



Reliably measure **trace-level contaminants** and meet **regulatory requirements** with confidence



From testing semi-volatile contaminants in drinking water to quantifying waterborne pollutants... analyzing increasingly small quantities of active solutes must be done more reliably, more efficiently, and with higher quality results than ever before. You simply cannot afford interferences or reduced sensitivity caused by column bleed or activity.

For starters, having to redo a run or verify suspect analytes wastes valuable resources, hinders productivity, and hurts your bottom line. Even worse, unreliable results could have catastrophic implications in terms of environmental safety.



# Agilent's J&W GC column portfolio was specifically designed and application tested to help you achieve the lowest possible detection limits for difficult analytes

Backed by 40 years of GC column innovation and applications expertise, Agilent J&W GC columns deliver low column bleed and low column activity for your sensitive, trace-level applications – regardless of detector type. So you can cut through the noise and stop worrying about peak tailing for active compounds.

## Agilent J&W Ultra Inert GC columns

*Perform consistent trace-level analysis of pesticides, phenols, and other active compounds*

By itself, low column bleed increases the signal-to-noise ratio; however, your results will be flawed if *any* analyte is adsorbed by active sites on the column. Similarly, if a well-deactivated column has a high bleed rate, some of the analyte-generated signal could be smothered by the bleed signal. Again, your results will be flawed.

### Ultra Inert GC Capillary columns give you *both* low bleed and low activity with:

- **The industry's highest degree of column inertness** for sharper peaks, better signal-to-noise ratios, and longer column life
- **The lowest column bleed in the business** for increased detector sensitivity, faster baseline stabilization, and reduced instrument downtime
- **Minimal compound adsorption** for more accurate quantification
- **Superior column-to-column consistency** for improved productivity and reliable, reproducible results

In addition, *all* Ultra Inert GC columns are individually tested against Agilent's exclusive Ultra Inert test probe mixture, so you know they can meet the inertness demands of today's environmental applications.

## Agilent J&W High Efficiency Capillary GC columns

*Decrease your run times by 50% or more, without compromising resolution*

Now it is possible to achieve high efficiency, high throughput, and high resolution... without the high costs.

High Efficiency Capillary GC columns can reduce your sample run time by 50% or more (compared to conventional GC), so you can get the reliable results you need using the resources you *have*. They are ideal for applications that require faster run times, and offer:

- **The flexibility to choose between helium and hydrogen carrier gases.** You can stay with a helium carrier if you wish to simplify method development, or switch to a hydrogen carrier if faster analysis is desired
- **The ability to separate samples using less carrier gas,** which can lead to longer intervals between cylinder changes, increased uptime, and a lower cost per sample

As an added benefit, High Efficiency Capillary GC columns are compatible with all standard-pressure capillary GC and GC/MS instruments without expensive high-pressure modifications.

## Agilent J&W DB-EUPAH columns

*Be certain that you are conforming to stringent European (EU) regulatory requirements*

DB-EUPAH GC columns are application designed, optimized, and tested for analyzing 15+1 EU-regulated priority PAHs. Engineered and manufactured to the industry's tightest QC specifications for column bleed, inertness, sensitivity, and efficiency, DB-EUPAH GC columns deliver:

- Optimal performance for all 15+1 EU-regulated priority PAHs
- Baseline resolution for difficult-to-separate critical isomer pairs
- Accurate analysis of high-boiling PAHs, such as dibenzopyrene isomers
- Exceptional thermal stability, low column bleed at elevated temperatures, and consistent column inertness

Every DB-EUPAH GC column is also individually tested with a two-part, application-specific QC procedure – including a test probe mixture that incorporates EU regulatory methods.

## Application-specific columns

*Tailored to individual methods and classes of compounds*

To supplement our standard GC column families, Agilent offers a wide selection of GC columns that have been designed, manufactured, and tested for particular samples and applications. Many of these columns have also been written into regulatory methods, making it easier for your lab to meet compliance requirements.

## Here are some examples of our most popular columns for environmental applications

Analyte	Column
Semi-volatiles	DB-5ms Ultra Inert HP-5ms Ultra Inert DB-5ms HP-5ms DB-5.625
CLP Pesticides (dual column configuration)	DB-35ms or DB-17ms (primary) DB-XLB (confirmation)
Pesticides	DB-35ms DB-XLB DB-5ms Ultra Inert HP-5ms Ultra Inert DB-5ms HP-5ms
PAHs	DB-5ms DB-EUPAH
PCBs	DB-XLB DB-35ms
Volatile organic compounds (VOCs)	DB-VRX
Volatiles and residual solvents	DB-624



## ACTIVE SEMI-VOLATILES

### Superior performance vs. the competition:

The examples that follow prove that Agilent J&W GC columns deliver reliable results and low column bleed for a broad range of benign and difficult sample types.

#### US EPA Method 8270 Short Mix

**Semi-volatile analysis using methods similar to US EPA Method 8270** is becoming increasingly important in environmental laboratories worldwide. Note the good peak shapes of the active analytes in the semi-volatile set below. These demonstrate the superior column inertness performance of the Agilent J&W DB-5ms Ultra Inert column.

**Column:** DB-5ms Ultra Inert  
122-5532UI

30 m x 0.25 mm, 0.25 µm

**Carrier:** Helium constant flow 30 cm/s

**Oven:** 40°C (1 min) to 100°C (15°C min),  
10°C to 210°C (1 min),  
5°C/min. to 310°C (8 min)

**Injection:** Split/splitless; 260°C,  
53.7 mL/min. total flow,  
purge flow 50 mL/min. on at 0.5 min.,  
gas saver flow 80 mL/min. on at 3.0 min.

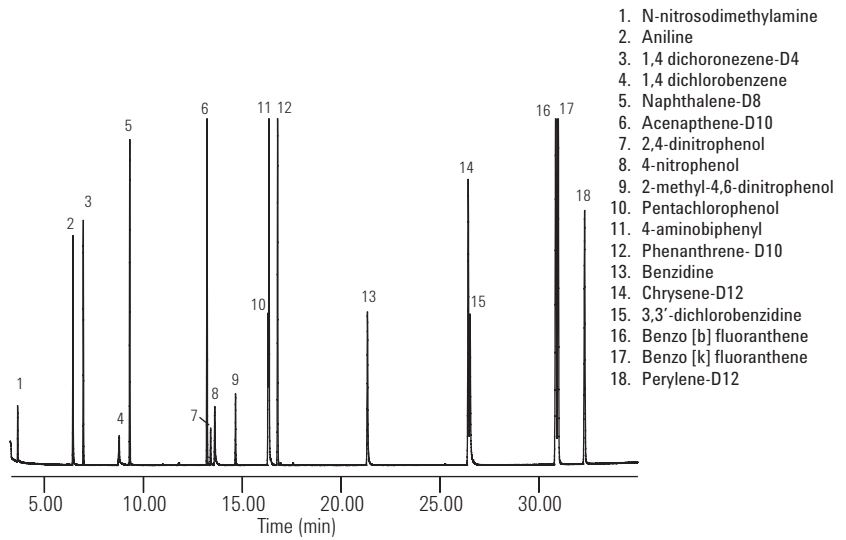
**Detector:** MSD source at 300°C,  
quadrapole at 180°C,  
transfer line at 290°C,  
full scan m/z 50-550

