

# ZB-SemiVolatiles

with Enviro-Inert™ Technology

“ This column has REDUCED  
TestAmerica’s DOWNTIME and  
INCREASED our PRODUCTIVITY ”

— TestAmerica Laboratories, Inc. Buffalo



# Introducing the Zebron™ Experience

## Get More Than Just A Column

When you choose Zebron, you get more than just high quality GC products. Choosing Zebron means you get access to a wide variety of tools, resources, and personalized support to help make your GC work easier, faster, and simply better.

## Our Customers Come First

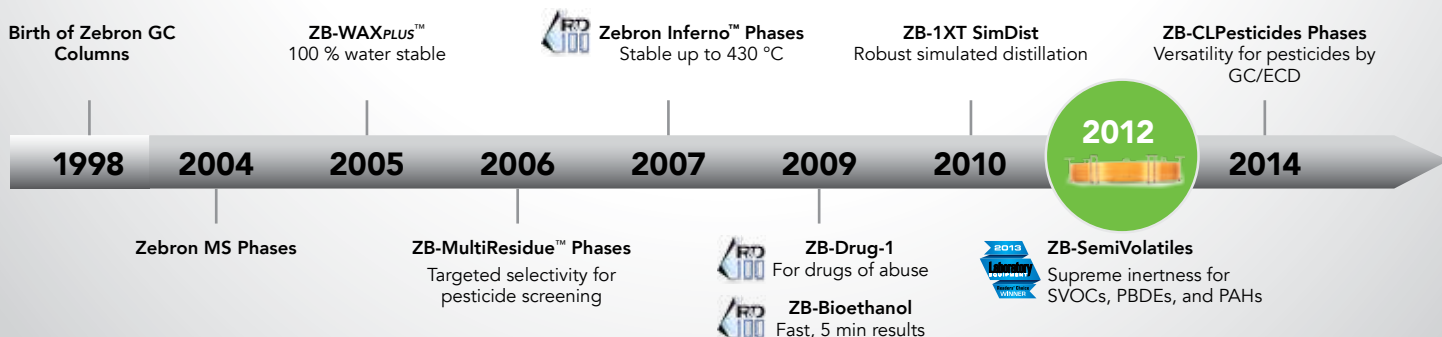


“ Phenomenex has always given superb customer support. I changed suppliers from...Agilent to Phenomenex based on your customer support...about 10 years ago and you have not failed me since that point! ”

Marie Coschigano  
Genzyme Corp. USA

## Continued Innovation

Our inventive GC scientists have 25+ years of experience on average, and many helped create keystone phases at J&W Scientific before joining the Phenomenex team. Zebron's track record of innovation has been recognized with 3 R&D 100 Awards and 2 Readers' Choice awards — no other GC columns have received this honor!



# Zebtron™ ZB-SemiVolatiles

## Designed For Real-World Performance

### You Spoke

Your input fueled the research and development of Zebtron ZB-SemiVolatiles – the column specifically designed to overcome your EPA Method 8270D obstacles.

### You Tested

Several environmental labs verified real-world performance

- TestAmerica Laboratories, Inc. Buffalo
- Phoenix Environmental Laboratories, Inc.
- Other labs like yours!

### You Approved

“...superior in quality and durability than any other columns we have previously used.”

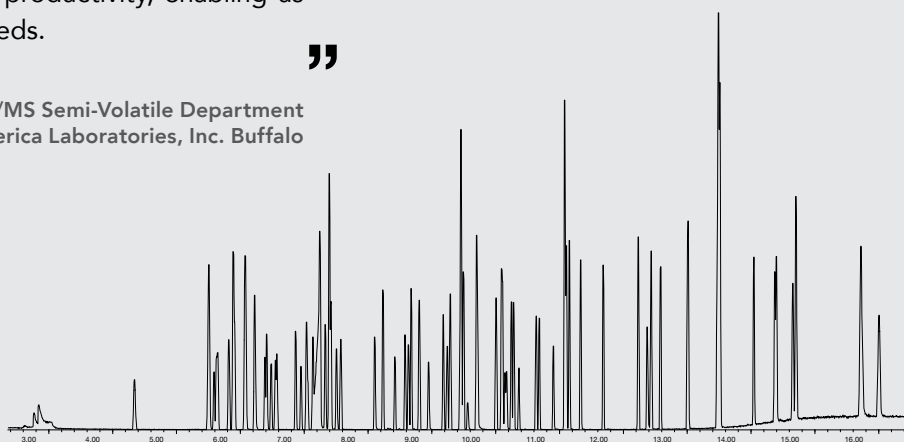
— TestAmerica Laboratories, Inc. p. 11

## Real Customer Results for EPA Method 8270D on ZB-SemiVolatiles

“ Zebtron ZB-SemiVolatiles is a very stable and durable semi-volatile column. This has reduced TestAmerica’s downtime and increased our productivity, enabling us to better serve our clients’ needs.

