New Application Specific Columns

Simon Jones
GC columns Application Engineer

What Columns are New?

DB-CLP1

DB-CLP2

DB-UI 8270D

Environmental

DB-Select 624 UI 467 — US Pharmacopeia

DB-Sulfur SCD

PLOT-PT

What are the Benefits?

Address specific issues with certain methods

- Response
- Tailing factor
- Resolution
- Detector coking
- Detector Spiking / Valve rotor damage

Named for easier identification

DB-CLP1 & DB-CLP2

What are they?

Contract Laboratory Pesticides

Why 2 columns?

Dual column method (µECD)

Primary and Confirmatory columns

Pesticides are active compounds!

Response, peak shape, tailing, breakdown

DB-CLP1/CLP2

CLP Pesticides

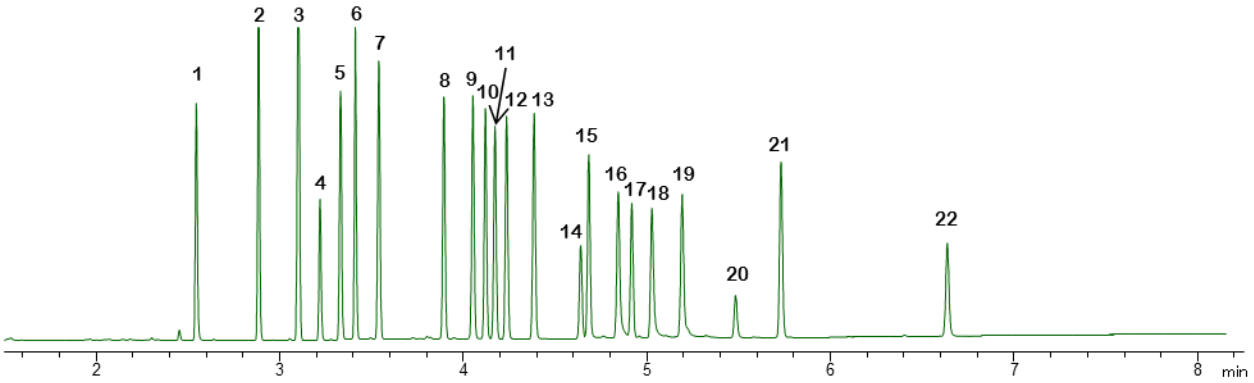
DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	50 ng/mL CLP Pesticides
Inj. Vol.:	1 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	250°C
Oven Temp:	150°C (hold 0.2 min), 45°C/min to 250°C, 18°C/min to 300°C, 30°C/min to 330°C, hold 2.5 min
Carrier Gas:	Helium, constant flow 3.5 mL/min
Detector:	µECD @ 340 °C

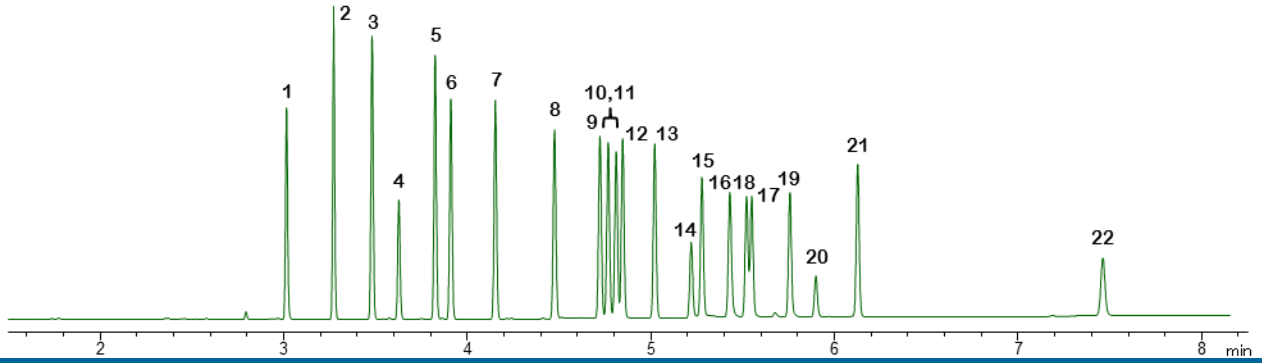
1. Tetrachloro-m-xylene*
2. α-BHC
3. γ-BHC
4. β-BHC
5. Heptachlor
6. δ-BHC
7. Aldrin
8. Heptachlor epoxide
9. γ-Chlordane
10. α-Chlordane
11. Endosulfan I
12. 4,4'-DDE
13. Dieldrin
14. Endrin
15. 4,4'-DDD
16. Endosulfan II
17. 4,4'-DDT
18. Endrin aldehyde
19. Endosulfan sulfate
20. Methoxychlor
21. Endrin ketone
22. Decachlorobiphenyl*

*surrogate standard

Agilent DB-CLP1



Agilent DB-CLP2



DB-CLP1/DB-CLP2

Additional Methods

EPA 504.1 - 1,2-dibromoethane (EDB), 1,2-dibromo-3-chloropropane (DBCP), and 1,2,3-trichloropropane

EPA 505 – organohalides

EPA 508.1 – Chlorinated pesticides, herbicides and organohalides

EPA 551 – chlorinated solvents, trihalomethanes (THMs), and disinfection byproducts (DBPs)

EPA 552.3 – haloacetic acids and dalapon

EPA 8081B – (extended analyte list) – organochlorine pesticides

EPA 8082A – polychlorinated biphenyls (PCBs) and aroclors

EPA 8151A – chlorophenoxyacid herbicides

EPA Method 504.1

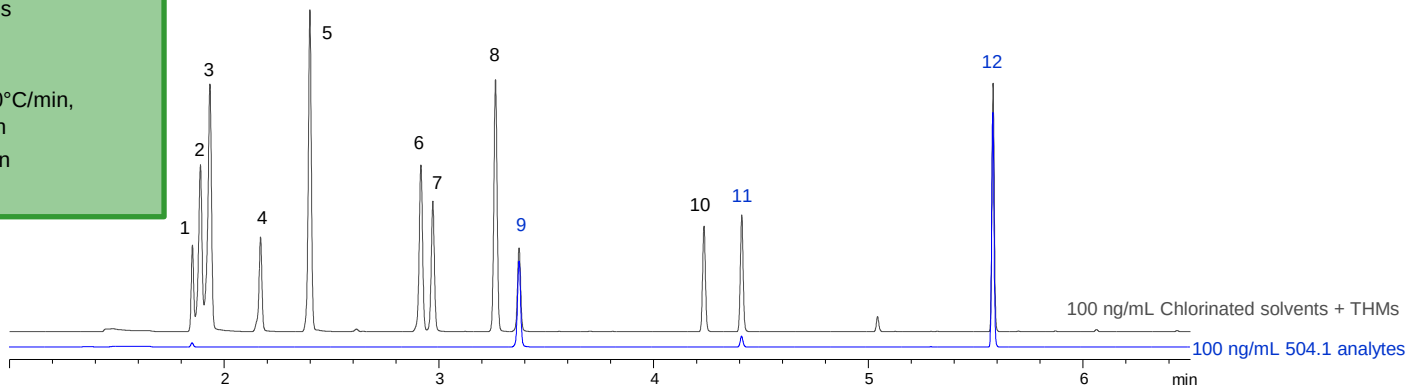
EDB, DBCP, and 123TCP

DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

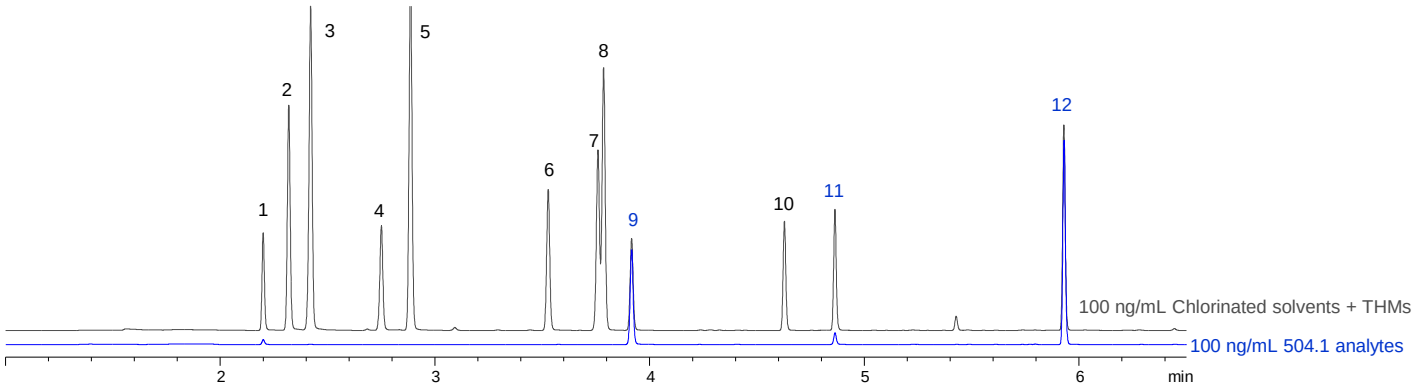
Instrument: Agilent 7890 GC with dual µECD
Sampler: Agilent 7693
Sample: 100 ng/mL 504.1 analytes
100 ng/mL Chlorinated Solvents + THMs
Inj. Vol.: 2 µL splitless
Liner: Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.: 200°C
Oven Temp: 50°C (hold 1.5 min) to 95°C at 20°C/min, 40°C/min to 175°C, hold 1.25 min
Carrier Gas: Helium, constant flow 3.75 mL/min
Detector: µECD @ 300 °C

1. Chloroform
2. 1,1,1-Trichloroethane
3. Carbon tetrachloride
4. Trichloroethene
5. Bromodichlormethane
6. Tetrachloroethene
7. 1,1,2-Trichloroethane
8. Dibromochloromethane
9. **1,2-Dibromoethane (EDB)**
10. Bromoform
11. **1,2,3-Trichloropropane (123TCP)**
12. **1,2-Dibromo-3-chloropropane (DBCP)**

Agilent DB-CLP1



Agilent DB-CLP2



EPA Method 505

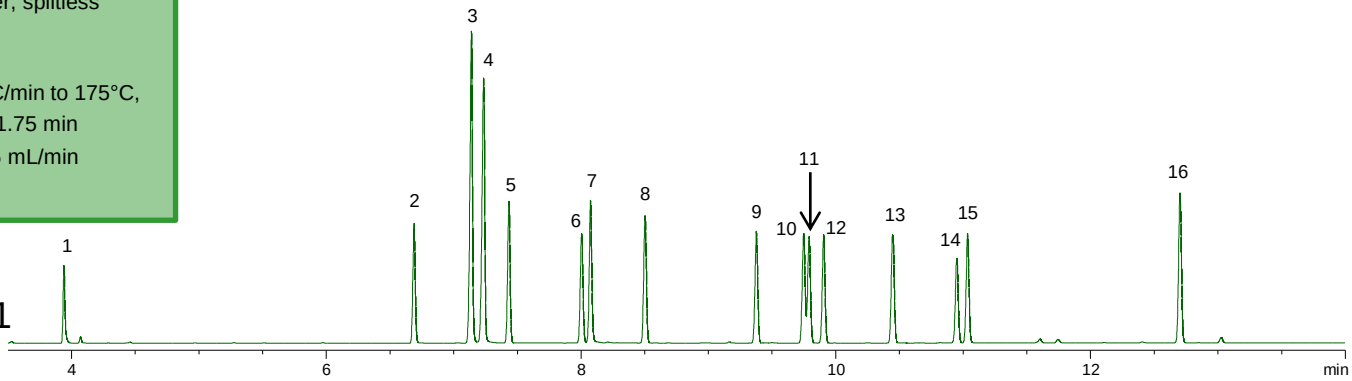
Organohalide Pesticides

DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

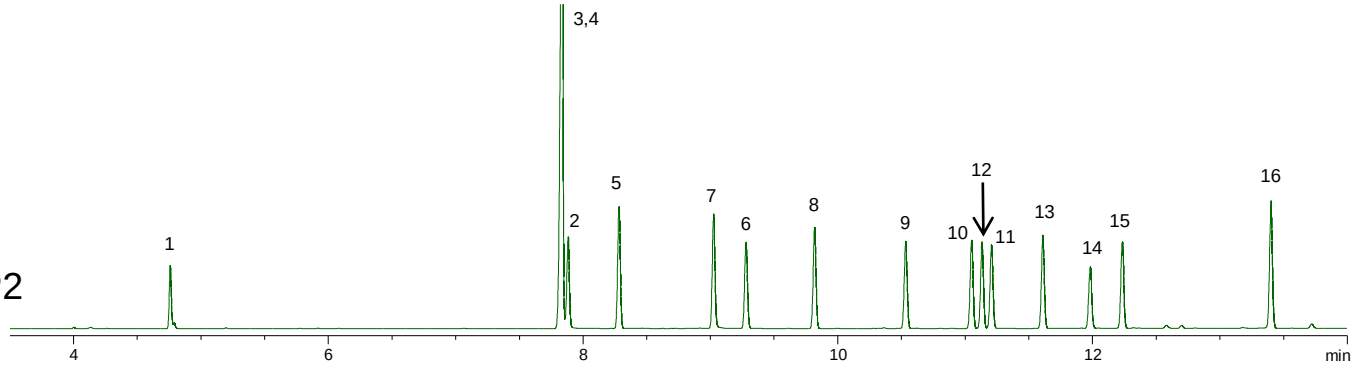
Instrument: Agilent 7890 GC with dual µECD
Sampler: Agilent 7873B
Sample: 100 ng/mL 505 analytes
Inj. Vol.: 2 µL splitless
Liner: Ultra Inert Liner double taper, splitless (cat.# 5190-3983)
Inj. Temp.: 250°C
Oven Temp: 90°C (hold 0.5 min), 35°C/min to 175°C, 12°C/min to 300°C, hold 1.75 min
Carrier Gas: Helium, constant flow 2.5 mL/min
Detector: µECD @ 325 °C

1. Hexachlorocyclopentadiene
2. Hexachlorobenzene
3. Atrazine (25 µg/mL)
4. Simazine (25 µg/mL)
5. γ-BHC
6. Heptachlor
7. Alachlor (1 µg/mL)
8. Aldrin
9. Heptachlor epoxide
10. γ-Chlordane
11. trans-Nonachlor
12. α-Chlordane
13. Dieldrin
14. Endrin
15. cis-Nonachlor
16. Methoxychlor (0.5 µg/mL)