**Sample:** 1.0 µL splitless injection,  
5 ng each component on column

#### Suggested Supplies

**Liner:** Direct connect, dual taper, deactivated,  
4 mm ID, G1544-80700

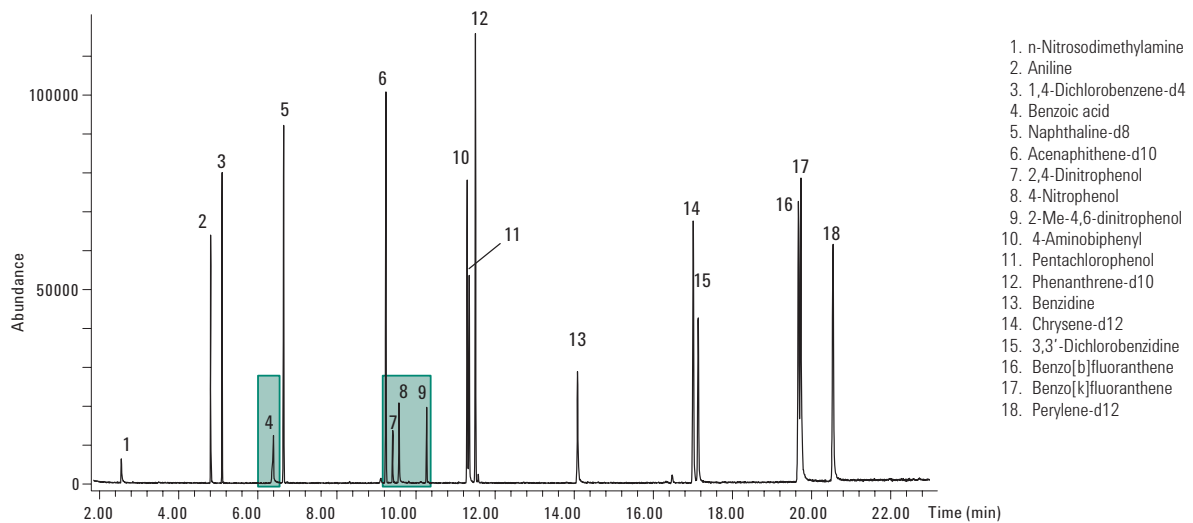
**Syringe:** 10 µl tapered, FN 23-26s/42/HP, 5181-1267



## Agilent J&W HP-5ms Ultra Inert GC columns outperform Restek Rxi-5ms columns in the recovery of active compounds

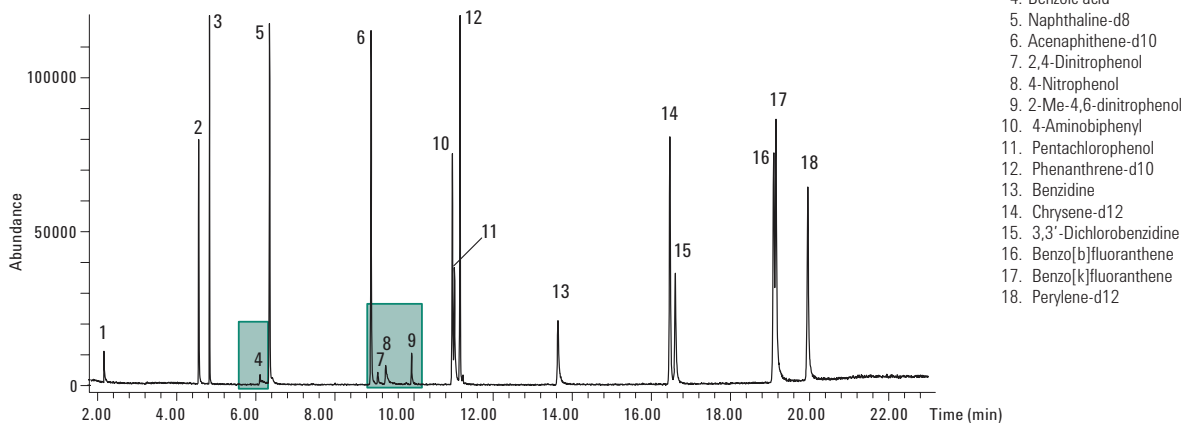
In these examples, the Ultra Inert GC column provides excellent peak shape for acids and bases, while the Restek Rxi-5ms column shows poor peak shape for some active compounds. (Acidic analytes are highlighted).

Sample: 0.5 ng on column loading of Short Mix Components with ISTD  
 Column: Agilent J&W HP-5ms Ultra Inert 20 m x 0.18 mm x 0.18 µm  
 Carrier: Helium 37 cm/s, Ramped flow; 0.7 mL/min (0.1 min) to 1.3 mL/min (15 mL/min)  
 Oven: 35 °C (2.5 min) to 80 °C (40 °C/min), 15 °C/min to 200 °C, 8 °C/min to 275 °C (2 min)  
 Injection: 0.5 µL, splitless. 280 °C purge flow 30 mL/min at 0.75 min  
 MSD: Transfer line 290 °C, Source 300 °C, Quad 180 °C



## Restek Rxi-5ms Column Shows Poor Peak Shapes for Semi-Volatile Acids

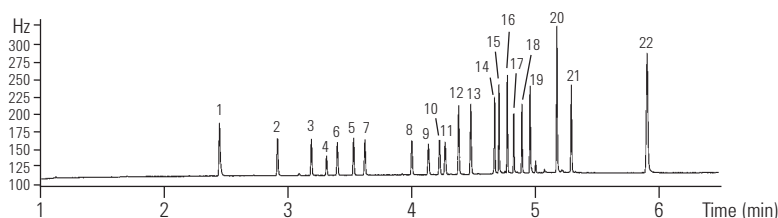
Sample: 0.5 ng on column loading of Short Mix Components with ISTD  
 Column: Rxi-5ms 20 m x 0.18 mm x 0.18 µm  
 Carrier: Helium 37 cm/s, Ramped flow; 0.7 mL/min (0.1 min) to 1.3 mL/min (15 mL/min)  
 Oven: 35 °C (2.5 min) to 80 °C (40 °C/min), 15 °C/min to 200 °C, 8 °C/min to 275 °C (2 min)  
 Injection: 0.5 µL, splitless. 280 °C purge flow 30 mL/min at 0.75 min  
 MSD: Transfer line 290 °C, Source 300 °C, Quad 180 °C



When it comes to speed and resolution, Agilent J&W High Efficiency GC columns outperform a leading competitor – and we can *prove it*

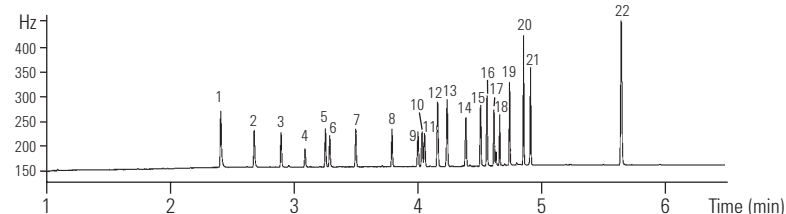
## Rapid CLP (Contract Laboratory Program) Pesticide Analysis: A side-by-side column comparison

### Agilent, DB-17ms primary column Agilent part no. 121-4722



Here, Agilent's DB-17ms primary analysis column resolved all 22 peaks of interest in less than 6 minutes with sharp symmetry and minimal baseline drift. Conversely, Restek's primary analysis column resolved only 20 of 22 peaks – and displayed evidence of peak tailing.