”

David Wilkes, GC/MS Semi-Volatile Department  
TestAmerica Laboratories, Inc. Buffalo



### Ready To Learn More?

- p. 4 How It's Different
- 6 Meet Requirements Out-of-the-Box
- 8 Industry Leaders Put To Our QC Test
- 10 Enhance SVOC Results
- 11 Hold Calibrations and Increase Productivity
- 12 Versatile Performance - Additional Applications
- 18 Recommended GC Accessories
- 19 Ordering Information

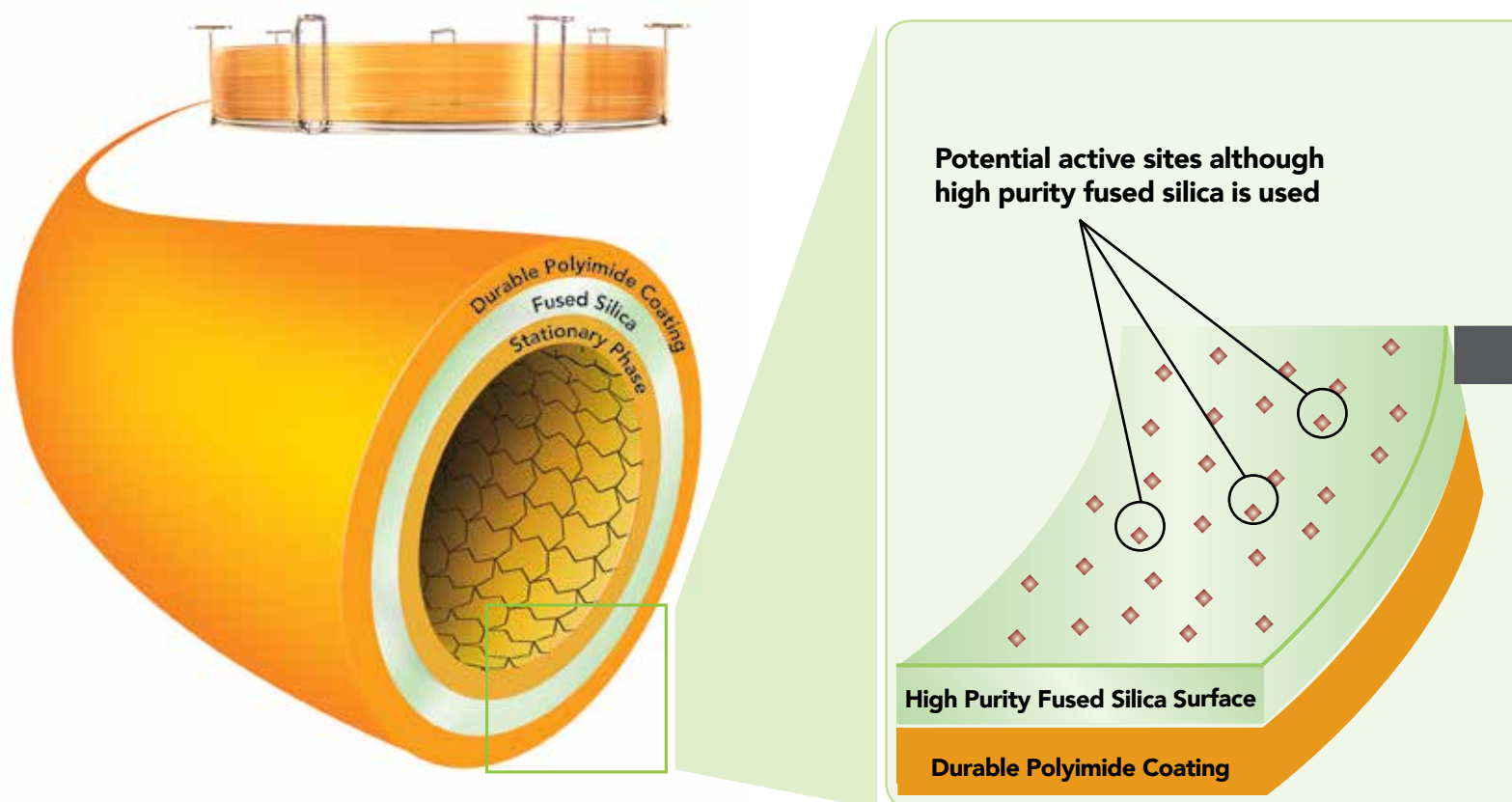
Enviro-Inert™ Technology

# A New Generation In Environmental Testing

## Why Is Reduced Activity Important?

Poor inertness as a result of increased column activity can lead to low acid/base sensitivity or analyte misidentification, causing incorrect data and big headaches! ZB-SemiVolatiles is designed with Enviro-Inert technology to ensure:

- Inert, rugged performance without compromising separation
- Improved resolution of key critical pairs like benzo[b]fluoranthene and benzo[k]fluoranthene
- Better peak shapes and response for acids, amines, and PAHs





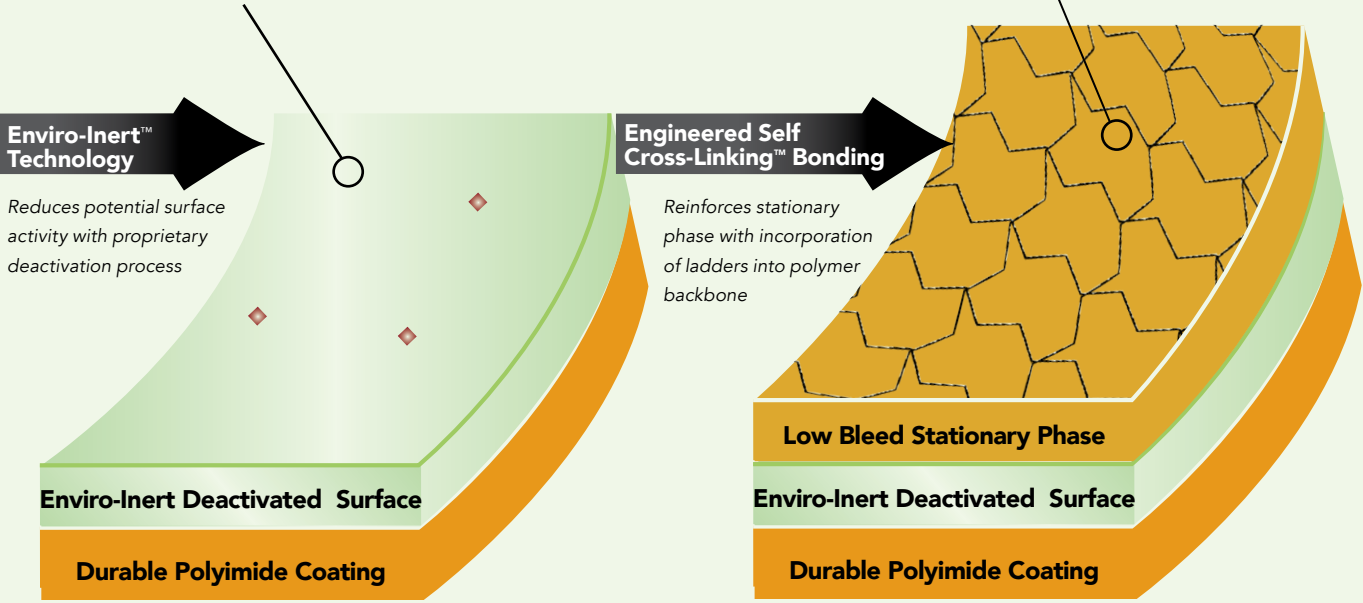
“ From the activation conditions and the deactivation process to the polymer coating techniques, we’ve manufactured our new proprietary bonding technology to deliver columns specifically designed to be more inert, rugged, and resilient for semivolatile methods like EPA 8270D. ”

Jim Archer, Phenomenex GC R&D Chemist  
11 years J&W, 20+ years GC experience

## Enviro-Inert Technology Improves Inertness Without Changing Selectivity

**Clean, highly inert surface due to fewer active sites**

**Very low bleed 5 % phenyl-arylene stationary phase is applied to the Enviro-Inert surface**



**Guaranteed.**  
No retention time shifts when switching from other 5% phenyl-arylene columns.

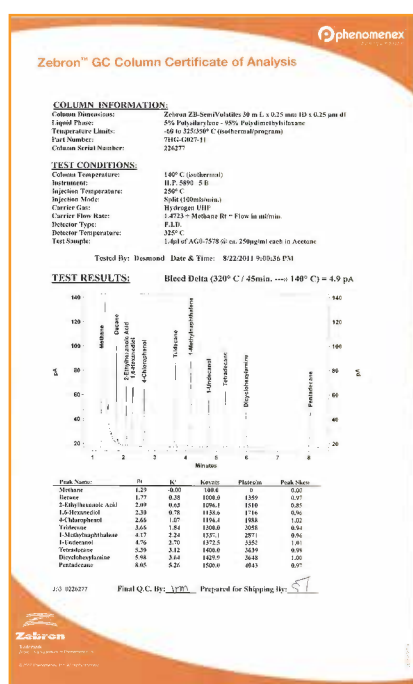
# Meet Requirements Out-of-the-Box

## We QC Test For the Compounds You Analyze

We take the guesswork out of meeting method requirements by aggressively testing ZB-SemiVolatiles with two different test mixes. We incorporated troublesome analytes from your samples and compounds in the EPA 8270D tuning standard into our QC test, so you can be sure your column is ready to meet suitability requirements for the method.