Agilent DB-CLP1



Agilent DB-CLP2



Agilent Technologies

EPA Method 508.1

Chlorinated Pesticides and Herbicides

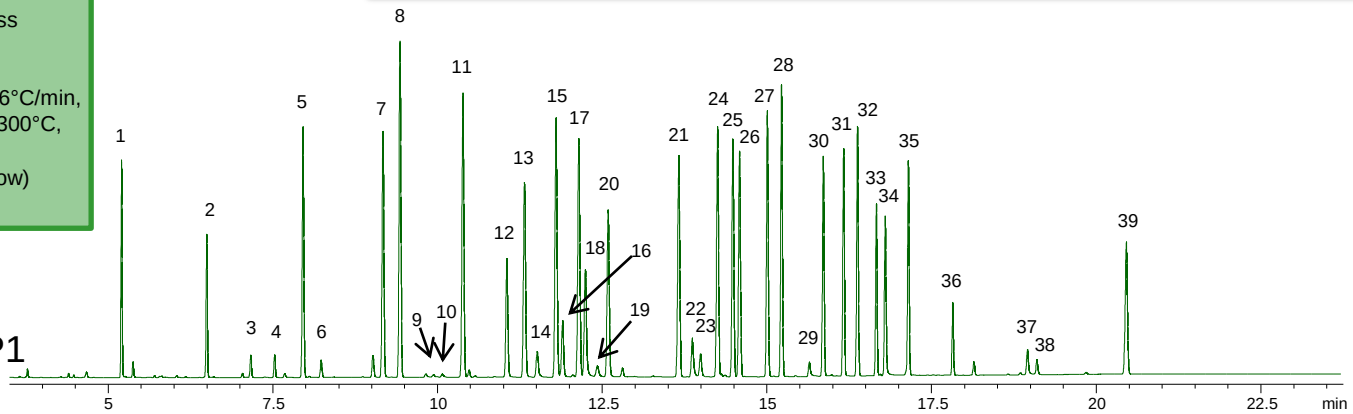
DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7873B
Sample:	100 ng/mL 508.1 analytes 100 ng/mL Pesticide Surrogate Mix
Inj. Vol.:	2 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	250°C
Oven Temp:	80°C (hold 0.5 min) to 175°C at 26°C/min, 6.5°C/min to 235°C, 15°C/min to 300°C, hold 6 min
Carrier Gas:	Helium at 35 cm/sec (constant flow)
Detector:	µECD @ 340 °C

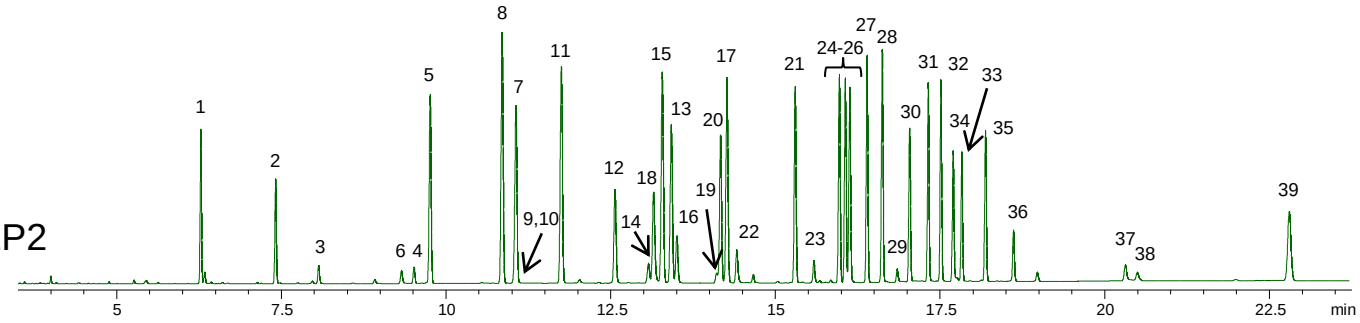
1. Hexachlorocyclopentadiene
2. Etradiazole
3. Chloroneb
4. Trifluralin
5. TCMX*
6. Propachlor
7. Hexachlorobenzene
8. α-BHC
9. Atrazine
10. Simazine
11. γ-BHC
12. β-BHC
13. Heptachlor
14. Alachlor
15. δ-BHC
16. Chlorothalonil
17. Aldrin
18. Metribuzin
19. Metolachlor
20. DCPA
21. Heptachlor epoxide
22. Cyanazine
23. Butachlor
24. γ-Chlordane
25. α-Chlordane
26. Endosulfan I
27. 4,4'-DDE
28. Dieldrin
29. Chlorobenzilate
30. Endrin
31. 4,4'-DDD
32. Endosulfan II
33. 4,4'-DDT
34. Endrin aldehyde
35. Endosulfan sulfate
36. Methoxychlor
37. cis-Permethrin
38. trans-Permethrin
39. Decachlorobiphenyl*

surrogate standard

Agilent DB-CLP1



Agilent DB-CLP2



Agilent Technologies

EPA Method 551

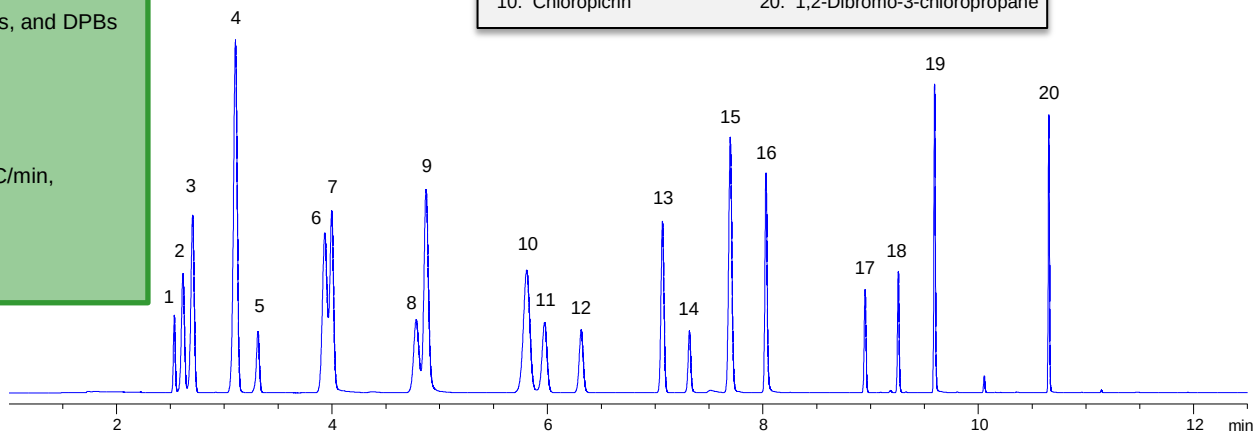
Chlorinated Solvents, THMs, and DBPs

DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

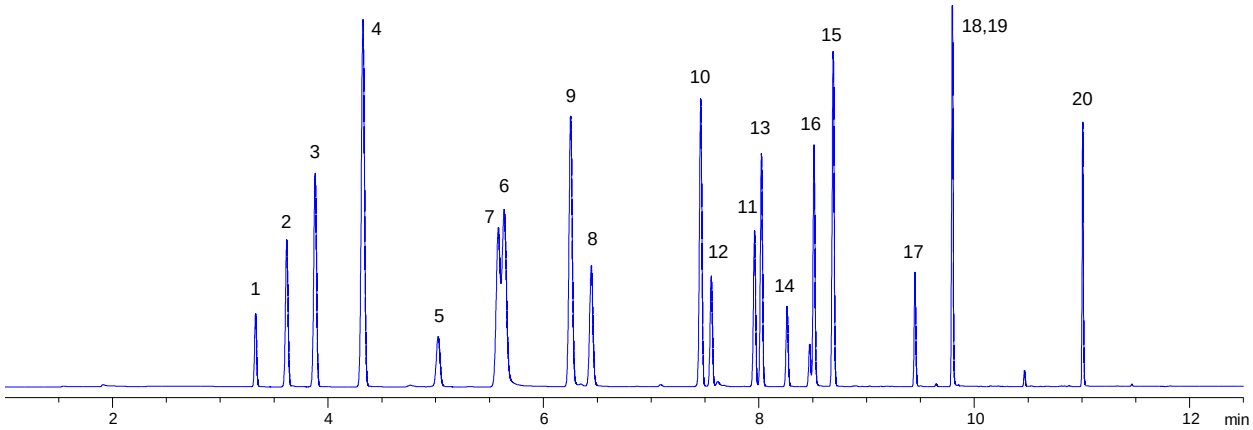
Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	100 ng/mL Chlorinated Solvents, THMs, and DPBs
Inj. Vol.:	2 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	200°C
Oven Temp:	35°C (hold 5.75 min) to 95°C at 20°C/min, 40°C/min to 200°C, hold 1.25 min
Carrier Gas:	Helium at 45 cm/sec (constant flow)
Detector:	µECD @ 300 °C

1. Chloroform
2. 1,1,1-Trichloroethane
3. Carbon tetrachloride
4. Trichloroacetonitrile
5. Trichloroethene
6. Chloral hydrate
7. Bromodichloromethane
8. 1,1-Dichloro-2-propanone
9. Dichloroacetonitrlie
10. Chloropicrin
11. Tetrachloroethene
12. 1,1,2-Trichloroethane
13. Dibromochloromethane
14. 1,2-Dibromoethane
15. 1,1,1-Trichloro-2-propanone
16. Bromochloroacetonitrile
17. Bromoform
18. 1,2,3-Trichloropropane
19. Dibromoacetonitrile
20. 1,2-Dibromo-3-chloropropane

Agilent DB-CLP1



Agilent DB-CLP2



EPA Method 552.3

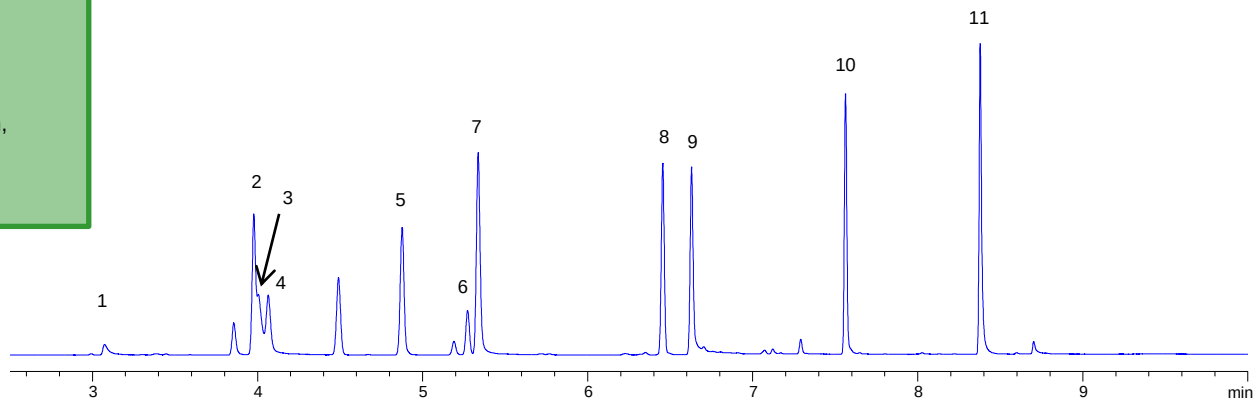
Haloacetic Acids and Dalapon

DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

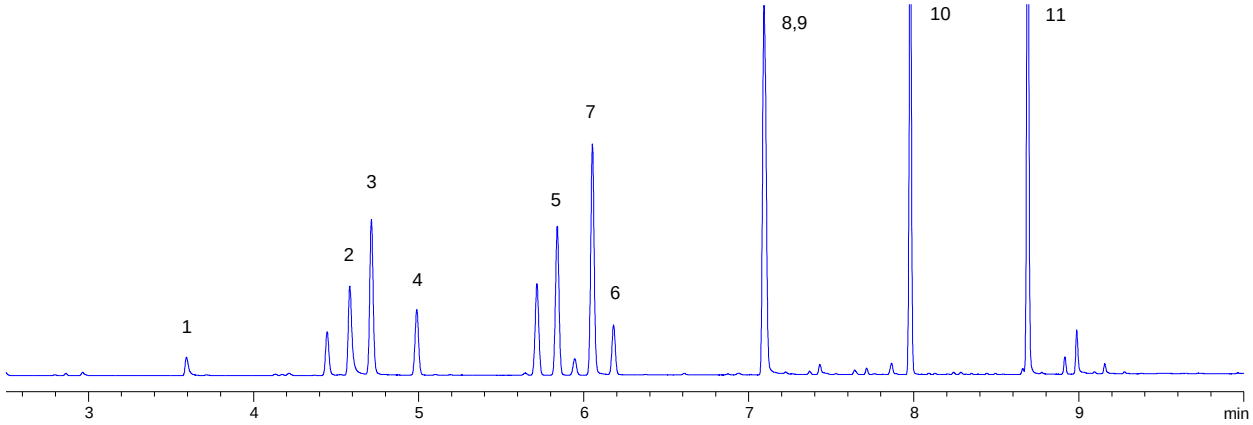
Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	10-100 ng/mL Haloacetic acids and Dalapon (methyl esters)
Inj. Vol.:	1 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	180°C
Oven Temp:	40°C (hold 0.5 min) to 95°C at 10°C/min, 30°C/min to 200°C, hold 1 min
Carrier Gas:	Helium at 54.79 cm/sec (constant flow)
Detector:	µECD @ 340 °C

1. Methyl chloroacetate (30ng/mL)
2. Methyl bromoacetate (20ng/mL)
3. Methyl dichloroacetate (30ng/mL)
4. Dalapon methyl ester (20ng/mL)
5. Methyl trichloroacetate (10ng/mL)
6. 1,2,3-Trichloropropane (IS) (50ng/mL)
7. Methyl bromochloroacetate (20ng/mL)
8. Methyl bromodichloroacetate (20ng/mL)
9. Methyl dibromoacetate (10ng/mL)
10. Methyl dibromochloroacetate (50ng/mL)
11. Methyl tribromoacetate (100ng/mL)

Agilent DB-CLP1



Agilent DB-CLP2



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EPA Method 8081B (extended)