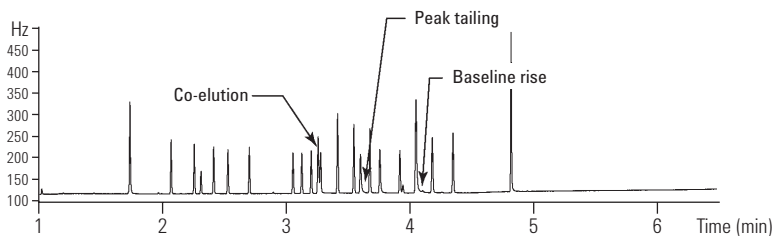
### Agilent, DB-XLB confirmatory column Agilent part no. 121-1222



Agilent's DB-XLB confirmatory analysis column resolved 20 peaks of interest in less than 6 minutes (the remaining peaks were close to being baseline resolved and were sufficient for peak confirmation.)

Although Restek's confirmatory column resolved all 22 peaks of interest, there is evidence of peak tailing – as well as an unacceptable level of temperature-dependent baseline drift. Compare that to Agilent's results, which show sharp, symmetrical peaks and minimal temperature-dependent baseline drift.

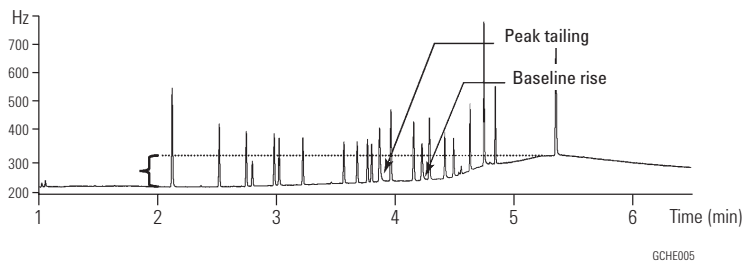
### Restek primary column



### Experimental Conditions:

Carrier	Hydrogen (69 cm/sec at 120° C, ramped at 99 mL/min to 106 cm/sec at 4.4 minutes)
Oven	120° C (0.32 min); 120° C/min to 160° C; 30° C/min to 258° C (0.18 min); 38.81° C/min to 300° C (1.5 min)
Injection	Split/splitless; 220° C, pulsed splitless (35 psi for 0.5 min, purge flow of 40 mL/min on at 1 minute, gas saver flow 20 mL/min on 3 minutes)
Detector	μECD 320° C; nitrogen makeup; constant column + makeup flow 60 mL/min

### Restek confirmatory column



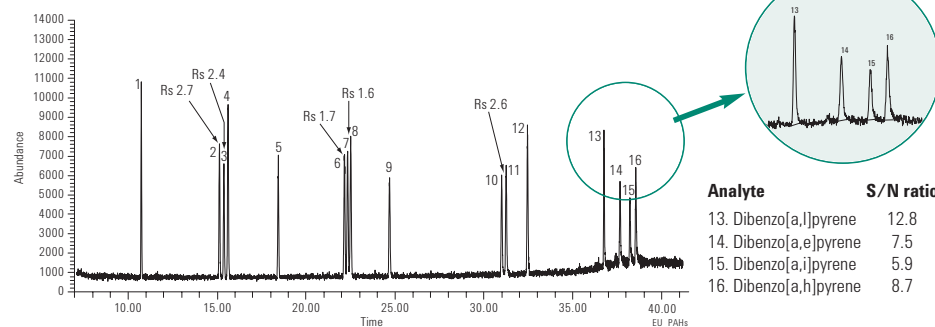
- |                         |                        |
|-------------------------|------------------------|
| 1. Tetrachloro-m-xylene | 12. 4,4' DDE           |
| 2. Alpha BHC            | 13. Dieldrin           |
| 3. Gamma BHC            | 14. Endrin             |
| 4. Beta BHC             | 15. 4,4' DDD           |
| 5. Delta BHC            | 16. Endosulfan II      |
| 6. Heptachlor           | 17. 4,4' DDT           |
| 7. Aldrin               | 18. Endrin Aldehyde    |
| 8. Heptachlor Epoxide   | 19. Endosulfan Sulfate |
| 9. Gamma Chlordane      | 20. Methoxychlor       |
| 10. Alpha Chlordane     | 21. Endrin Ketone      |
| 11. Endosulfan I        | 22. Decachlorobiphenyl |

# Agilent J&W DB-EUPAH GC columns clearly surpass the competition in detecting dangerous PAHs

## Performance Comparison for 15+1 EU-Regulated Priority PAHs

In this chromatogram, all 15+1 EU-regulated priority PAHs are well resolved with the DB-EUPAH column. Challenging Benzo[b,k,i]fluoranthene isomers are baseline resolved, allowing accurate quantitation of each isomer. Baseline resolution is also achieved for three critical pairs: benz[a]anthracene and cyclopenta[c,d]pyrene, cyclopenta[c,d]pyrene and chrysene, and indeno[1,2,3-cd]pyrene and dibenzo[a,h]anthracene.

### Agilent J&W DB-EUPAH 20 m x 0.18 mm, 0.14 µm



**Column 1:** Agilent J&W DB-EUPAH  
20 m x 0.18 mm, 0.14 µm  
(Agilent Part No. 121-9627)

**Column 2:** Restek Rxi-17  
20 m x 0.18 mm, 0.18 µm

Instrument: Agilent 6890N/5975B MSD

Sampler: Agilent 7683B, 5.0 µL syringe  
(Agilent Part No. 5181-1273)  
0.5 µL splitless injection,  
injection speed 75 µL/min

Carrier: Helium, ramped flow  
1.0 mL/min (0.2 min),  
5 mL/min 2 to 1.7 mL/min

Inlet: 325°C splitless, purge flow  
60 mL/min at 0.8 min

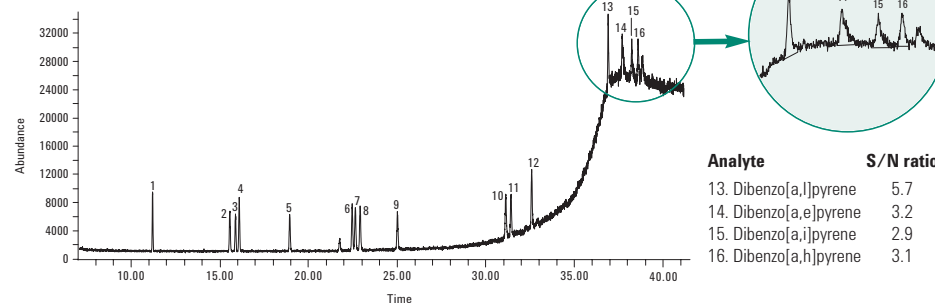
Oven: 45°C (0.8 min) to 200°C  
(45°C/min), 2.5°C/min  
to 225°C, 3°C/min to 266°C,  
5°C/min to 300°C, 10°C/min  
to 320°C (4.5 min)

Detector: MSD source at 300°C,  
quadrupole at 180°C,  
transfer line at 330°C,  
Scan range 50-550 AMU

Here, the Restek Rxi-17 column shows significantly higher bleed than the DB-EUPAH column, even at 320°C. As a result, the signal-to-noise ratios are less than half of those achieved by the DB-EUPAH columns. The Rxi-17 column's excess bleed at higher temperatures makes trace-level detection difficult and unreliable for the four late-eluting dibenzopyrene isomers.