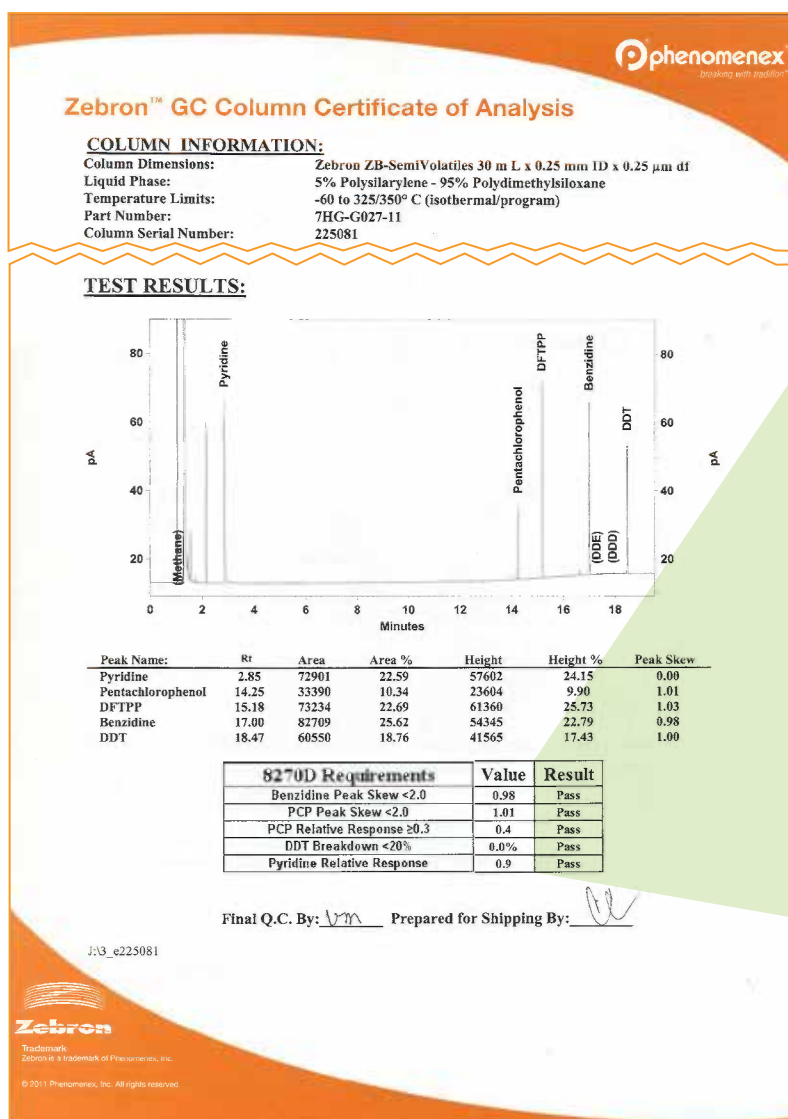
### QC TEST 1: Standard Zebron™ QC Test Mix

Rigorous test for Efficiency, Bleed, Activity, and Retention



### QC TEST 2: ZB-SemiVolatiles Performance QC Test Mix

Includes the GC/MS tuning standard for EPA Method 8270D (DDT, Pentachlorophenol, and Benzidine) and Pyridine, a more sensitive probe for column activity.



## ZB-SemiVolatiles Performance QC Test Criteria

### Pyridine (PYR)

Pyridine is a very active amine, and exposes even the smallest amount of column activity. We added pyridine to our QC test to ensure that our specially deactivated column performs at the highest possible level, even for your most difficult basic compounds.

#### Peak Response Criteria

- EPA 8270D Requirement: Not Specified
- Our Requirement:  $\geq 0.6^*$

### Pentachlorophenol (PCP)

Pentachlorophenol peaks disappear and exhibit tailing on active columns, so it is important to measure their relative responses and peak skews to ensure column performance.

#### Peak Skew Criteria

- EPA 8270D Requirement:  $\leq 2.0$
- Our Requirement:  $\leq 2.0$

#### Peak Response Criteria

- EPA 8270D Requirement: Not Specified
- Our Requirement:  $\geq 0.3$

### Benzidine

Benzidine is another active amine that tails when column activity is present, complicating peak quantification. We require ZB-SemiVolatiles columns to meet EPA 8270D peak skew requirements for this compound prior to shipment.