Organochlorine Pesticides

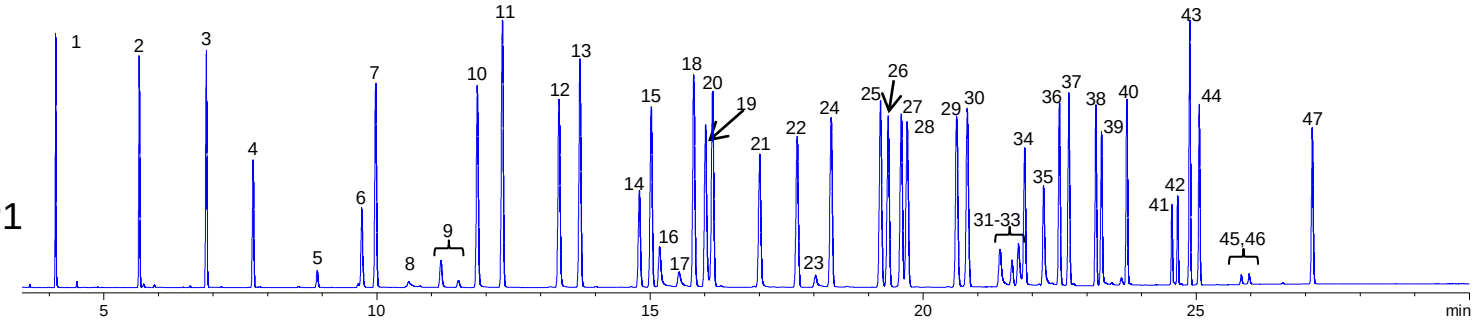
DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	50 ng/mL 8081B analytes
Inj. Vol.:	2 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	250°C
Oven Temp:	80°C (hold 0.5 min) to 150°C at 20°C/min, 5°C/min to 235°C, 15°C/min to 300°C, hold 5 min
Carrier Gas:	Helium at 43.5 cm/sec (constant flow)
Detector:	µECD @ 325 °C

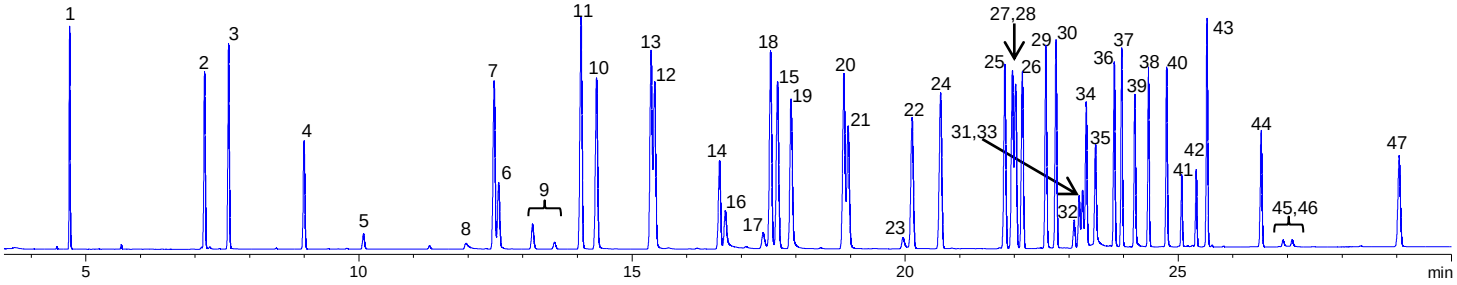
1. 1,2-Dibromo-3-chloropropane
2. Hexachlorocyclopentadiene
3. 1-Bromo-2-nitrobenzene
4. Etradiazole
5. Chloroneb
6. Trifluralin
7. TCMX*
8. Propachlor
9. Diallate isomers (250ng/mL)
10. Hexachlorobenzene
11. α-BHC
12. Pentachloronitrobenzene
13. γ-BHC
14. β-BHC
15. Heptachlor
16. Dichlone
17. Alachlor
18. δ-BHC
19. Chlorothalonil
20. Aldrin
21. DCPA
22. Isodrin
23. Kelthane
24. Heptachlor epoxide
25. γ-Chlordane
26. trans-Nonachlor
27. α-Chlordane
28. Endosulfan I
29. 4,4'-DDE
30. Dieldrin
31. Chlorobenzilate (250ng/mL)
32. Perthane (250ng/mL)
33. Chloropropylate (250ng/mL)
34. Endrin
35. Nitrofen
36. 4,4'-DDD
37. Endosulfan II
38. 4,4'-DDT
39. Endrin aldehyde
40. Endosulfan sulfate
41. Captafol
42. Methoxychlor
43. Endrin ketone
44. Mirex
45. cis-Permethrin
46. trans-Permethrin
47. Decachlorobiphenyl*

surrogate standard

Agilent DB-CLP1



Agilent DB-CLP2



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EPA Method 8082A

PCB Congeners

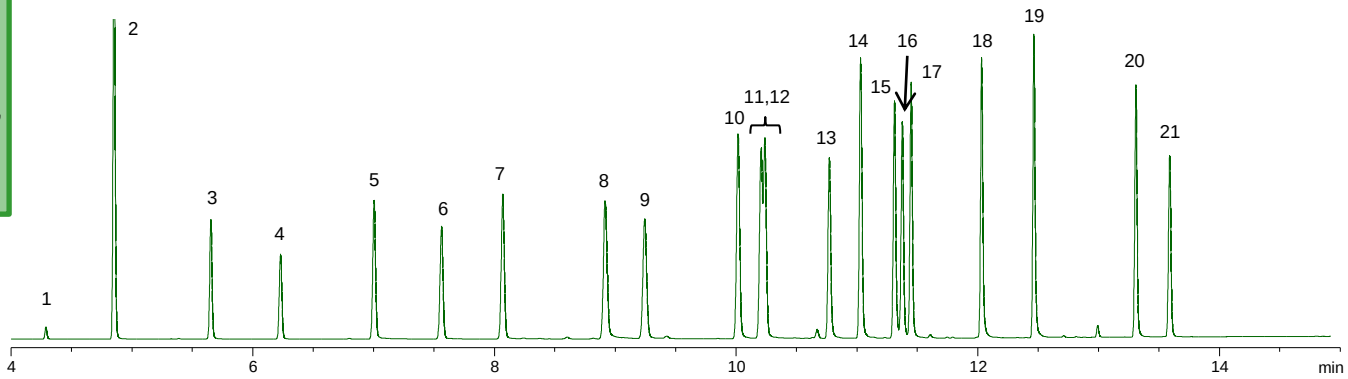
DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	100 ng/mL PCB congeners 100 ng/mL Pesticide Surrogate Mix
Inj. Vol.:	2 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	250°C
Oven Temp:	125°C (hold 0.25 min), 20°C/min to 210°C, hold 0.5 min 7°C/min to 235°C, hold 0.75 min, 25°C/min to 325°C, hold 2 min,
Carrier Gas:	Helium, constant flow 3 mL/min
Detector:	µECD @ 340 °C

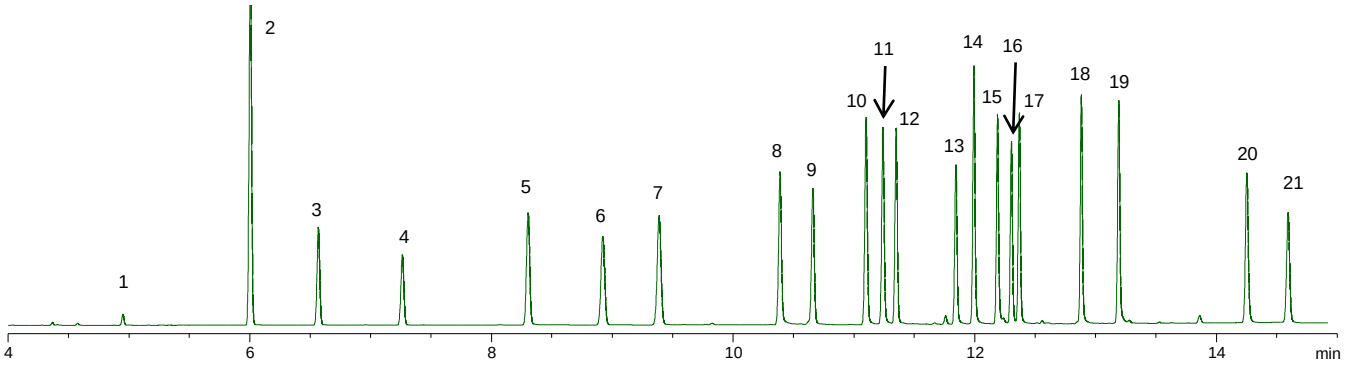
1. BZ #1
2. TCMX*
3. BZ #5
4. BZ #18
5. BZ #31
6. BZ #52
7. BZ #44
8. BZ #66
9. BZ #101
10. BZ #87
11. BZ #110
12. BZ #151
13. BZ #153
14. BZ #141
15. BZ #138
16. BZ #187
17. BZ #183
18. BZ #180
19. BZ #170
20. BZ #206
21. Decachlorobiphenyl*

*surrogate standard

Agilent DB-CLP1



Agilent DB-CLP2

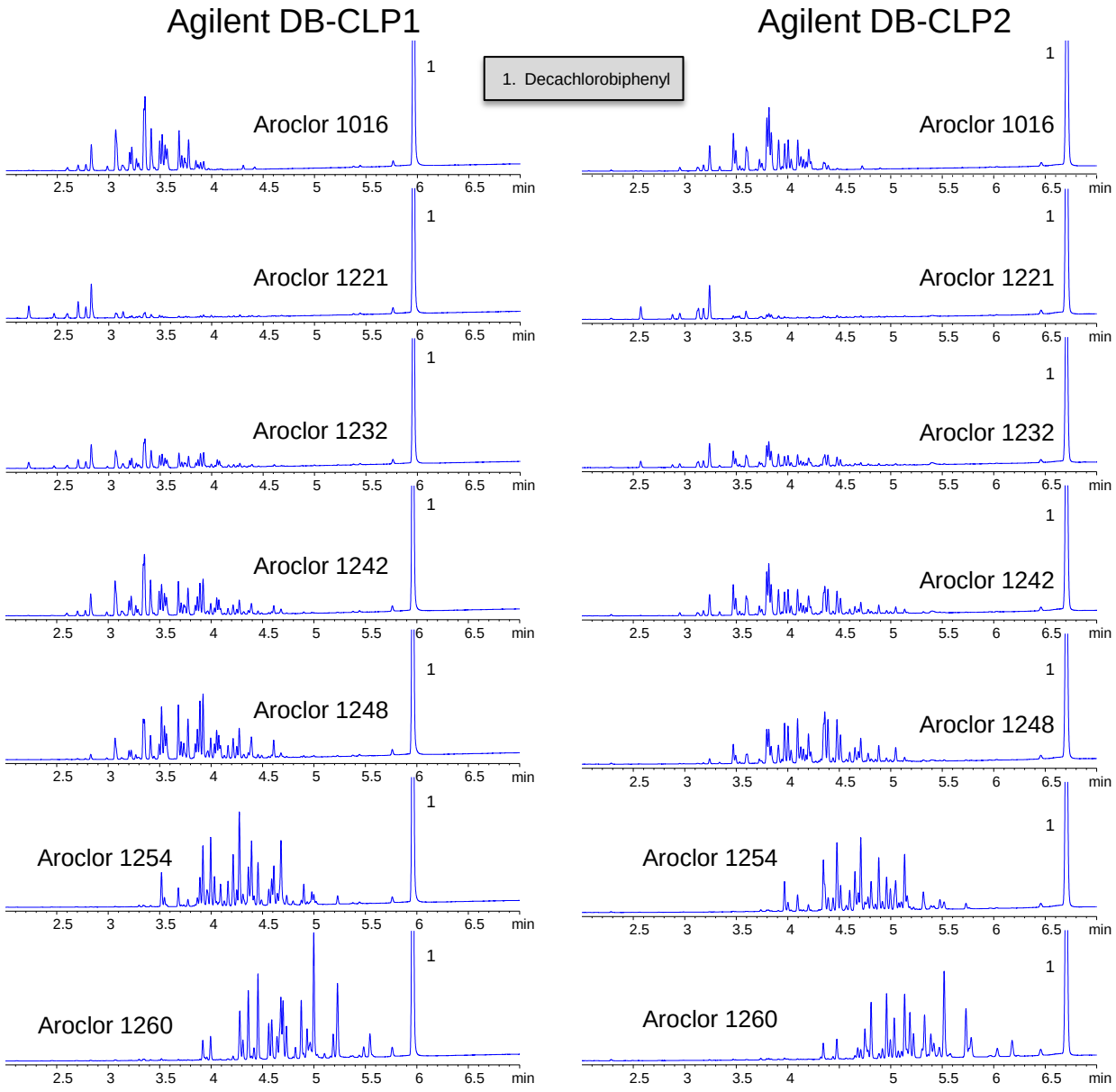


EPA Method 8082A

Aroclors

DB-CLP1 30m 0.32mm ID 0.25µm (cat.# 123-8232)
DB-CLP2 30m 0.32mm ID 0.5µm (cat.# 123-8336)
5m x 0.32mm ID deact. guard column
Inert Tee CFT device (cat.# G3184-60065) 1:1 Split

Instrument:	Agilent 7890 GC with dual µECD
Sampler:	Agilent 7693
Sample:	100 ng/mL Individual Aroclor 100 ng/mL Decachlorobiphenyl
Inj. Vol.:	2 µL splitless
Liner:	Ultra Inert liner, single taper splitless (cat.#5190-2292)
Inj. Temp.:	250°C
Oven Temp:	160°C (hold 0.25 min), 35°C/min to 330°C, hold 3 min
Carrier Gas:	Helium, constant flow 3.75 mL/min
Detector:	µECD @ 340 °C