With its higher upper temperature limit, superior thermal stability and greater column inertness, the Agilent J&W DB-EUPAH column improves peak shape and sensitivity. This translates to consistently lower detection limits – a must for analyzing EU-priority PAHs.

### Rxi-17 20 m x 0.18 mm, 0.18 µm

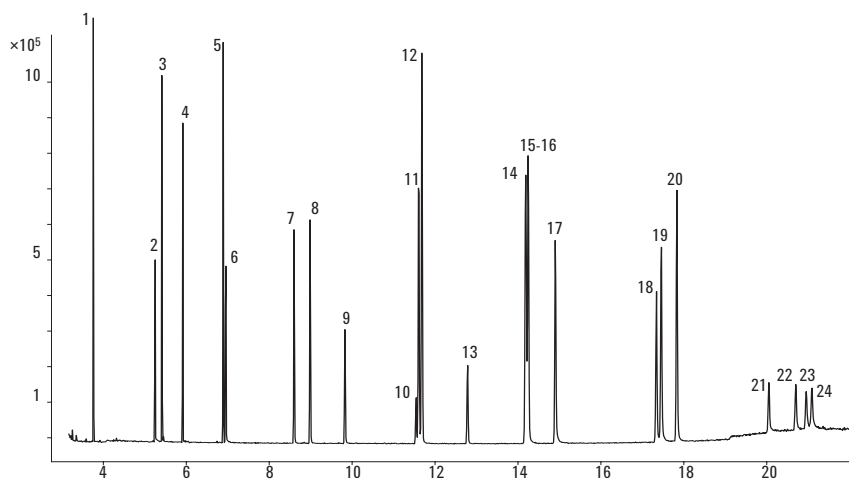


1. Benzo[c]fluorene
2. Benz[a]anthracene
3. Cyclopenta[c,d]pyrene
4. Chrysene
5. 5-Methylchrysene
6. Benzo[b]fluoranthene
7. Benzo[k]fluoranthene
8. Benzo[j]fluoranthene
9. Benz[a]pyrene
10. Indeno[1,2,3-cd]pyrene
11. Dibenzo[a,h]anthracene
12. Benzo[g,h,i]perylene
13. Dibenzo[a,l]pyrene
14. Dibenzo[a,e]pyrene
15. Dibenzo[a,i]pyrene
16. Dibenzo[a,h]pyrene

# PAHs

## Agilent, DB-5ms primary column Agilent part no. 121-5522

EU and US-EPA regulated PAH separation on an Agilent J&W DB-5ms 20 x 0.18  $\mu\text{m}$  (Agilent P/N 121-5522) column.



1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benzo[c]fluorene
10. Cyclopenta[c,d]pyrene
11. Benz[a]anthracene
12. Chrysene
13. 5-Methylchrysene
14. Benzo[b]fluoranthene
15. Benzo[k]fluoranthene
16. Benzo[j]fluoranthene
17. Benzo[a]pyrene
18. Indeno[1,2,3-cd]pyrene
19. Dibenzo[a,h]anthracene
20. Benzo[g,h,i]perylene
21. Dibenzo[a,l]pyrene
22. Dibenzo[a,e]pyrene
23. Dibenzo[a,i]pyrene
24. Dibenzo[a,h]pyrene



# Confirmed speed and accuracy:

See how an Agilent J&W High Efficiency DB-VRX column resolved 114 VOCs in under 8 minutes

## High Speed VOC, EPA Method 8260

**EPA Method 8260 with P&T sample introduction** is one of the most widely used water analysis methods. As the chromatogram below demonstrates, DB-VRX columns ensure the fewest chromatographic coelutions and the highest degree of mass spectral integrity for VOC analysis.

### Column: DB-VRX

**121-1524**

**20 m x 0.18 mm, 1.00 µm**

Carrier: Helium at 55 cm/sec (1.5 mL/min)

Oven: 45°C for 3.0 minutes  
45-190°C at 36°C/min  
190-225°C at 20°C/min  
225°C for 0.5 min

Sampler: Purge and Trap (Tekmar 3100)  
Purge: 11 min  
Trap: Vocarb 3000  
Preheat: 245°C

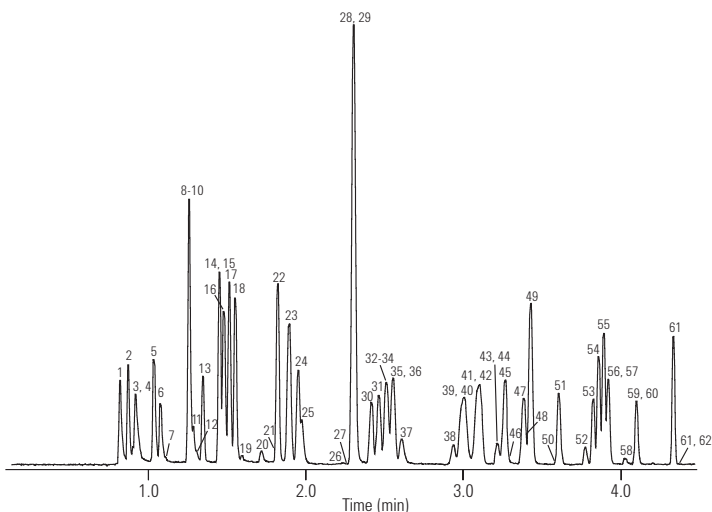
Desorb: 250°C for 1 min  
Bake: 260°C for 10 min  
Line & valve: 100°C

Injection: Split, 150°C

Split ratio 60:1  
Detector: Agilent 5973 MSD,  
Scan range: 35-260 amu  
Scan rate: 3.25 scans/sec  
Quad temperature: 150°C  
Source temperature: 200°C

Transfer line temp: 200°C  
Sample: 5 mL

- Halogenated and aromatic analytes at 40 ppb
- Internal standards at 20 ppb
- Polar analytes (i.e., ethers, alcohols and ketones at 100-800 ppb)