#### Peak Skew Criteria

- EPA Requirement:  $\leq 2.0$
- Our Requirement:  $\leq 2.0$

### DDT

DDT breaks down in an active system to DDE and DDD. With our QC test, you are assured that your column will meet the EPA requirements upon installation.

#### Breakdown Criteria

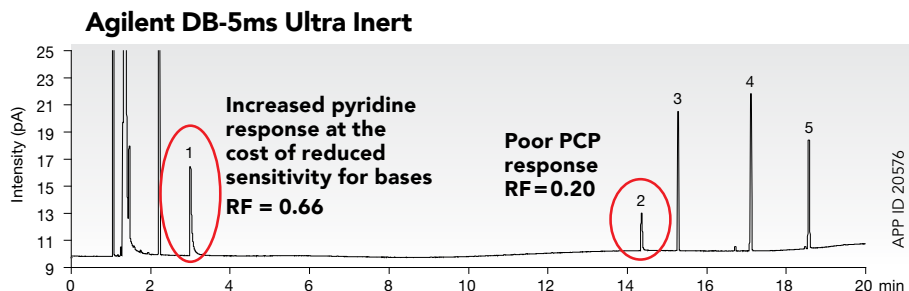
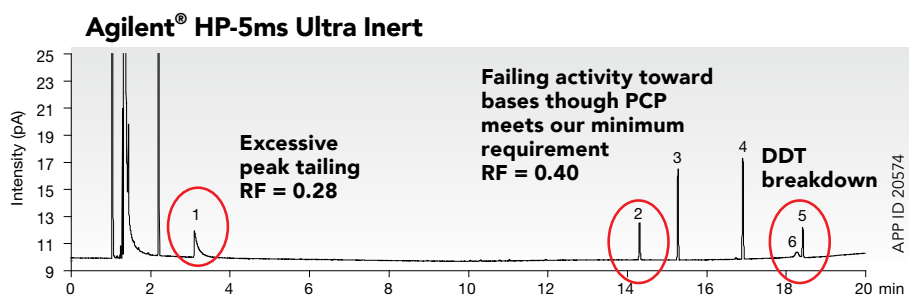
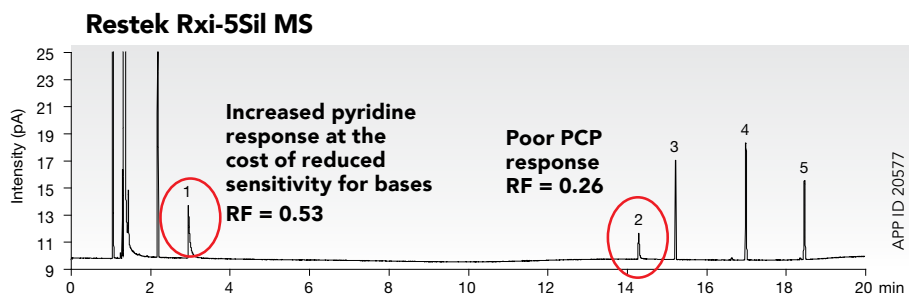
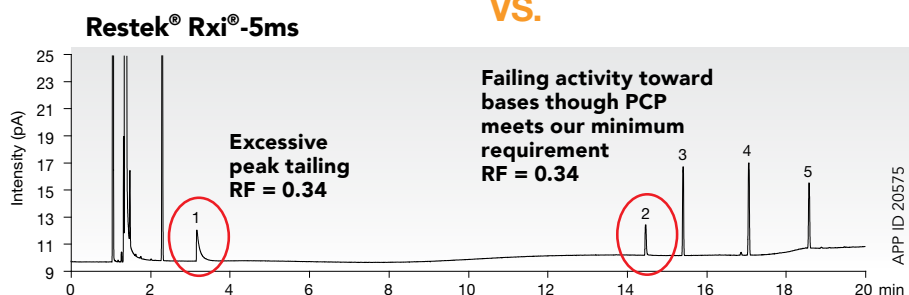
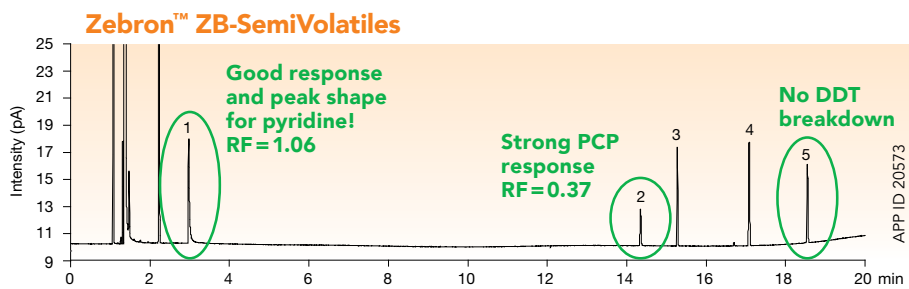
- EPA 8270D Requirement:  $< 20\%$
- Our Requirement:  $< 20\%$