Agilent Technologies

DB-8270D UI

EPA Semivolatiles method

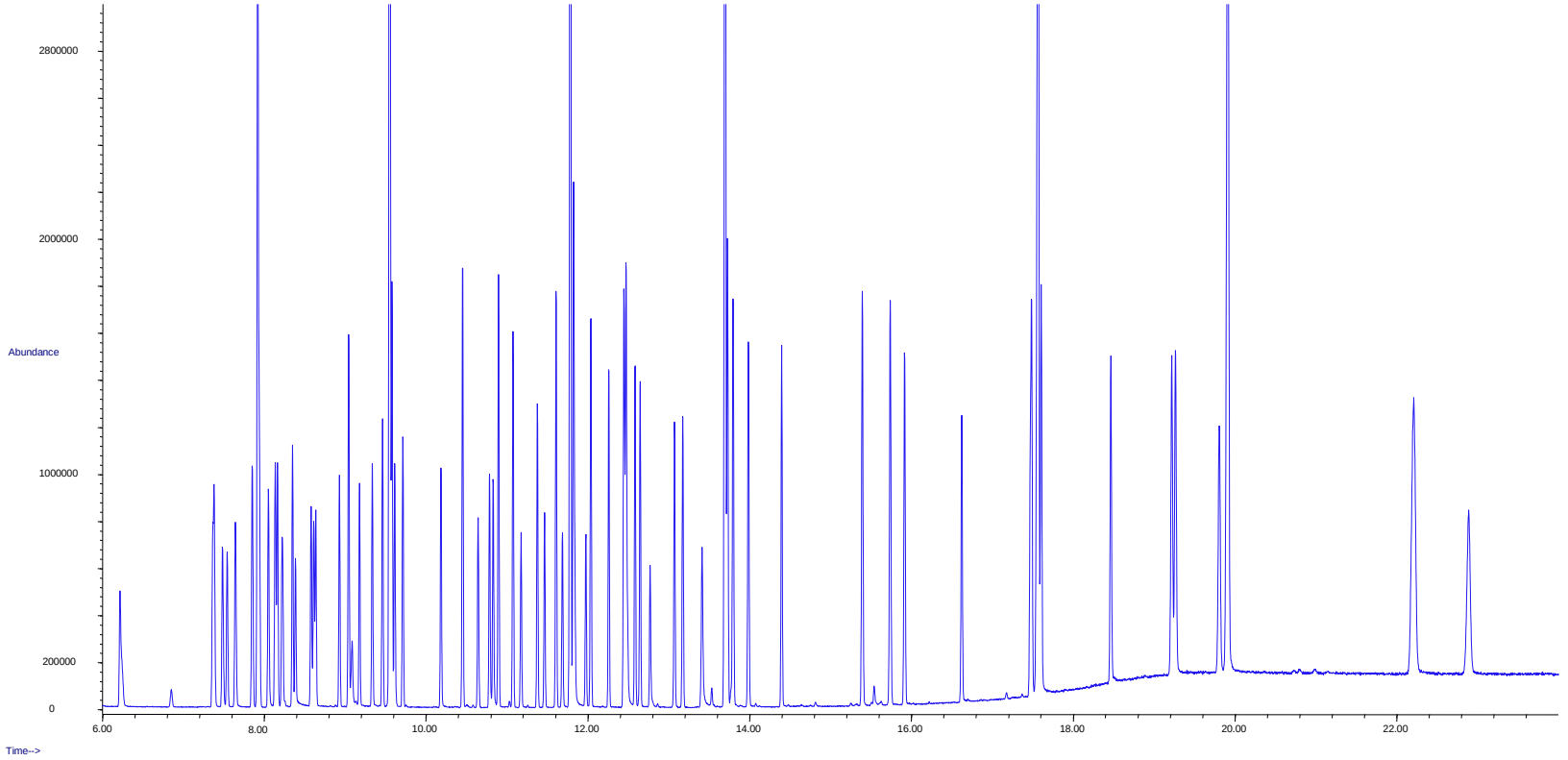
Dirty Samples

Issues with Endrin and DDT breakdown *

Response of 2,4-Dinitrophenol

Resolution

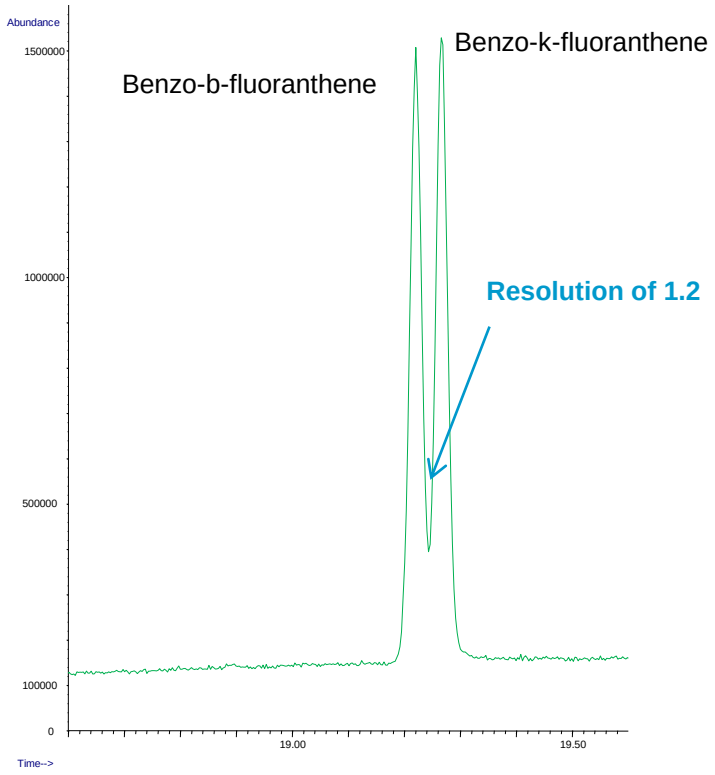
78 Semi-Volatile Components on a DB-UI 8270D 30m x 0.25 x 0.25



25 minute Semi-Volatile Analysis

Application note 5991-0250EN

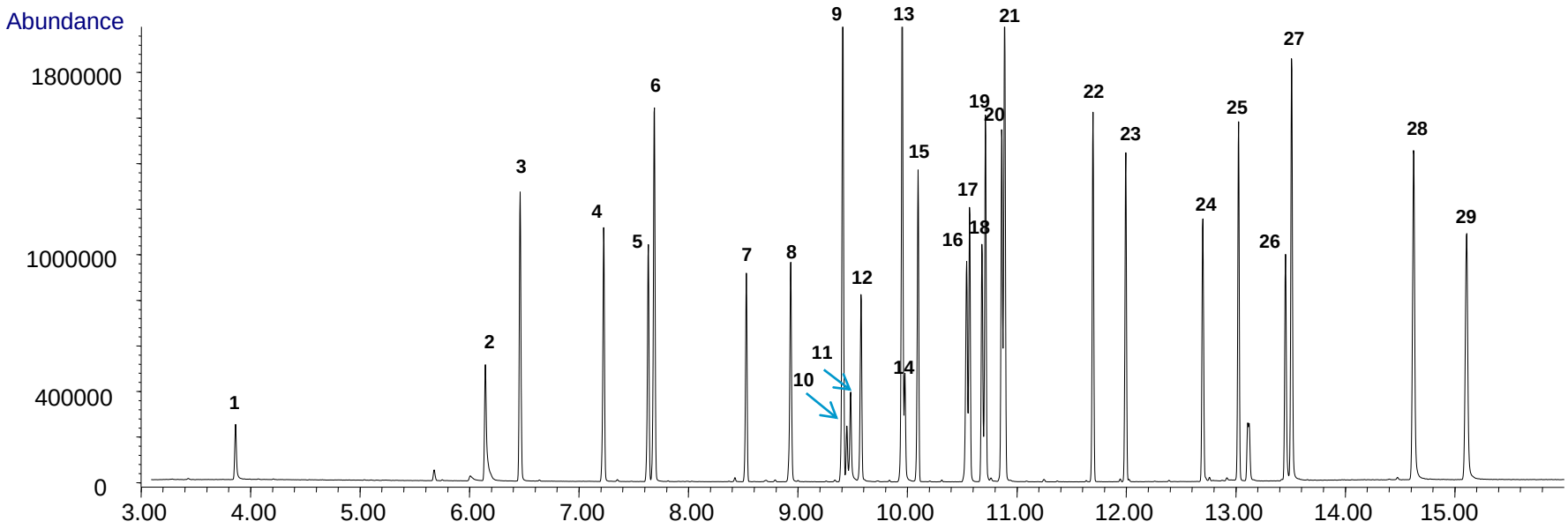
Resolution of benzo-b & k fluoranthene isomers



Positional isomers

Column:	Agilent DB-UI 8270D, 30 m x 0.25 mm, 0.25 µm (p/n 122-9732)
Liner:	Dual taper direct connect liner (p/n G1544-80700)
Inlet:	MMI in non-pulsed splitless mode 1 µL at 275 °C
Carrier:	He, 1.2 mL/min, constant flow
Septum purge flow:	3 mL/min, purge time on 0.7 min 50 mL/min
Oven program:	30 °C (1.0 min), 15 °C/min to 100 °C, 20 oC/min to 240 °C (0.5 min), 15 °C/min to 325 °C (6.7 min) Gas saver Off
GC/MSD:	Agilent 7890/5975C, 325 °C transfer line, 280 °C source, 150 °C quad, 35-500 AMU range
Sampler:	Agilent 7693, 10.0 µL syringe (p/n G4513-80216)

10 ng/ul Semivolatile Checkout Standard on 20m x 0.18mm x 0.36um DB-8270D Capillary GC Column using an Ultra Inert Liner with Wool

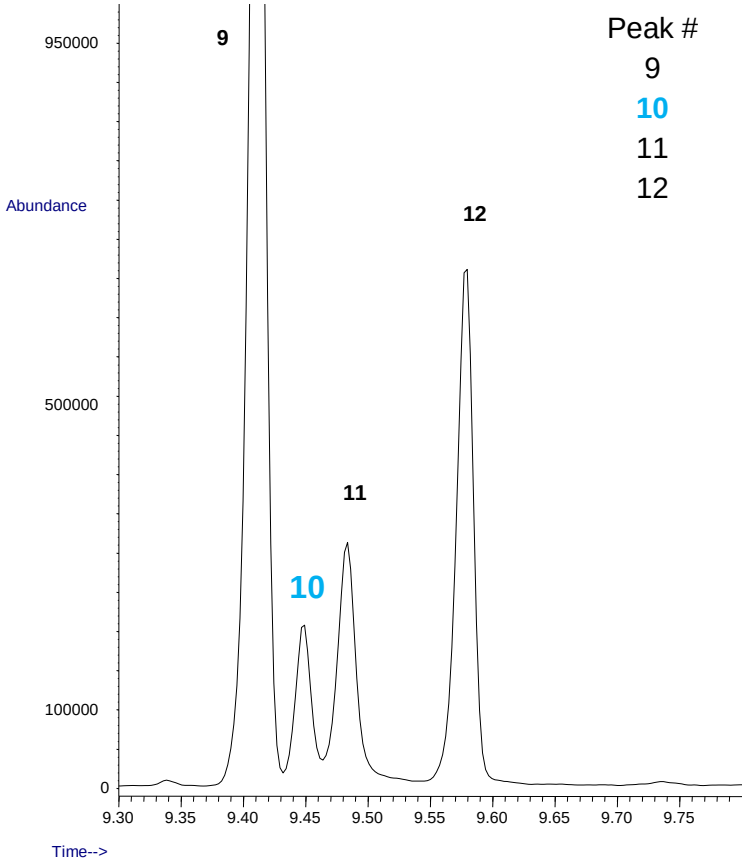


1	N-Nitrosodimethylamine	11	4-nitrophenol	21	Phenanthrene-d10
2	Aniline	12	2,4-dinitrotoluene	22	Aldrin
3	1,4-Dichlorobenzene-d4	13	Flourene	23	Heptachlor epoxide
4	Isophorone	14	4,6-dinitro-2-methyl phenol	24	Endrin
5	1,3-dimethyl-2-nitrobenzene	15	Trifluralin	25	4,4'-DDT
6	Naphthalene	16	Simazine	26	3,3'-dichlorobenzidine
7	hexachlorocyclopentadiene	17	Atrazine	27	Chrysene d-12
8	Mevinphos	18	pentachorophenol	28	benzo[b]flouranthene
9	Acenaphthene-d10	19	Terbufos	29	Perylene-d12
10	2,4-dinitrophenol	20	Chlorothanlonil		

16 minute Semi-Volatile Analysis

Checkout Standard mix Agilent part # 5190-0473

Excellent Peak Shape and Response for 2,4 Dinitrophenol



Peak #	Compound
9	Acenaphthalene D10
10	**2,4 Dinitrophenol**
11	4 Nitro phenol
12	2,4 Dinitro toluene

Column 1:	Agilent J&W 8270-D 20 m x 0.18mm x 0.36 um
Column 2:	1 m 0.15 mm ID deactivated 2 psi with 5ml/min bleeder
Carrier:	1 ml/min constant flow at 40^{O}/C, AUX EPC 2 PSI constant pressure
Backflush:	postrun 75 psi AUX EPC 2 PSI inlet
Oven:	40^{o}C (2.5min) to 320^{O}C (25^{O}/min) 4.8 min hold
Injection:	280^{o}C Pulsed splitless 44 psi until 0.3 min, purge flow 60ml/min on at 0.35 min
Liner:	UI single taper
MSD:	Transfer Line 290^{O}C , Source 300^{O}C, Quad 150^{O}C 50 -550 AMU