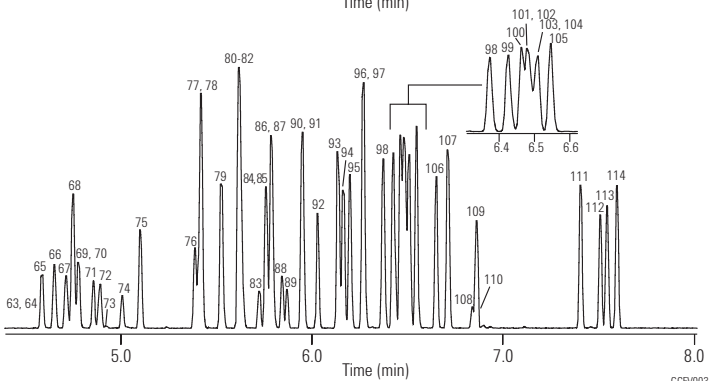


### Suggested Supplies:

Septum: 11 mm Advanced Green septa, 5183-4759

Liner: Direct, 1.5 mm ID, 18740-80200

Seal: Gold plated seal, 18740-20885



1. Dichlorodifluoromethane	20. 1-Propanol	39. Pentafluorobenzene	58. 1,4-Dioxane	77. 1-Chlorohexane	96. 1,3,5-Trimethylbenzene
2. Chloromethane	21. Propargyl alcohol	40. 1,2-Dichloroethane	59. Epichlorohydrin	78. Chlorobenzene	97. Pentachloroethane
3. Hydroxypropionitrile	22. trans-1,2-Dichloroethene	41. 1,1,1-Trichloroethane	60. Methyl methacrylate	79. Ethylbenzene	98. tert-Butylbenzene
4. Vinyl chloride	23. MTBE	42. 1-Chlorobutane	61. cis-1,3-Dichloropropene	80. Bromoform	99. 1,2,4-Trimethylbenzene
5. Bromomethane	24. 1,1-Dichloroethane	43. Crotonaldehyde	62. Propiolactone	81. m-Xylene	100. sec-Butylbenzene
6. Chloroethane	25. Propionitrile	44. 2-Chloroethanol	63. Bromoacetone	82. p-Xylene	101. 1,3-Dichlorobenzene
7. Ethanol	26. 2-Butanone	45. 1,1-Dichloropropene	64. Pyridine	83. trans-Dichlorobutene	102. Benzylchloride
8. Acetonitrile	27. Diisopropyl ether	46. 1-Butanol	65. trans-1,3-Dichloropropene	84. 1,3-Dichloro-2-propanol	103. 1,4-Dichlorobenzene-d4 (IS)
9. Acrolein	28. cis-1,2-Dichloroethene	47. Carbon tetrachloride	66. 1,1,2-Trichloroethane	85. Styrene	104. 1,4-Dichlorobenzene
10. Trichlorofluoromethane	29. Methacrylonitrile	48. Chloroacetonitrile	67. Toluene-d8 (IS)	86. 1,1,2,2-Tetrachloroethane	105. Isopropyltoluene
11. Isopropyl alcohol	30. Bromochloromethane	49. Benzene	68. Toluene	87. o-Xylene	106. 1,2-Dichlorobenzene
12. Acetone	31. Chloroform	50. tert-Amylmethyl ether	69. 1,3-Dichloropropane	88. 1,2,3-Trichloropropane	107. Butylbenzene
13. Ethyl ether	32. 2,2-Dichloropropane	51. Fluorobenzene (IS)	70. Paralddehyde	89. cis-Dichlorobutene	108. 1,2-Dibromo-3-chloropropane
14. 1,1-Dichloroethene	33. Ethyl acetate	52. 2-Pentanone	71. Ethyl methacrylate	90. 4-Bromofluorobenzene (IS)	109. Hexachloroethane
15. tert-Butyl alcohol	34. Ethyl-tert-butyl ether	53. Dibromomethane	72. Dibromochloromethane	91. Isopropylbenzene	110. Nitrobenzene
16. Acrylonitrile	35. Methyl acrylate	54. 1,2-Dichloropropane	73. 3-Chloropropionitrile	92. Bromobenzene	111. 1,2,4-Trichlorobenzene
17. Methylene chloride	36. Dibromofluoromethane (IS)	55. Trichloroethene	74. 1,2-Dibromoethane	93. Propylbenzene	112. Naphthalene
18. Allyl chloride	37. Isobutanol	56. Bromodichloromethane	75. Tetrachloroethene	94. 2-Chlorotoluene	113. Hexachlorobutadiene
19. Allyl alcohol	38. Dichloroethane-d4 (IS)	57. 2-Nitropropane	76. 1,1,1,2-Tetrachloroethane	95. 4-Chlorotoluene	114. 1,2,3-Trichlorobenzene

# Productivity-boosting power:

## Fast GC separation of 53 VOCs using an Agilent J&W High Efficiency DB-624 Column

### Fast VOC Analysis

Agilent DB-624 columns are the proven choice for analyzing VOCs in many environmental laboratories. Their stationary phase and optimized film thickness provide the resolving power needed to meet method requirements.

**Column:** DB-624  
121-1324  
20 m x 0.18 mm, 1.00 µm

**Carrier:** Helium at 37 cm/sec,  
(constant flow mode)

**Oven:** 35°C for 4 min  
35-200°C at 15°/min  
200°C for 0.1 min  
60-200°C at 17°/min

**Sampler:** Purge and trap (Tekmar LSC 3000)  
Purge: Helium for 11 min at 50 mL/min  
Trap:  
Preheat: 250°C  
Desorb: 260°C for 2 min  
Line & valve: 100°C

**Detector:** MSD, 250°C transfer line  
Full scan 35 -260 amu  
3.25 scans per second

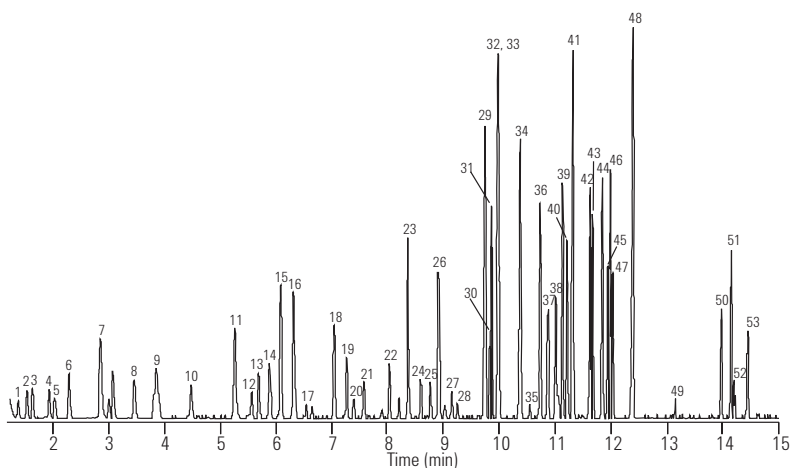
**Sample:** 10 ppb per component in 25 mL water

