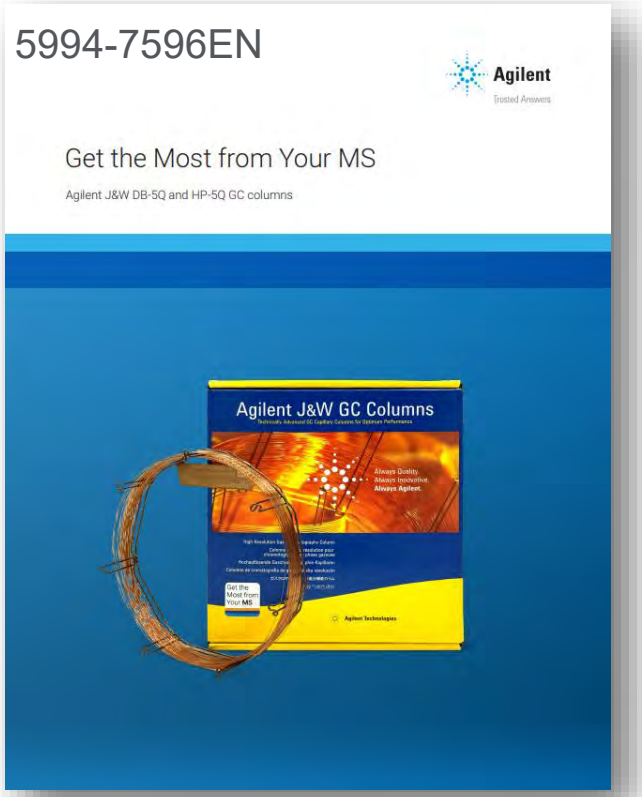
NEW!



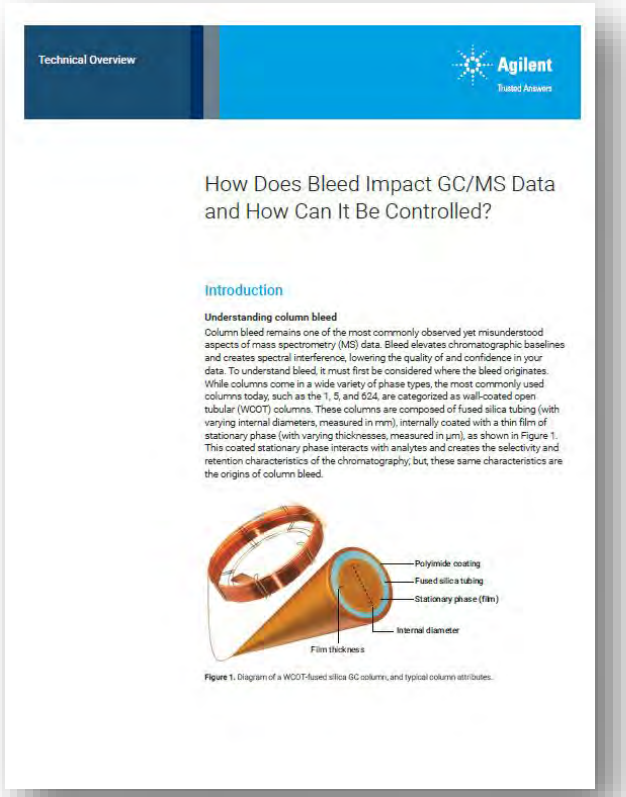
DB-5Q and HP-5Q Available as of August 1



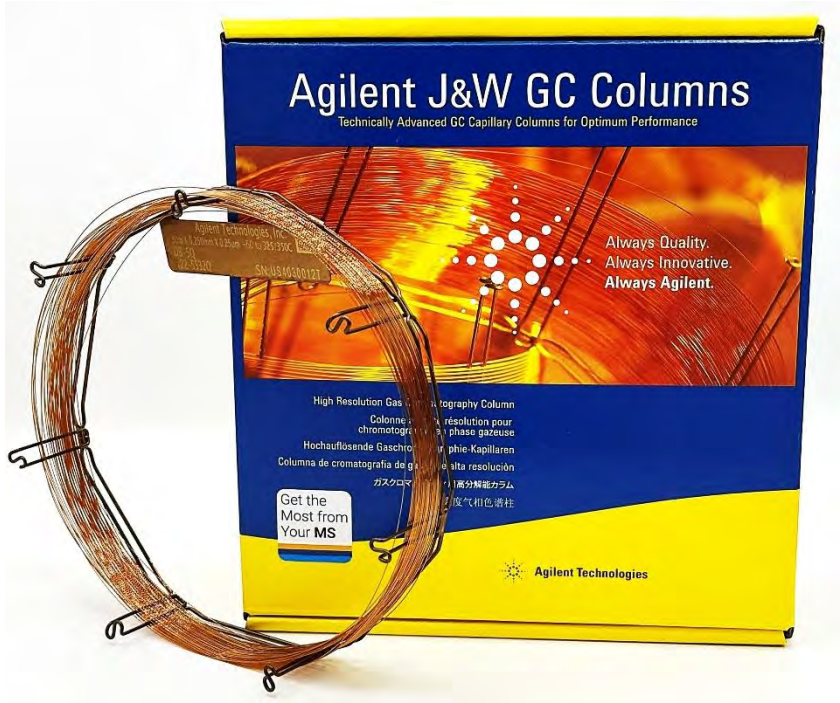
[Conditioning Your GC Column | Agilent]



[Get the Most from Your MS: Agilent J&W DB-5Q and HP-5Q GC Columns]



[How Does Bleed Impact GC/MS Data and How Can It Be Controlled? (Agilent.com)]



Contact Agilent Chemistries and Supplies Technical Support

1-800-227-9770 option 3, option 3:

Option 1 for GC and GC/MS columns and supplies

Option 2 for LC and LC/MS columns and supplies

Option 3 for sample preparation, filtration, and QuEChERS

Option 4 for spectroscopy supplies

Option 5 for chemical standards

Available in the U.S. and Canada 8–5, all time zones

gc-column-support@agilent.com

lc-column-support@agilent.com

spp-support@agilent.com

spectro-supplies-support@agilent.com

chem-standards-support@agilent.com