Additional Enhancements

Ultra Inert Liners

Certificate of Performance

5190 - 2293 Ultra Inert Liner

Splitless , Sngl taper, Glass Wool

Liner Body Lot: 0023A

Deactivation Lot: B11002

Tested for: 2ng 4- Aminopyridine
2ng 2,4- Dinitrophenol

Ultimetal Plus

Inlet Weldment

Ultra Inert Gold Seal

Flexible Metal Ferrules

DB-Select 624 UI 467

Residual Solvents Method USP<467>

Procedure A uses “G43” stationary phase

6% cyanopropyl phenyl -94% dimethylpolysiloxane

30 m X 0.53 mm X 3.0 µm

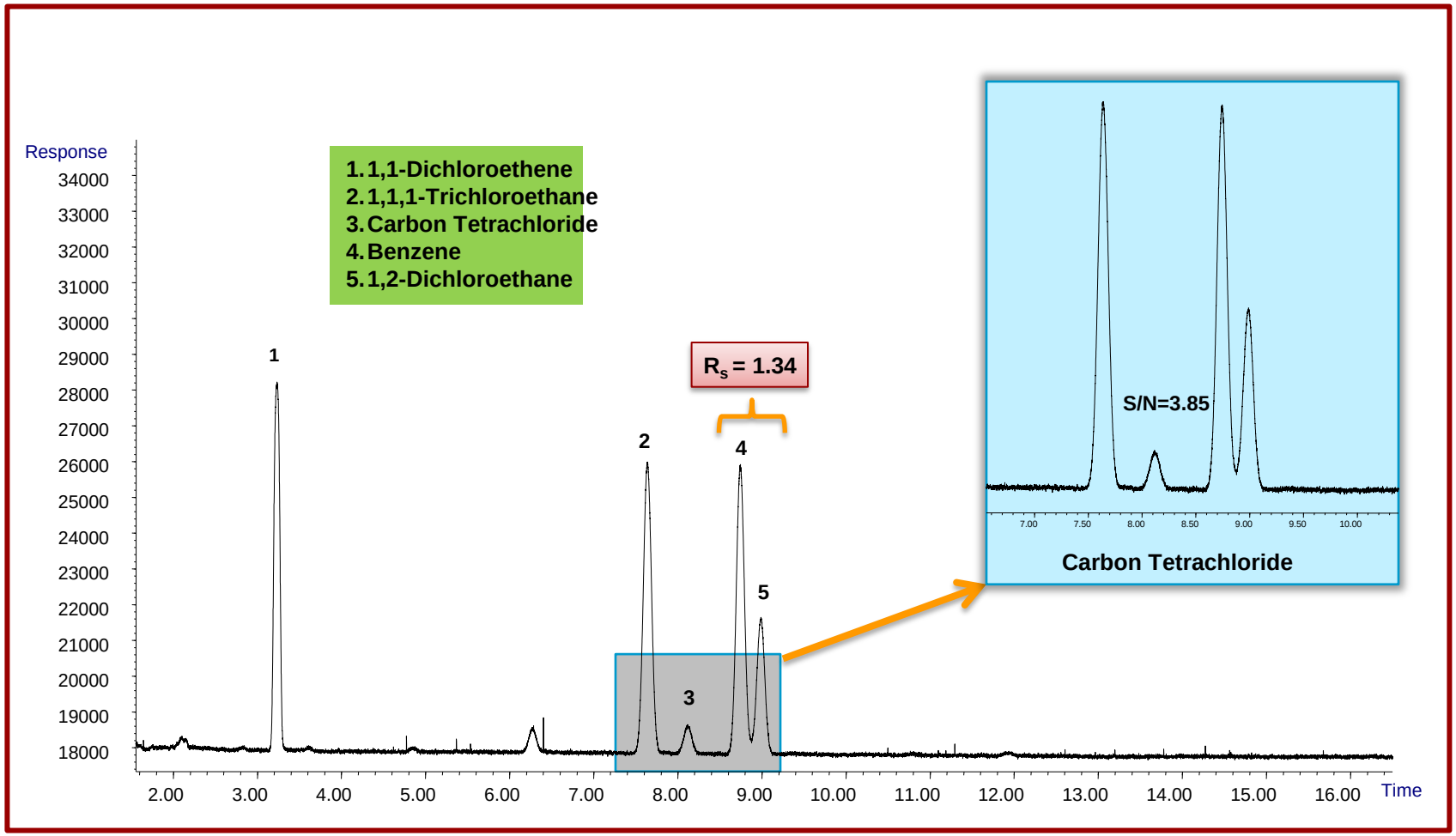
30 m X 0.32 mm X 1.8 µm

USP 467 Application Development

- **Column Performance Evaluation**
  - USP Method 467 Residual Solvents
  - Standards Criteria
    - Class 1
      - Carbon Tetrachloride Signal to Noise ≥ 3
    - Class 2A
      - Resolution of Acetonitrile:Dichloromethane
      - Resolution of Methylcyclohexane:1,4-Dioxane
      - Tailing of Methylcyclohexane
    - Class 2B
      - Tailing for Pyridine