### Suggested Supplies:

**Septum:** 11 mm Advanced Green septa,  
5183-4759

**Liner:** Direct, 1.5 mm ID, 18740-80200

**Seal:** Gold plated seal, 18740-20885



- |                             |                               |                               |                                 |
|-----------------------------|-------------------------------|-------------------------------|---------------------------------|
| 1. Dichlorofluoromethane    | 15. Carbon tetrachloride      | 29. Chlorobenzene             | 43. 1,2,4-Trimethylbenzene      |
| 2. Chloromethane            | 16. Benzene                   | 30. 1,1,1,2-Tetrachloroethane | 44. sec-Butylbenzene            |
| 3. Vinyl chloride           | 17. Fluorobenzene             | 31. Ethylbenzene              | 45. 1,3-Dichlorobenzene         |
| 4. Bromomethane             | 18. Trichloroethene           | 32. m-Xylene                  | 46. 4-Isopropyltoluene          |
| 5. Chloroethane             | 19. 1,2-Dichloropropane       | 33. p-Xylene                  | 47. 1,4-Dichlorobenzene         |
| 6. Trichlorofluoromethane   | 20. Dibromomethane            | 34. o-Xylene                  | 48. 1,2-Dichlorobenzene         |
| 7. 1,1-Dichloroethene       | 21. Bromodichloromethane      | 35. Bromoform                 | 49. 1,2-Dibromo-3-chloropropane |
| 8. Methylene chloride       | 22. cis-1,3-Dichloropropene   | 36. Isopropylbenzene          | 50. 1,2,4-Trichlorobenzene      |
| 9. trans-1,2-Dichloroethene | 23. Toluene                   | 37. Bromofluorobenzene        | 51. Hexachlorobutadiene         |
| 10. 1,1-Dichloroethane      | 24. trans-1,3-Dichloropropene | 38. Bromobenzene              | 52. Naphthalene                 |
| 11. 2,2-Dichloropropane     | 25. 1,1,2-Trichloroethane     | 39. n-Propylbenzene           | 53. 1,2,3-Trichlorobenzene      |
| 12. Bromochloromethane      | 26. Tetrachloroethene         | 40. 2-Chlorotoluene           |                                 |
| 13. Chloroform              | 27. Dibromochloromethane      | 41. 1,3,5-Trimethylbenzene    |                                 |
| 14. 1,1,1-Trichloroethane   | 28. 1,2-Dibromomethane        | 42. tert-Butylbenzene         |                                 |

## Ultimate confidence for key environmental applications

### PCBs by EPA Method 8082

**Agilent DB-35ms columns utilize arylene phase technology**, giving them improved thermal stability through a “stiffening” of the polymer backbone. In this example, DB-35ms columns completely resolved 21 CLP pesticides in less than 16 minutes.

**Column:** DB-35ms  
123-3832  
30 m x 0.32 mm, 0.25 µm

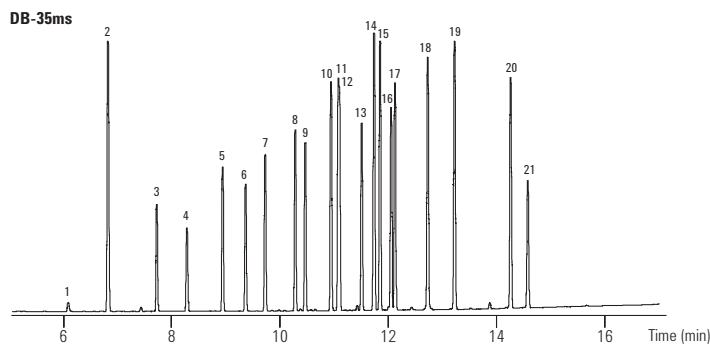
**Carrier:** Helium at 45 cm/sec (EPC in constant flow mode)

**Oven:** 110°C for 0.5 min  
110-320°C at 15°C/min  
320°C for 5 min

**Injection:** Splitless, 250°C  
30 sec purge activation time

**Detector:** µECD, 350°C  
Nitrogen makeup gas  
(column + makeup flow =  
30 mL/min constant flow)

**Sample:** 50 pg per component



#### Suggested Supplies:

**Septum:** 11 mm Advanced Green septa, 5183-4759

**Liner:** Splitless, single taper, deactivated,  
4 mm ID, 5181-3316

**Syringe:** 10 µl tapered, FN 23-26s/42/HP, 5181-1267

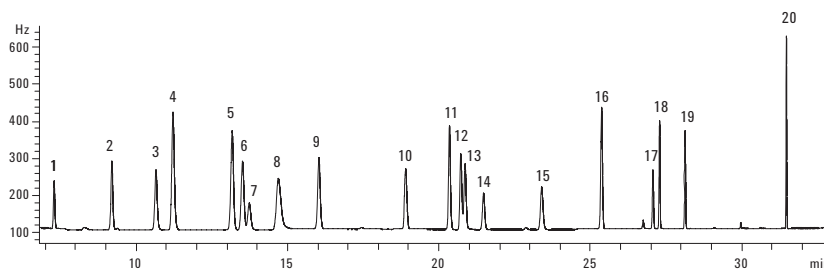
- |                                 |               |  |
|---------------------------------|---------------|--|
| 1. IUPAC 1                      | 9. IUPAC 101  | 17. IUPAC 183                                    |
| 2. Tetrachloro-m-xylene (IS/SS) | 10. IUPAC 87  | 18. IUPAC 180                                    |
| 3. IUPAC 5                      | 11. IUPAC 110 | 19. IUPAC 170                                    |
| 4. IUPAC 18                     | 12. IUPAC 151 | 20. IUPAC 206                                    |
| 5. IUPAC 31                     | 13. IUPAC 153 | 21. Decachlorobiphenyl (IS/SS)                   |
| 6. IUPAC 52                     | 14. IUPAC 141 |  |
| 7. IUPAC 44                     | 15. IUPAC 137 | IS/SS - Internal Standard/<br>Surrogate Standard |
| 8. IUPAC 66                     | 16. IUPAC 187 |  |

## CHLORINATED HYDROCARBONS

**Analysis of EPA 551.1 chlorinated solvents, trihalomethanes, and disinfection by-products** using an Agilent J&W HP-1ms Ultra Inert capillary GC column as the primary column and a DB-1301 column for confirmation. The excellent peak shape of the chloral hydrate, along with the resolution between bromodichloromethane and trichloroethylene, emphasize the superior column inertness performance of the HP-1ms Ultra Inert column.

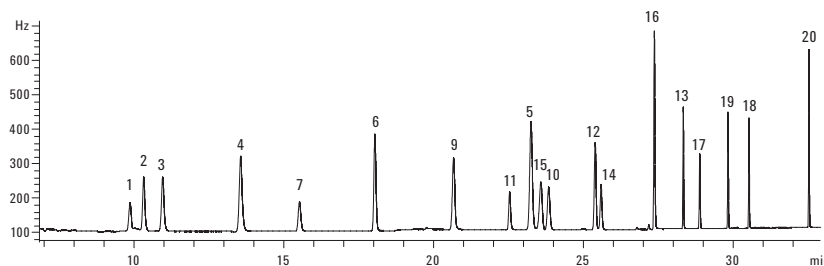
#### Column 1:

Agilent J&W HP-1ms Ultra Inert  
30 m x 0.25 mm x 1.0 µm  
(Agilent p/n 19091S-733UI)



#### Column 2:

Agilent J&W DB-1301  
30 m x 0.25 mm x 1.0 µm  
(Agilent p/n 122-1333)



# Easy ordering guide

Use the charts below to select the column you need based on your application.