\*Requirement of 0.5 for 60m x 0.25mm x 0.25 $\mu$ m and 10m Guardian™ dimensions

# Depend on the Industry's Most Stringent QC Specifications

## Leading Competitor Columns Put to <sup>OUR</sup> the Test

Our QC test exposed poor performance for key compounds on competing columns. Enviro-Inert™ technology improves inertness, so you experience increased responses, lower limits of detection (LOD), and virtually no breakdown when using a ZB-SemiVolatiles GC column.



### Response Factor (RF)

	PYR	PCP
ZB-SemiVolatiles	1.06	0.37
Rxi-5ms	0.34	0.34
Rxi-5Sil MS	0.53	0.26
HP-5ms Ultra Inert	0.28	0.40
DB-5ms Ultra Inert	0.66	0.20

RF is calculated by dividing peak height of analyte by peak height of DFTPP as internal standard.

### Conditions for all columns:

**Dimensions:** 30 meter x 0.25 mm x 0.25 μm

**Injection:** Split 100:1 @ 175 °C, 1 μL

**Carrier Gas:** Hydrogen @ 40 cm/sec (constant pressure)

**Oven Program:** 40 °C for 2 min to 300 °C @ 15 °C/min for 3.5 min

**Detector:** FID @ 325 °C

**Sample:** Analytes are 20ppm in Dichloromethane  
 1. Pyridine  
 2. Pentachlorophenol  
 3. DFTPP  
 4. Benzidine  
 5. DDT  
 6. DDD

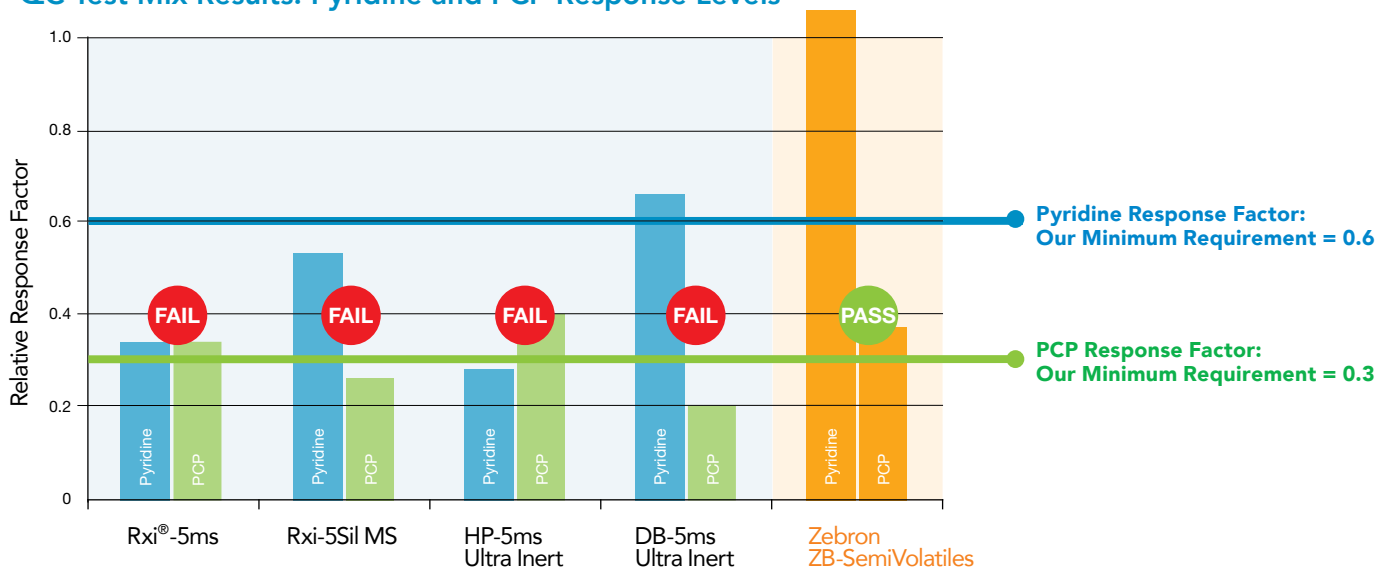
Conditions were the same for all columns tested. Comparative separations are not representative of all applications.