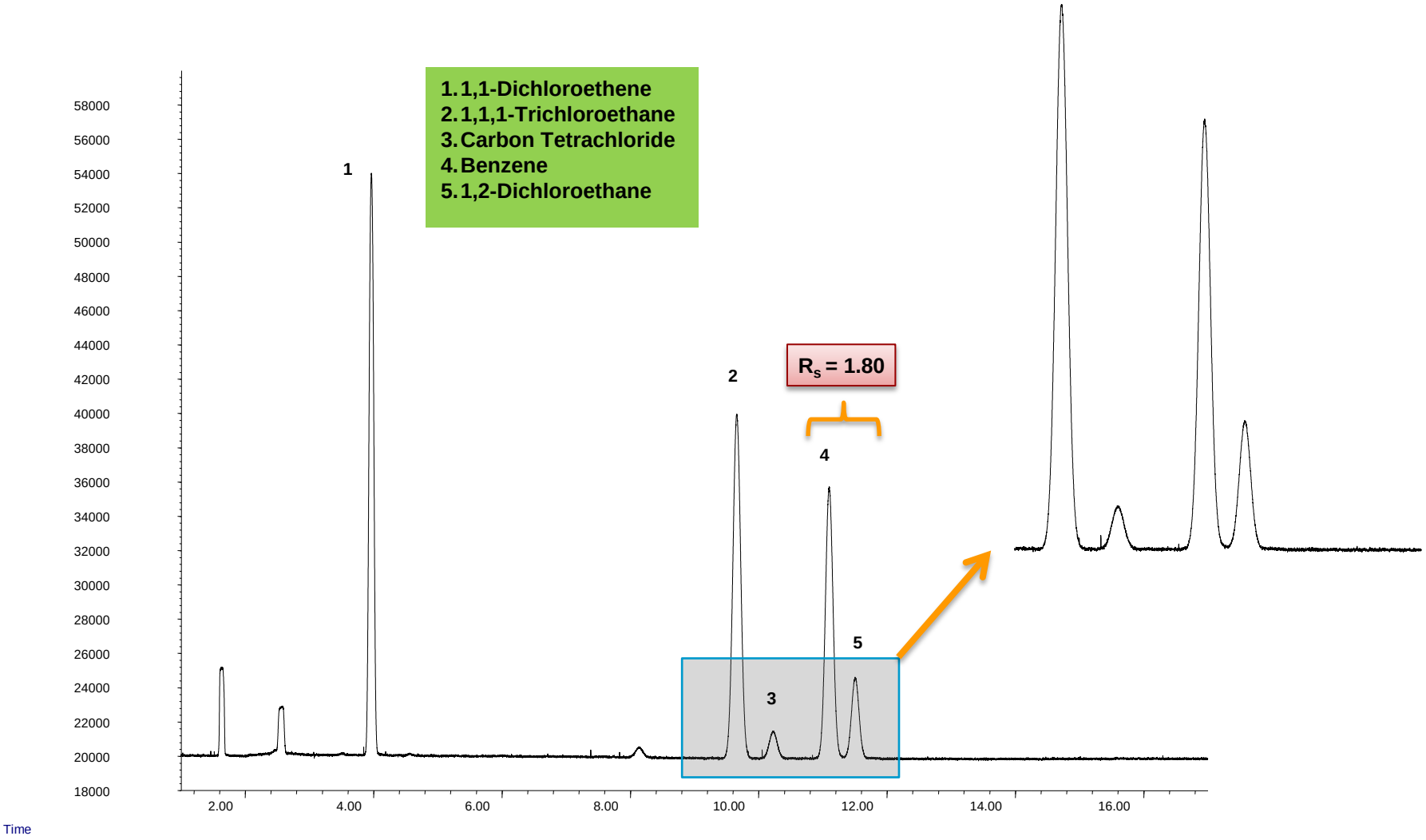
USP 467 Class 1

DB-Select 467UI Serial #USC9275175



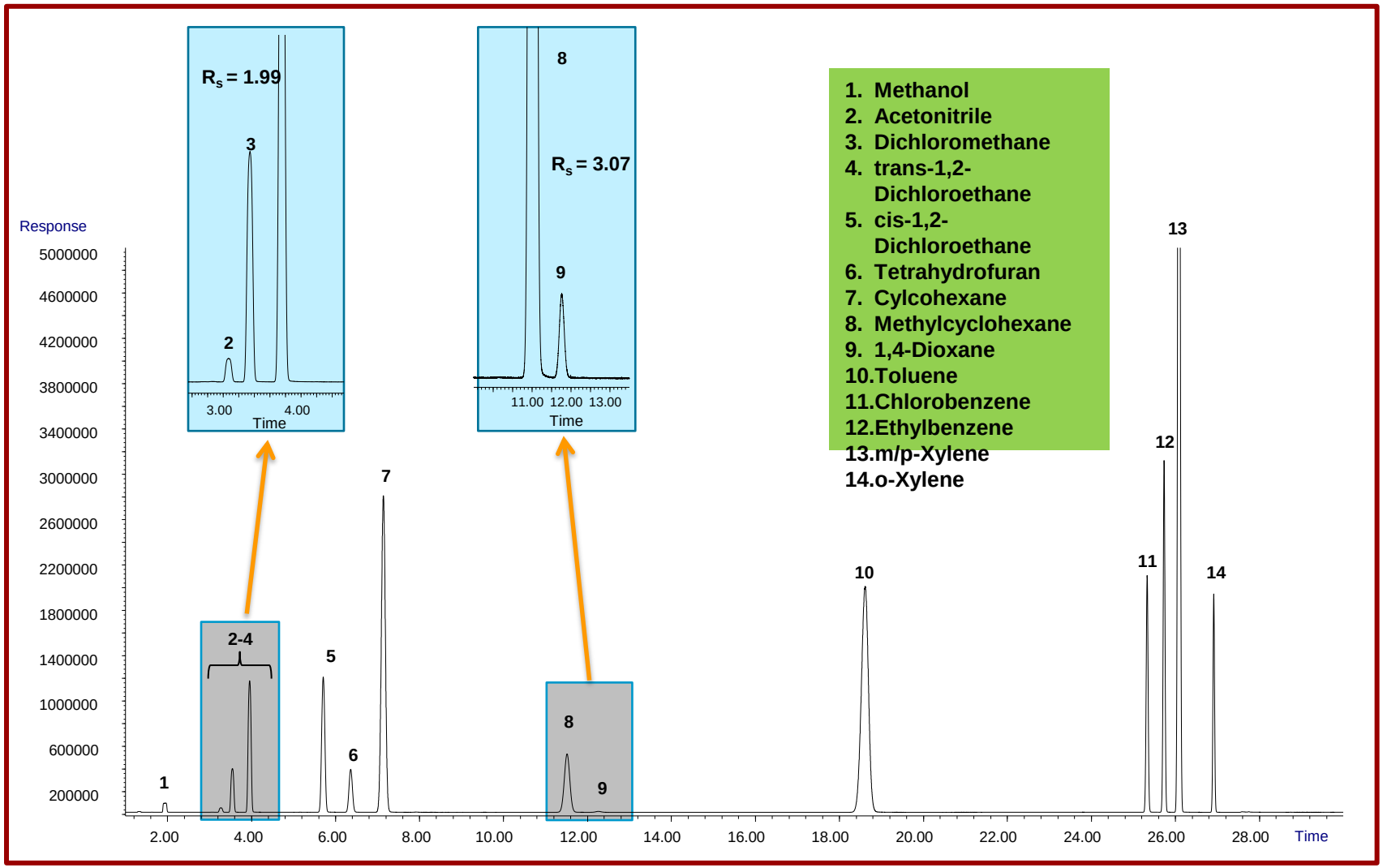
USP 467 Class 1

DB-Select 467UI Serial #USC284013H



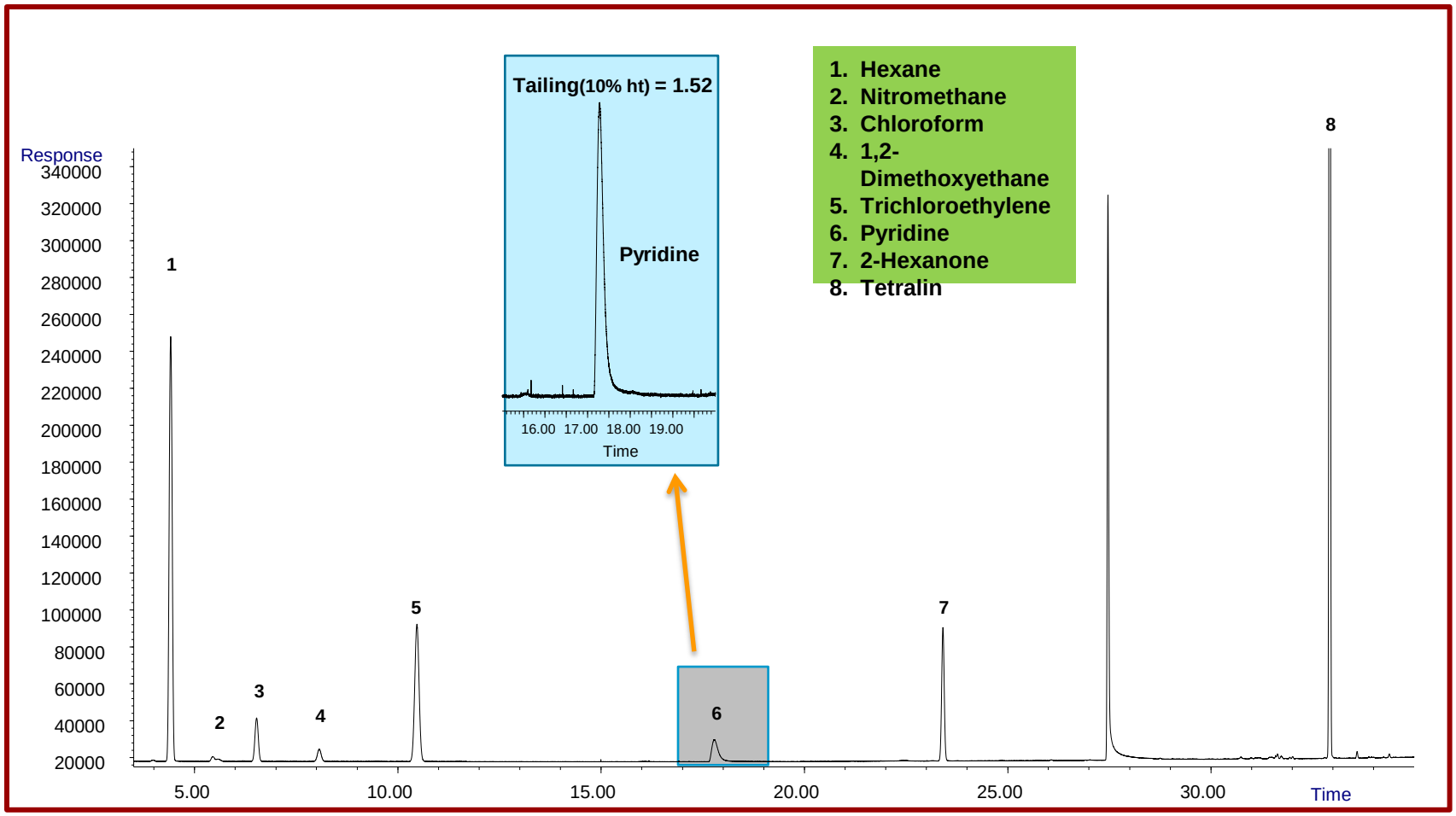
USP 467 Class 2A

DB-624 UI 467 Select Serial #USC9261831

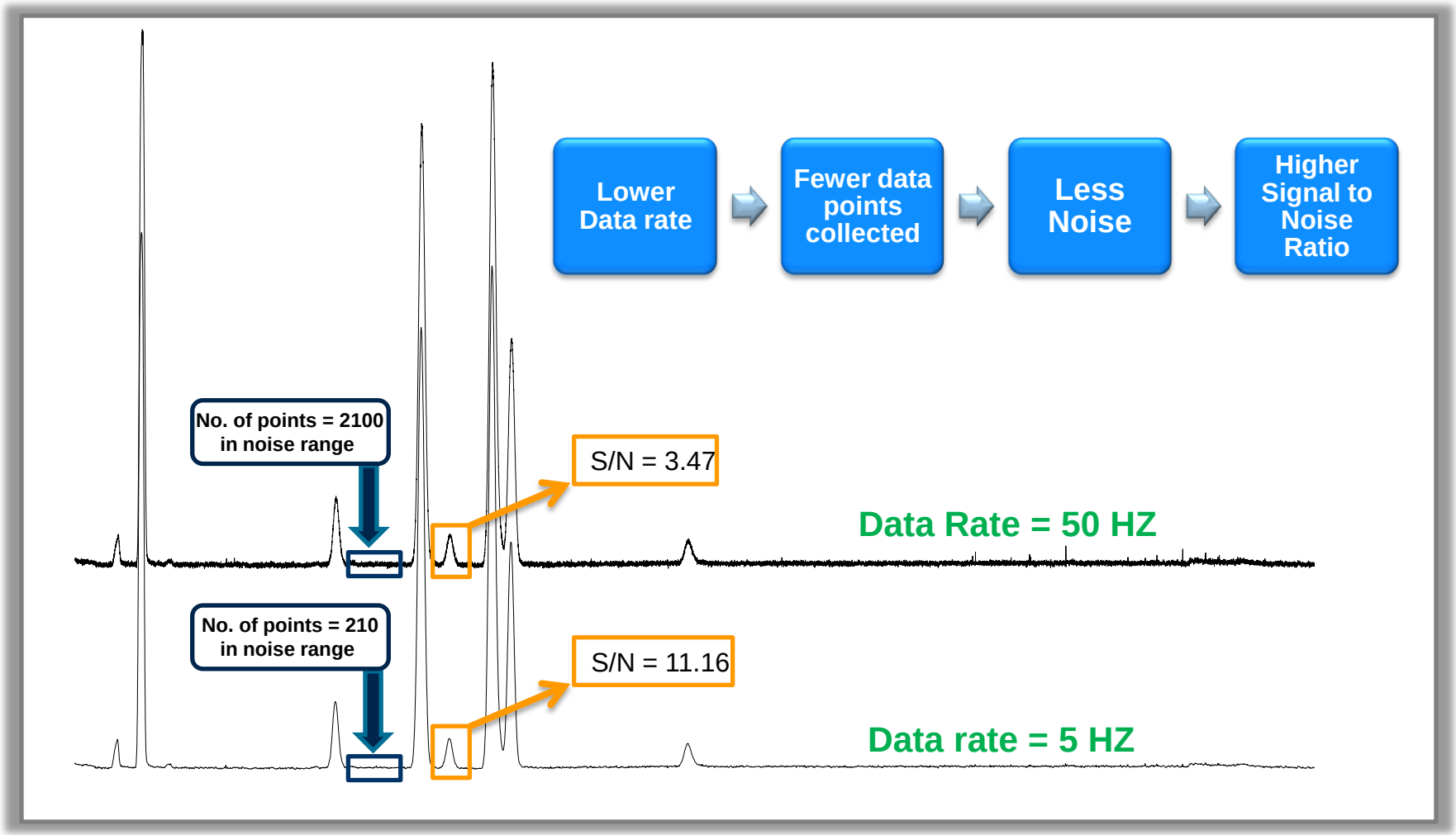


USP 467 Class 2B

DB-624 UI 467 Select Serial #USC9261831



Impact of Data Acquisition Rate on S/N Determination



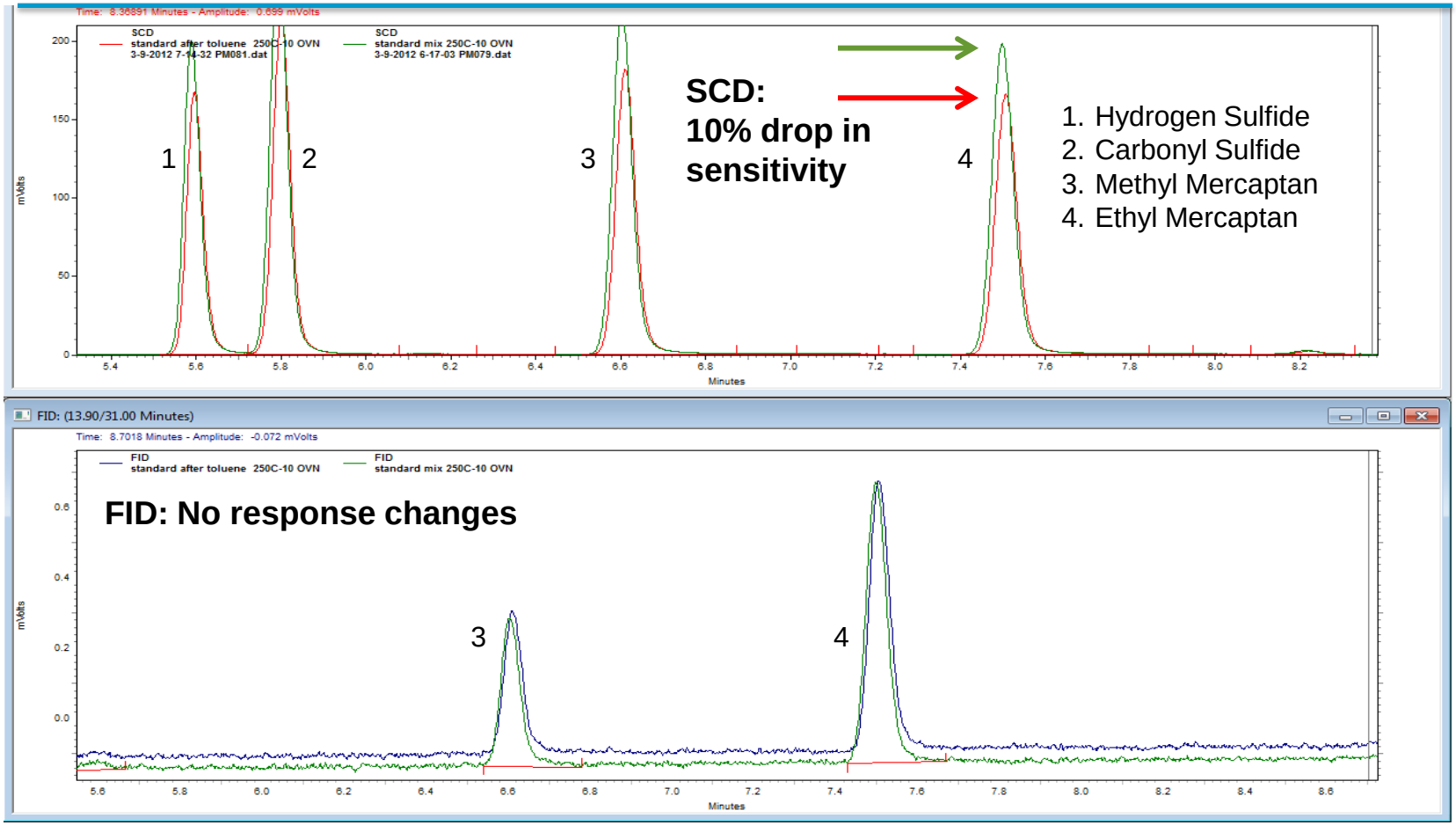
DB-Sulfur SCD

Thick film PDMS phase generally coat ceramics in SCD

Must have good inertness for H_2S

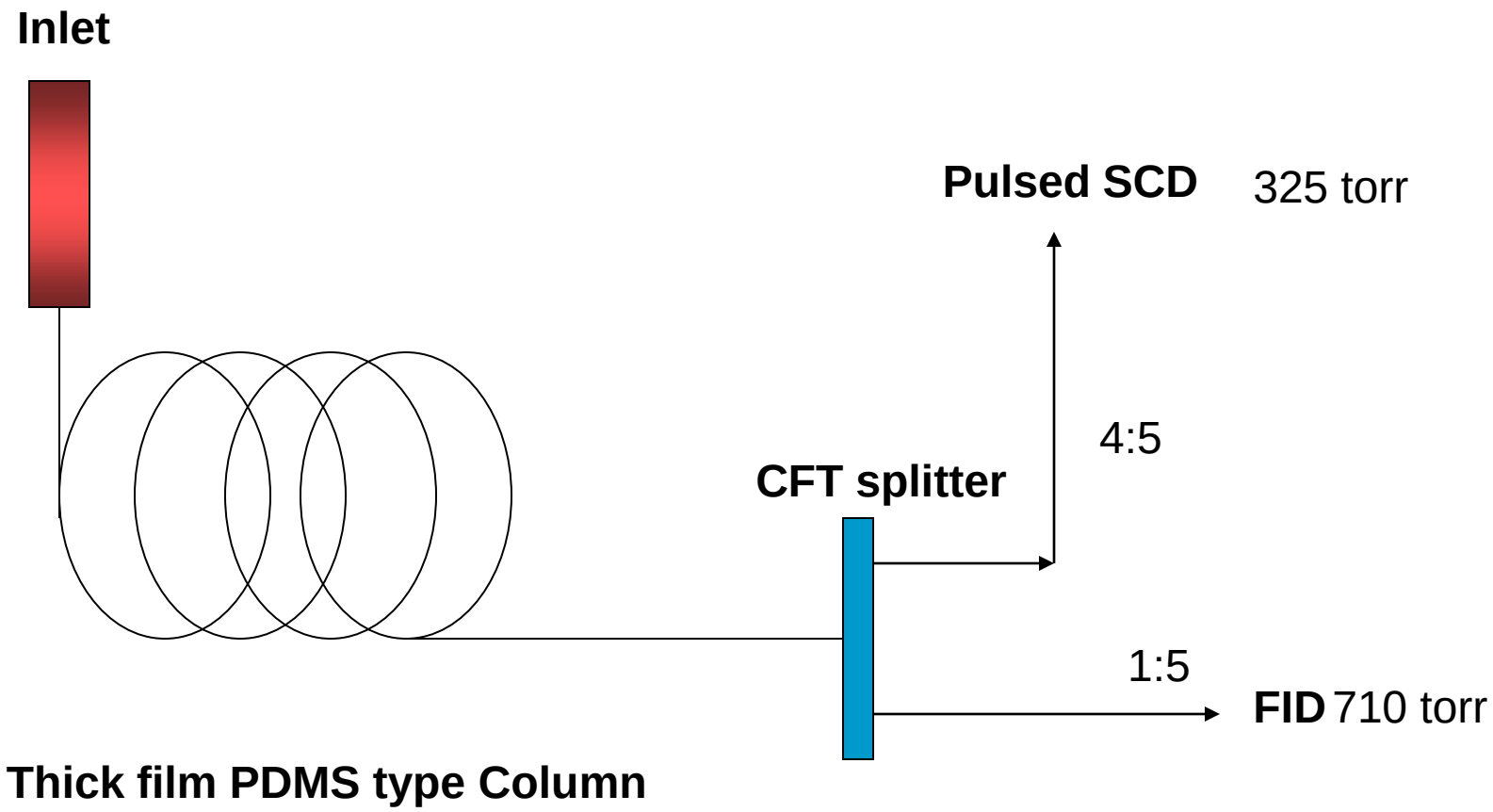
Traditional PDMS column- Coating of Reactor Tubes

Overlay of before (green) and after 2 x 2 uL neat toluene Injection (red)



Data courtesy of Jim Luong, Ronda Gras, Myron Hawryluk of Dow Chemical Canada

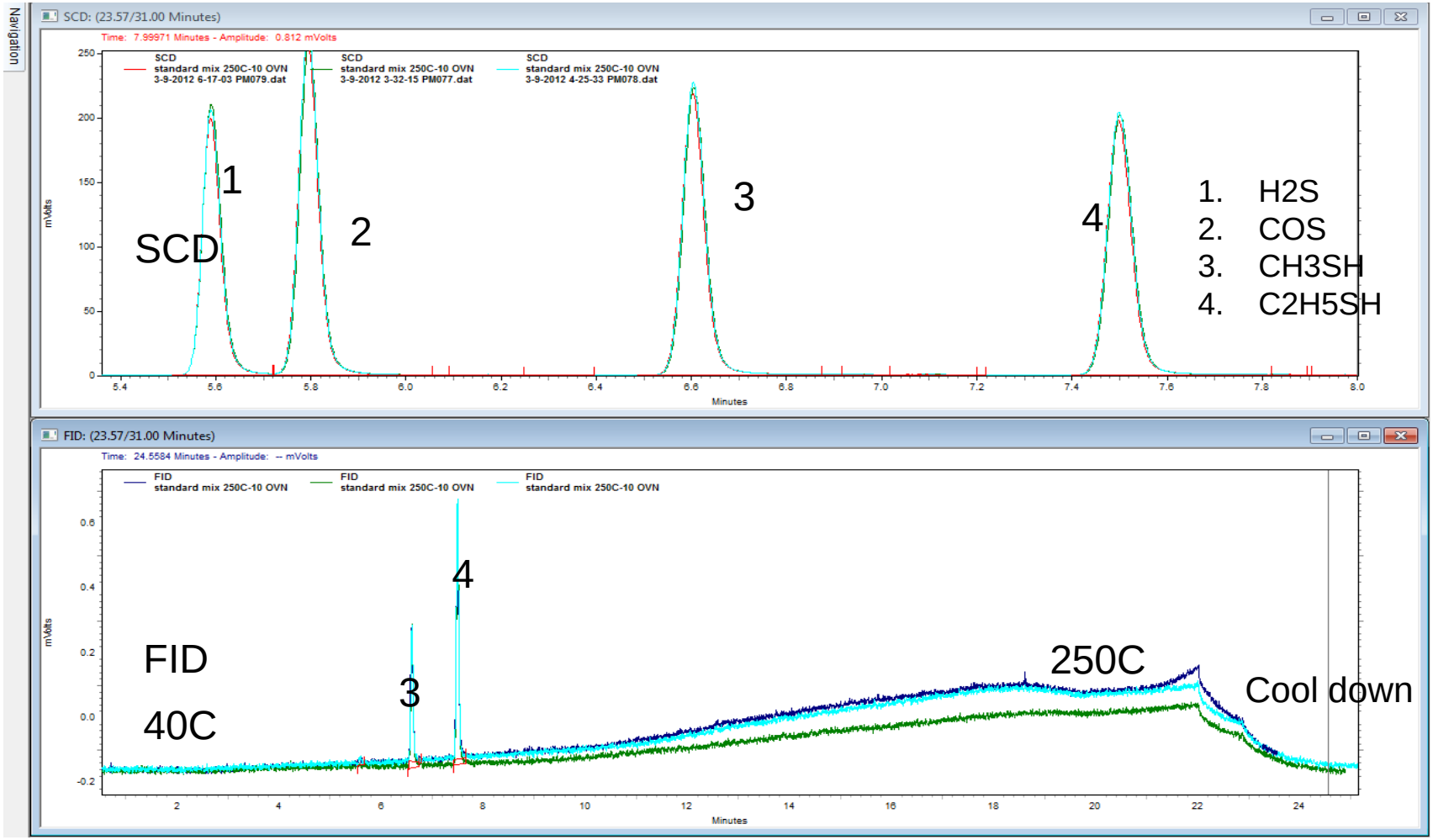
Configuration to test SCD Quenching Issue