Environmental/EPA Methods					
Analyte Type	EPA Method Reference	Common Sample Preparation	Detector Types	Sample Matrix	Recommended Agilent Column
<b>Volatiles</b>					
Trihalomethanes	501	Purge and trap, direct injection, headspace	ELCD, ECD	Drinking water	DB-VRX, 30 m x 0.45 mm, 2.55 µm, 124-1534
					DB-624, 30 m x 0.45 mm, 2.55 µm, 124-1334
					HP-1, 30 m x 0.53 mm, 2.65 µm, 19095Z-123
Volatile Organic Compounds (VOCs)	502.2, 8021, CLP-Volatiles	Purge and trap, direct injection, headspace	PID, ELCD	Drinking water, waste water, solid wastes	DB-VRX, 75 m x 0.45 mm, 2.55 µm, 124-1574
					DB-624, 75 m x 0.45 mm, 2.55 µm, 124-1374
					DB-502.2, 105 m x 0.53mm, 3.0 µm, 125-1444
Purgeable Halogenated Organics	601, 8010	Purge and trap, headspace for screening	PID, ELCD	Waste water, solid waste water, solid wastes	DB-VRX, 75 m x 0.45 mm, 2.55 µm, 124-1574
					DB-624, 75 m x 0.45 mm, 2.55 µm, 124-1374
Purgeable Aromatic Organics	503.1, 602, 8020	Purge and trap, headspace for screening	PID	Drinking water, waste water, solid wastes	DB-VRX, 30 m x 0.45 mm, 2.55 µm, 124-1534
					DB-624, 30 m x 0.45 mm, 2.55 µm, 124-1334
Volatile Organic Compounds (VOCs) Using MSD	524.2, 624, 8240, 8260, CLP-VOCs	Purge and trap, direct injection, headspace	MSD	Drinking water, waste water, solid wastes	DB-VRX, 60 m x 0.25 mm, 1.40 µm, 122-1564
					DB-624, 60 m x 0.25 mm, 1.40 µm, 122-1364
					HP-VOC, 60 m x 0.20 mm, 1.10 µm, 19091R-306
Volatile Organic Compounds (VOCs) Using 5973 MSD	524.2, 624, 8240, 8260, CLP-VOCs	Purge and trap, direct injection, headspace	MSD	Drinking water, waste water, solid wastes	DB-VRX, 20 m x 0.18 mm, 1.00 µm, 121-1524
					DB-624, 20 m x 0.18 mm, 1.00 µm, 121-1324
EDB and DBCP	504.1, 8011	Microextraction with Hexane	MSD	Drinking water, solid wastes	DB-VRX, 30 m x 0.45 mm, 2.55 µm, 124-1534
					DB-624, 30 m x 0.45 mm, 2.55 µm, 124-1334
Acrylonitrile and Acrolein	603, 8015, 8031	Purge and trap, liquid extraction, sonication	FID, NPD	Waste water, solid wastes	DB-VRX, 30 m x 0.45 mm, 2.55 µm, 124-1534
					DB-624, 30 m x 0.45 mm, 2.55 µm, 124-1334
<b>Semivolatiles</b>					
Semivolatile Organic Compounds	525, 625, 8270	Liquid extraction, sonication, soxhlet extraction, SPE	MSD	Drinking water, waste water, solid wastes	DB-5.625, 30 m x 0.25 mm, 0.50 µm, 122-5632
					DB-5.625, 20 m x 0.18 mm, 0.36 µm, 121-5622
					HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 19091S-433UI
					DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					HP-5ms, 30 m x 0.25 mm, 0.50 µm, 19091S-133
Phenols	528, 604, 8040, 8041	Liquid extraction, sonication, soxhlet extraction, derivatization	ECD, FID	Waste water, solid wastes	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
					DB-XLB, 30 m x 0.25 mm, 0.25 µm, 122-1232
					DB-5ms, 30 m x 0.53 mm, 1.50 µm, 125-5532

Environmental/EPA Methods					
Analyte Type	EPA Method Reference	Common Sample Preparation	Detector Types	Sample Matrix	Recommended Agilent Column
<b>Semivolatiles (Continued)</b>					
Phthalate Esters	506, 606, 8060, 8061	Liquid extraction, sonication, soxhlet extraction, SPE	ECD, FID	Drinking water, waste water, solid wastes	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
					DB-5ms, 30 m x 0.53 mm, 1.50 µm, 125-5532
					DB-608, 30 m x 0.53 mm, 0.50 µm, 125-6837
Benzidines	605	Liquid extraction	ECD	Waste water	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
					DB-5ms, 30 m x 0.53 mm, 1.50 µm, 125-5532
					DB-608, 30 m x 0.53 mm, 0.50 µm, 125-6837
Nitrosamines	607, 8070	Liquid extraction, sonication, soxhlet extraction, SPE	NPD	Waste water, solid wastes	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
					DB-5ms, 30 m x 0.53 mm, 1.50 µm, 125-5532
Nitroaromatics and Isophorone	609, 8090	Liquid extraction, sonication, soxhlet extraction, SPE	ECD, FID	Waste water, solid wastes	HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 19091S-433UI
					HP-5ms, 30 m x 0.25 mm, 0.50 µm, 19091S-133
					DB-5ms, 30 m x 0.53 mm, 1.50 µm, 125-5532
					DB-608, 30 m x 0.53 mm, 0.50 µm, 125-6837
Polynuclear Aromatic Hydrocarbons (PAHs)	610, 8100	Liquid extraction, sonication, soxhlet extraction, SPE	FID	Waste water, solid wastes	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
					DB-5ms, 30 m x 0.32 mm, 0.25 µm, 123-5532
					DB-1ms, 30 m x 0.25 mm, 0.25 µm, 122-0132
Chlorinated Hydrocarbons	612, 8120, 8121	Liquid extraction, sonication, soxhlet extraction, SPE	ECD	Waste water, solid wastes	DB-5ms Ultra Inert, 30 m x 0.32 mm, 0.50 µm, 123-5536UI
					DB-5ms, 30 m x 0.32 mm, 0.50 µm, 123-5536
					HP-5ms, 30 m x 0.32 mm, 0.50 µm, 19091S-113
					DB-1, 30 m x 0.32 mm, 0.50 µm, 123-103E
Chlorinated Disinfection Byproducts	551, 551.1A	Liquid extraction, derivatization	ECD	Drinking water	HP-1ms Ultra Inert, 30 m x 0.25 mm x 1.0 µm, 19091S-733UI
					DB-1301, 30 m x 0.25 mm x 1.0 µm, 122-1333
					DB-5ms, 30 m x 0.25 mm, 1.00 µm, 122-5533
					DB-1, 30 m x 0.25 mm, 1.00 µm, 122-1033
Halogenated Acetic Acids	552, 552.1, 552.2	Liquid extraction, derivatization	ECD	Drinking water	DB-35ms, 30 m x 0.32 mm, 0.25 µm, 123-3832
					DB-XLB, 30 m x 0.32 mm, 0.50 µm, 123-1236