## Competing Columns Fail Our Stringent QC Requirements

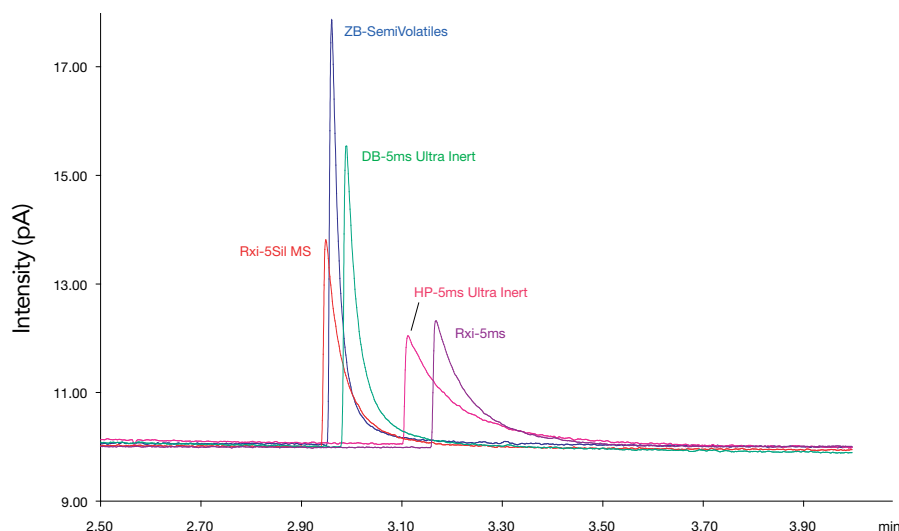
As part of our QC requirements, columns must meet minimum Pyridine and Pentachlorophenol responses. Each of the four competitor columns would have been failed by our QC department and would not have shipped to our customers.

### QC Test Mix Results: Pyridine and PCP Response Levels



### Why Is Pyridine Response Important?

Pyridine is a very active amine and a good indicator for both column lifetime and sensitivity. Columns with higher initial peak responses can be expected to maintain performance over time. Additionally, higher responses allow you to run at lower levels of detection, improving the sensitivity of your analysis.



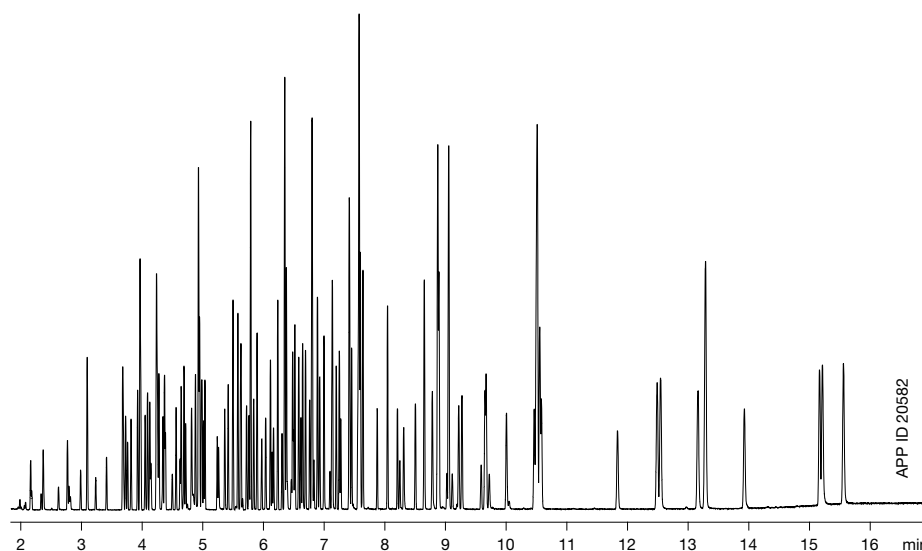
Conditions were the same for all columns tested. Comparative separations are not representative of all applications.

# Enhance Your Method Results

## Great Resolution of Key Critical Pairs and Improved Peak Shapes

Enviro-Inert™ technology allows Zebtron™ ZB-SemiVolatiles to provide improved productivity with shorter run times for EPA 8270D, while maintaining resolution of key critical pairs.