Data courtesy of Jim Luong, Ronda Gras, Myron Hawryluk of Dow Chemical Canada

New DB-Sulfur SCD column

Last Three Runs of the day (n=20, 100 ppmv std)



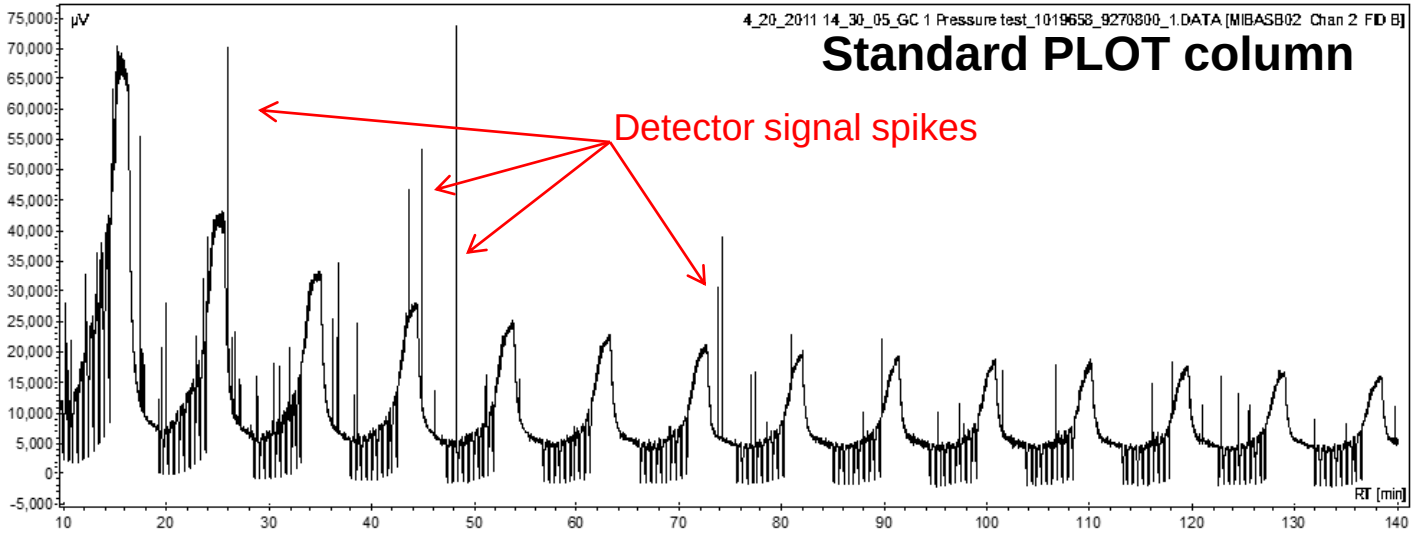
Data courtesy of Jim Luong, Ronda Gras, Myron Hawryluk of Dow Chemical Canada

PLOT-PT columns

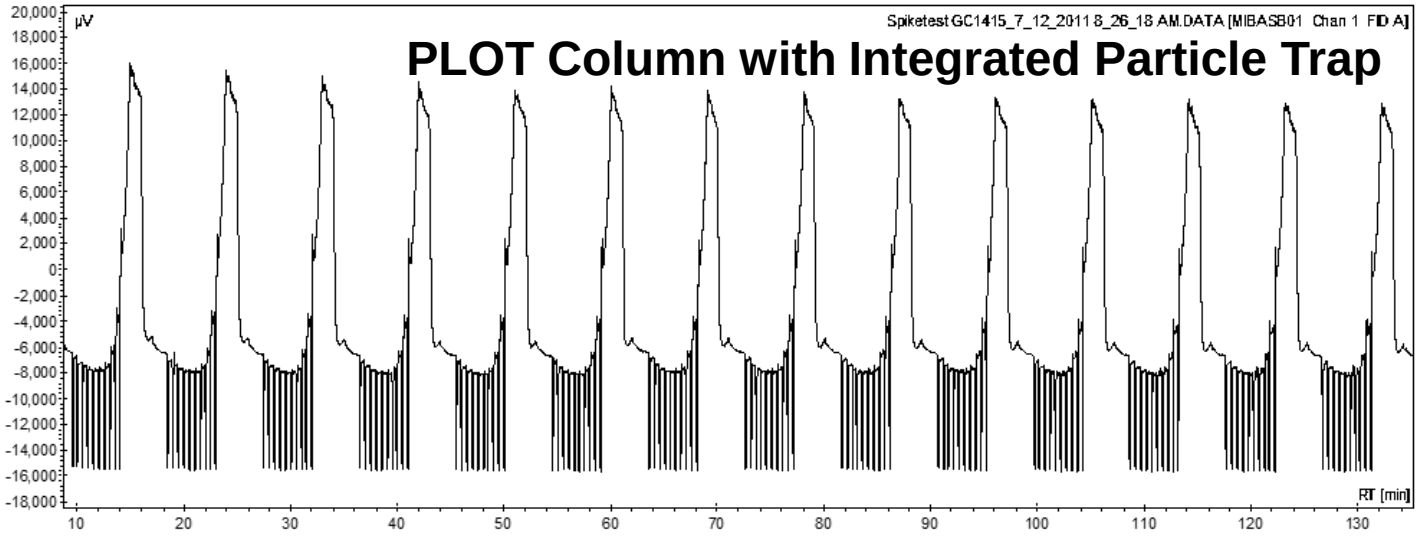
Solid stationary phase ‘Particles’ can cause:

- Detector spiking
- Valve scoring
- Clogged Unions

No Detector Spikes Observed on PT Columns with Repeated Temperature and Pressure Cycling



- Temperature: 150°C + 20°C/min → 250°C;15 times
- Pressure 3x optimum
- Each run switch off/on carrier gas 10 times

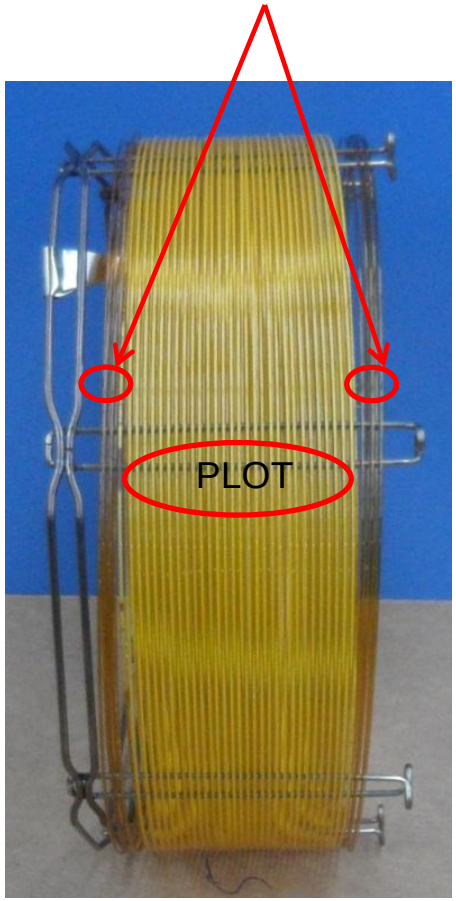


The unusual "chromatogram" shows the detector signal profile of the temp and pressure cycling

Agilent Technologies

Integrated Particle Trap PLOT Column

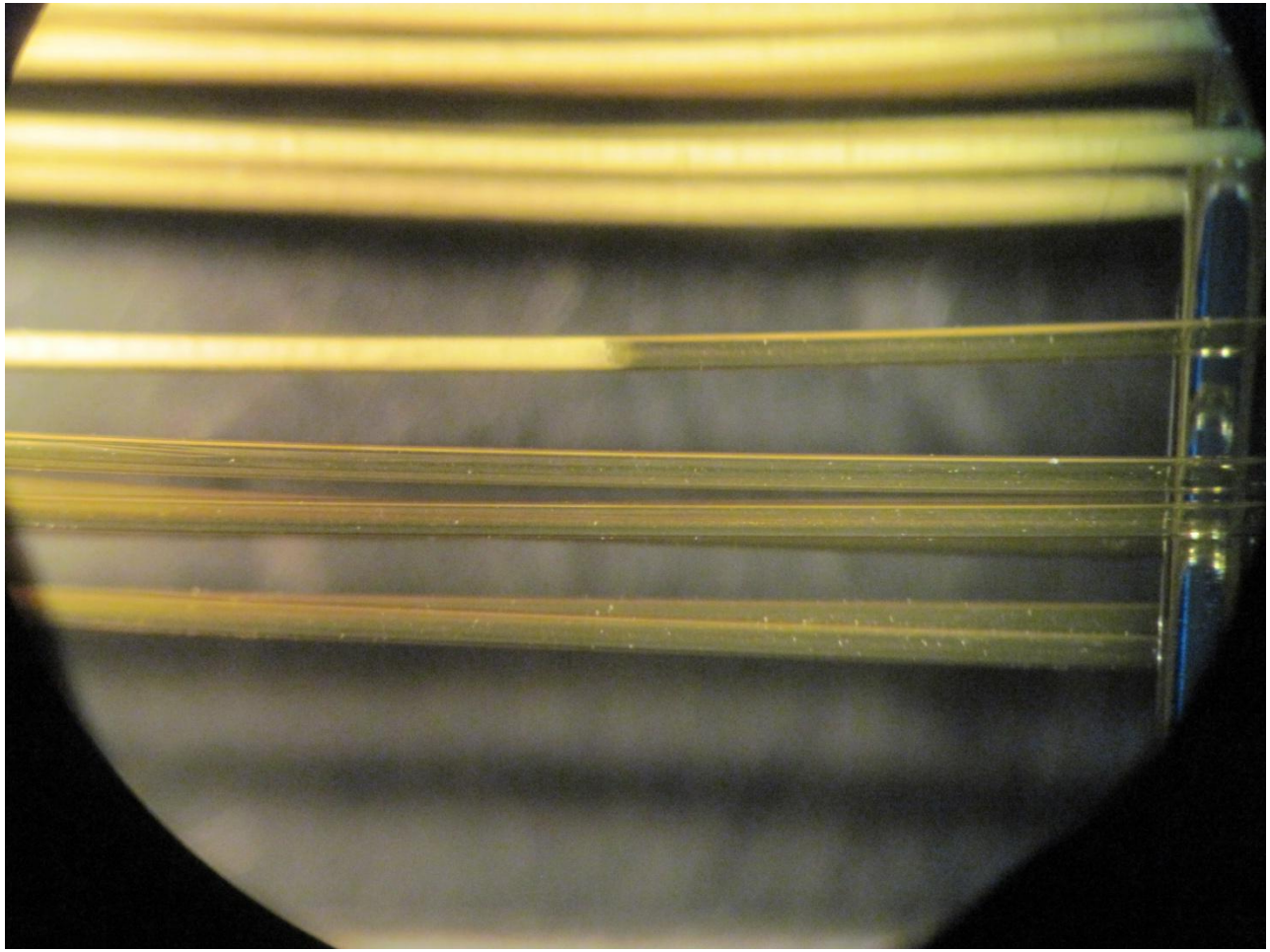
2.5 meter integrated particle traps on both ends



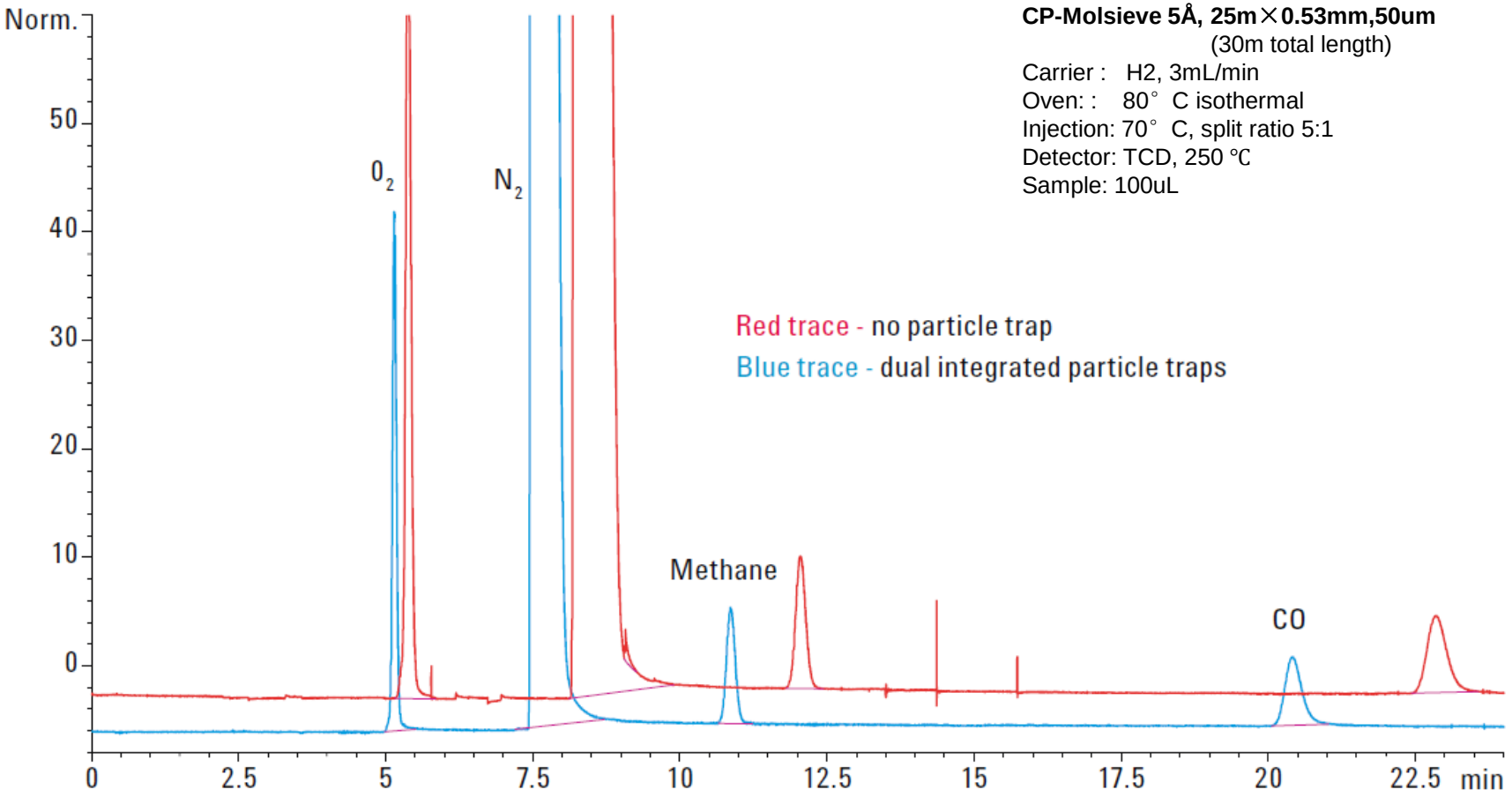
Compatible with GC/MS and valve switching systems, and Capillary Flow Technology