Environmental/EPA Methods					
Analyte Type	EPA Method Reference	Common Sample Preparation	Detector Types	Sample Matrix	Recommended Agilent Column
<b>Pesticides, Herbicides, and PCBs</b>					
Organochlorine Pesticides and PCBs	508.1, 608, 8081A, 8082, CLP-Pesticides	Liquid extraction, derivatization	ECD	Drinking water	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					DB-1ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-0132UI
					DB-35ms, 30 m x 0.32 mm, 0.25 µm, 123-3832
					DB-XLB, 30 m x 0.32 mm, 0.50 µm, 123-1236
					DB-XLB, 20 m x 0.18 mm, 0.18 µm, 121-1222
Phenoxy Acid Herbicides	515, 615, 8150, 8151	Liquid extraction, derivatization	ECD	Drinking water	DB-35ms, 30 m x 0.32 mm, 0.25 µm, 123-3832
					DB-XLB, 30 m x 0.32 mm, 0.50 µm, 123-1236
N- and P-Containing Pesticides and Herbicides	507, 614, 619, 622, 8140, 8141A	Liquid extraction, derivatization	NPD, ELCD, FPD	Drinking water	DB-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 122-5532UI
					HP-5ms Ultra Inert, 30 m x 0.25 mm, 0.25 µm, 19091S-433UI
					DB-35ms, 30 m x 0.25 mm, 0.25 µm, 122-3832
					DB-5ms, 30 m x 0.25 mm, 0.25 µm, 122-5532
PCB Congeners Using MSD		Liquid extraction, derivatization	MSD		DB-35ms, 30 m x 0.32 mm, 0.25 µm, 123-3832
					DB-XLB, 30 m x 0.32 mm, 0.50 µm, 123-1236

Ultra Inert 5ms Capillary GC Columns			
ID (mm)	Length (m)	Film (µm)	Part No.
<b>DB-5ms Ultra Inert</b>			
0.18	20	0.18	121-5522UI
		0.36	121-5523UI
0.25	15	0.25	122-5512UI
		1.00	122-5513UI
		0.25	122-5522UI
		0.25	122-5532UI
		0.50	122-5536UI
		1.00	122-5533UI
		0.25	122-5552UI
		0.25	122-5562UI
0.32	30	0.25	123-5532UI
		0.50	123-5536UI
		1.00	123-5533UI
		1.00	123-5563UI
<b>HP-5ms Ultra Inert</b>			
0.18	20	0.18	19091S-577UI
0.25	15	0.25	19091S-431UI
		0.25	19091S-433UI
		0.50	19091S-133UI
		1.00	19091S-233UI
		0.25	19091S-436UI
0.32	30	0.25	19091S-413UI
		1.00	19091S-213UI

Ultra Inert 1ms Capillary GC Columns			
ID (mm)	Length (m)	Film (µm)	Part No.
<b>DB-1ms Ultra Inert</b>			
0.18	20	0.18	121-0122UI
		0.25	122-0112UI
		0.25	122-0132UI
		0.25	122-0162UI
0.32	30	0.25	123-0112UI
		0.25	123-0132UI
<b>HP-1ms Ultra Inert</b>			
0.18	20	0.18	19091S-677UI
0.25	15	0.25	19091S-931UI
		0.25	19091S-933UI
		0.50	19091S-633UI
		1.00	19091S-733UI
0.32	30	0.25	19091S-911UI
		0.52	19091S-612UI
		0.25	19091S-913UI
		1.00	19091S-713UI

High Efficiency Capillary GC Columns					
Stationary Phase	Part No. (7" cage)	ID (mm)	Length (m)	Film (µm)	Part No. (5" cage)
DB-1	121-1012	0.18	10	0.18	121-1012E
	121-1013	0.18	10	0.40	121-1013E
	121-101A	0.18	10	0.20	
	121-1022	0.18	20	0.18	121-1022E
	121-1023	0.18	20	0.40	
	121-1043	0.18	40	0.40	121-1043E
HP-1	19091Z-577	0.18	20	0.18	19091Z-577E
DB-1ms	121-0122	0.18	20	0.18	121-0122E
HP-1ms	19091S-677	0.18	20	0.18	19091S-677E
DB-5	121-5012	0.18	10	0.18	121-5012E
	121-5013	0.18	10	0.40	
	121-5022	0.18	20	0.18	121-5022E
	121-5023	0.18	20	0.40	121-5023E
	121-5042	0.18	40	0.18	
HP-5	19091J-577	0.18	20	0.18	19091J-577E
DB-5ms	121-5522	0.18	20	0.18	121-5522E
	121-5542	0.18	40	0.18	
	121-5523	0.18	20	0.36	
HP-5ms	19091S-577	0.18	20	0.18	19091S-577E
DB-XLB	121-1222	0.18	20	0.18	121-1222E
	121-1232	0.18	30	0.18	
DB-35ms	121-3822	0.18	20	0.18	121-3822E
DB-17	121-1722	0.18	20	0.18	
	121-1723	0.18	20	0.30	
DB-17ms	121-4722	0.18	20	0.18	121-4722E
HP-50+	19091L-577	0.18	20	0.18	
DB-23	121-2323	0.18	20	0.20	

High Efficiency Capillary GC Columns (continued)					
Stationary Phase	Part No. (7" cage)	ID (mm)	Length (m)	Film (µm)	Part No. (5" cage)
DB-225	121-2223	0.18	20	0.20	
DB-624	121-1324	0.18	20	1.00	121-1224E
DB-1301	121-1313	0.18	10	0.40	
DB-1701	121-0713	0.18	10	0.40	
	121-0722	0.18	20	0.18	
DB-WAX	121-7012	0.18	10	0.18	
	121-7022	0.18	20	0.18	121-7022E
	121-7023	0.18	20	0.30	121-7023E
	121-7042	0.18	40	0.18	121-7042E
	121-7043	0.18	40	0.30	
HP-INNOWax	19091N-577	0.18	20	0.18	19091N-577E
DB-5.625	121-5621	0.18	20	0.18	
	121-5622	0.18	20	0.36	
DB-VRX	121-1524	0.18	20	1.00	
	121-1544	0.18	40	1.00	121-1544E
DB-608	121-6822	0.18	20	0.18	

DB-EUPAH GC Columns					
Stationary Phase	Part No.	ID (mm)	Length (m)	Film (µm)	Temp Limit (°C)
DB-EUPAH	121-9627	0.18	20	0.14	40 to 320/340
DB-EUPAH	122-96L2	0.25	60	0.25	40 to 320/340
DB-EUPAH	123-9612	0.32	15	0.25	40 to 320/340
15+1 PAH standard 250 µg/mL	5190-0487				

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