Very similar selectivity, plates and peak shape to existing Agilent PLOT columns

The PLOT Column and Integrated Particle Trap



No spikes at Fixed Gases Analysis on CP-Molsieve 5Å PLOT PT column

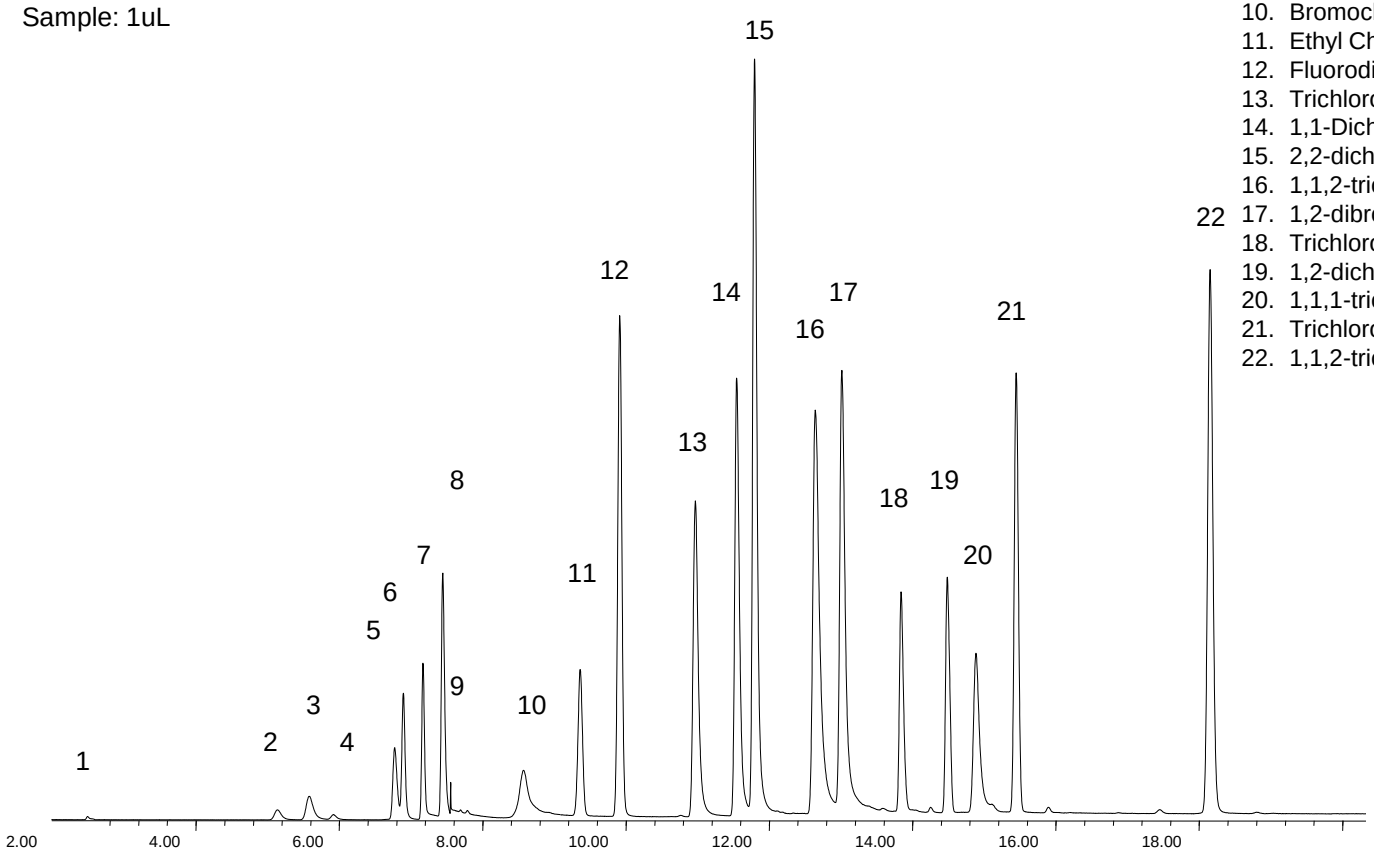


CP-Molsieve 5Å, 25m×0.53mm,50um
(30m total length)
Carrier : H2, 3mL/min
Oven: : 80° C isothermal
Injection: 70° C, split ratio 5:1
Detector: TCD, 250 ℃
Sample: 100uL

Halocarbons by GCMS

Column: PoraPLOT Q PT, 25m×0.32mm,10um (P/N CP7551PT)
(30m total length)

Carrier : Helium, 42cm/s @55 ℃
Oven: : 55 °C for 5min
55 °C - 200 °C at 12°C/min
200 °C for 10min
Injection: 250 ℃, splitless, 0.2min purge activation time
Detector: MSD, 280 ℃ Transfer line, full Scan at m/z 45-185
Sample: 1uL



1. Fluoroform (Freon-23)
2. 1,1,1-trifluoroethane (Freon-143a)
3. Pentafluoroethane (Freon-125)
4. Bromotrifluoromethane (Freon-13b1)
5. 1,1,1,2-Tetrafluoroethane (Freon-134a)
6. 1,1-difluoroethane (Freon-152a)
7. Difluorochloromethane (Freon-22)
8. 1,1,2,2-tetrafluoroethane (Freon-134)
9. 1-chloro-1,1-difluoroethane (Freon-142)
10. Bromochlorodifluoromethane (Freon-12b1)
11. Ethyl Chloride (Freon-160)
12. Fluorodichloromethane (Freon-21)
13. Trichloromonofluoromethane (Freon-11)
14. 1,1-Dichloro-1-fluoroethane (Freon-141)
15. 2,2-dichloro-1,1,1-trifluoroethane (Freon-123)
16. 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113)
17. 1,2-dibromo-1,1,2,2-tetrafluoroethane (Freon-114b2)
18. Trichloromethane (Freon-20)
19. 1,2-dichloroethane
20. 1,1,1-trichloro-ethane
21. Trichloroethylene
22. 1,1,2-trichloroethane

Agilent J&W PLOT PT Columns

Available PLOT PT columns:

- Porous polymers:
  - PoraPLOT Q
  - PoraBOND Q
  - PoraBOND Q HT
  - HP-PLOT Q
  - GS-Q
  - PoraPLOT U
  - HP-PLOT U
- *NEW!* Aluminum oxide
  - HP-PLOT Al2O3 S
  - HP-PLOT Al2O3 M
  - HP-PLOT Al2O3 KCl
  - GS-Alumina
  - GS-Alumina/KCl
  - CP-Al2O3 KCl
  - CP-Al2O3 Na2SO4
- *NEW!* Molsieve
  - CP-Molsieve 5A

Custom PLOT PT columns are available for these phases

Phase type	Part number	Description	Dimensions
PLOT Q	CP7348PT	PoraBOND Q PT	25m x 0.25mm x 3µm
	CP7351PT	PoraBOND Q PT	25m x 0.32mm x 5µm
	CP7352PT	PoraBOND Q PT	50m x 0.32mm x 5µm
	CP7353PT	PoraBOND Q PT	10m x 0.53mm x 10µm
	CP7354PT	PoraBOND Q PT	25m x 0.53mm x 10µm
	CP7550PT	PoraPLOT Q PT	10m x 0.32mm x 10µm
	CP7551PT	PoraPLOT Q PT	25m x 0.32mm x 10µm
	CP7554PT	PoraPLOT Q PT	25m x 0.53mm x 20µm
	CP7557PT	PoraPLOT Q-HT PT	25m x 0.32mm x 10µm
	115-3432PT	GS-Q PT	30m x 0.53mm
	19091P-QO3PT	HP-PLOT Q PT	15m x 0.32mm x 20µm
	19091P-QO4PT	HP-PLOT Q PT	30m x 0.32mm x 20µm
	19095P-QO3PT	HP-PLOT Q PT	15m x 0.53mm x 40µm
	19095P-QO4PT	HP-PLOT Q PT	30m x 0.53mm x 40µm
PLOT U	CP7584PT	PoraPLOT U PT	25m x 0.53mm x 20µm
	19095P-UO4PT	HP-PLOT U PT	30m x 0.53mm x 20µm
Al2O3 KCl deactivated	CP7515PT	CP-Al2O3/KCl PT	50m x 0.32mm x 5µm
	CP7517PT	CP-Al2O3/KCl PT	25m x 0.53mm x 10µm
	CP7518PT	CP-Al2O3/KCl PT	50m x 0.53mm x 10µm
	19091P-K15PT	HP-PLOT Al2O3 KCl PT	50m x 0.32mm x 8µm
	19095P-K23PT	HP-PLOT Al2O3 KCl PT	30m x 0.53mm x 15µm
	19095P-K25PT	HP-PLOT Al2O3 KCl PT	50m x 0.53mm x 15µm
	115-3352PT	GS-Alumina/KCl PT	50m x 0.53mm
Al2O3 Na2SO4 deactivated	CP7565PT	CP-Al2O3/Na2SO4 PT	50m x 0.32mm x 5µm
	CP7568PT	CP-Al2O3/Na2SO4 PT	50m x 0.53mm x 10µm
	19091P-S12PT	HP-PLOT Al2O3 S PT	25m x 0.32mm x 8µm
	19091P-S15PT	HP-PLOT Al2O3 S PT	50m x 0.32mm x 8µm
	19095P-S23PT	HP-PLOT Al2O3 S PT	30m x 0.53mm x 15µm
	19095P-S25PT	HP-PLOT Al2O3 S PT	50m x 0.53mm x 15µm
Al2O3 with proprietary deactivation	115-3532PT	GS-Alumina PT	30m x 0.53mm
	115-3552PT	GS-Alumina PT	50m x 0.53mm
	19095P-M25PT	HP-PLOT Al2O3 M PT	50m x 0.53mm x 15µm
Molsieve	CP7534PT	CP-Molsieve 5A PT	30m x 0.32mm x 10µm
	CP7536PT	CP-Molsieve 5A PT	25m x 0.32mm x 30µm
	CP7538PT	CP-Molsieve 5A PT	25m x 0.53mm x 50µm
	CP7539PT	CP-Molsieve 5A PT	50m x 0.53mm x 50µm

Conclusions

The Application Specific columns are designed to help address some of the known issues with certain methods.

Can be used for other methods as well

Samples still kill the columns

Activity Issues don’t reside with the column only!

Depending upon the method, UI liners and gold seals can help reduce or eliminate activity issues

Column Part Numbers

DB-CLP1	123-8232	30 m X 0.32 mm X 0.25 µm
DB-CLP2	123-8336	30 m X 0.32 mm X 0.50 µm

DB-Select 624 UI for <467>

122-0334UI	30 m X 0.25 mm X 1.4 µm
122-0364UI	60 m X 0.25 mm X 1.4 µm
123-0334UI	30 m X 0.32 mm X 1.8 µm
123-0364UI	60 m X 0.32 mm X 1.8µm
125-0334UI	30 m X 0.53 mm X 3.0 µm

DB-UI 8270D

121-9723	20 m X 0.18 mm X 0.36 µm
621-9723	Pack of 6
122-9732	30 m X 0.25 mm X 0.25 µm
622-9732	Pack of 6
122-9736	30 m X 0.25 mm X 0.50 µm

Column Part Numbers

DB-Sulfur SCD	G3903-63001	60 m X 0.32 mm X 4.2 µm
	G3903-63002	40 m X 0.32 mm X 0.75 µm
	G3903-63003	70 m X 0.53 mm X 4.3 µm
	G3903-63004	40 m X 0.32 mm X 3 µm

Applicaton Notes

Residual Solvent Analysis with a Specifically Designed and Tested Agilent J&W DB-Select 624UI for USP <467> Column

5991-0616EN

Evaluating CLP and EPA Methods for Pesticides in Water Using Agilent J&W DB-CLP1/DB-CLP2 GC Columns

5991-0615EN

Semivolatile Analysis with Specially Designed Agilent J&W DB-UI 8270D Columns

5991-0250EN

Analysis of Sulfur Compounds in a Petroleum Fraction using Agilent J&W DB-Sulfur SCD GC Column and Inert Flow Path

5991-3108EN

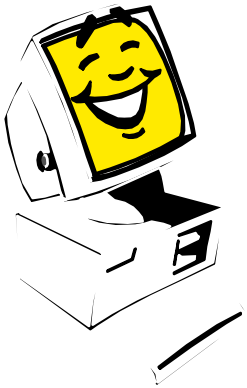
Agilent J&W Scientific Technical Support

800-227-9770 (phone: US & Canada)*

** Select option 3, then 3, then 1.*

866-422-5571 (fax)

GC-Column-support@agilent.com



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