### EPA Method 8270D: Semivolatile Organic Compounds

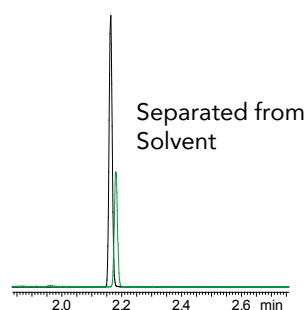


**Column:** Zebtron ZB-SemiVolatiles  
**Dimensions:** 30 meter x 0.25 mm x 0.25  $\mu$ m  
**Part Number:** 7HG-G027-11  
**Injection:** Split 10:1 @ 280 °C, 1  $\mu$ L  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45 – 450 amu  
**Sample:** Analytes are 25ppm in Dichloromethane  
**Liner:** AG0-8499 (Single Taper with Wool)  
**Septum:** AG0-4697 (PhenoRed™-400)  
**Inlet Seal:** AG0-8620 (Easy Seals™ Inlet Base Seal)

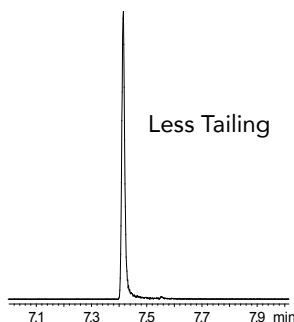
See the full compound list at  
[www.phenomenex.com/GC](http://www.phenomenex.com/GC)

#### Running A Splitless Injection?

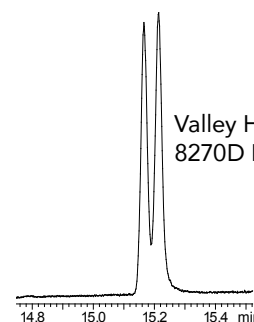
Use a Direct Connect top side-hole liner (AG0-7850) to improve reproducibility and response. See more recommended accessories on p. 18.



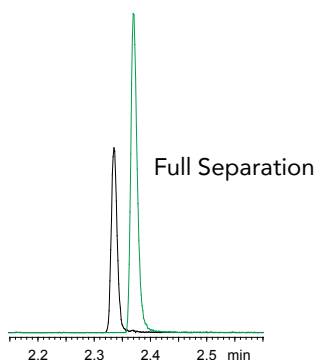
**1,4-Dioxane-D8 and  
1,4-Dioxane**



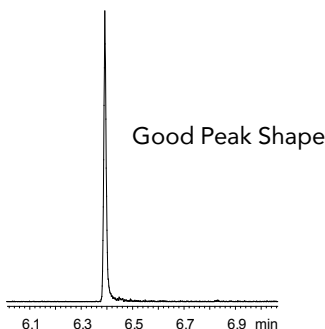
**Pentachlorophenol**



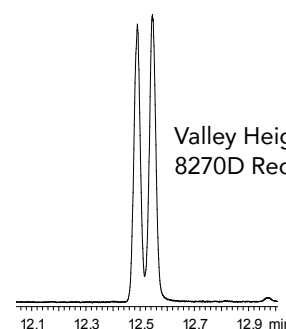
**Indeno[1,2,3-cd]pyrene and  
Dibenz[a,h]anthracene,  
both share mass 276**



**N-Nitrosodimethylamine and  
Pyridine**



**2,4-Dinitrophenol**



**Benzo[b]fluoranthene and  
Benzo[k]fluoranthene**

# Hold Calibrations and Increase Productivity

## Stands Up to Tough Samples for Increased Lifetime



“ I have found the Phenomenex ZB-SemiVolatiles columns to be superior in quality and durability than any other columns we have previously used. The columns not only last longer, but the reproducibility of column is extraordinary. The column holds calibrations particularly well, even after multiple injections of samples with far less than desirable matrices. All of this equates to less downtime and maintenance and more productivity for TestAmerica. ”

Ryan McKernan, GC/MS Semi-Volatile Analyst  
TestAmerica Laboratories, Inc. Buffalo

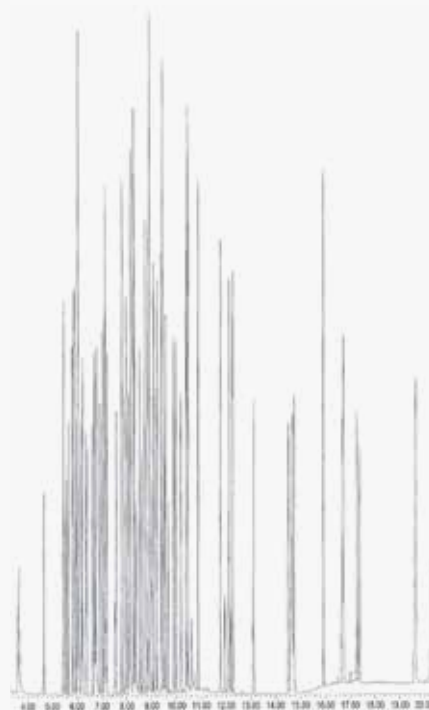
## Improve Resolution, Decrease Runtime

“ We made the switch to the ZB-SemiVolatiles column for an increase in performance for separating pyridine and n-nitrosodimethylamine. The improved peak shape has dramatically decreased the %RSD in our calibration curve.

Additionally, we have seen an increase of peak separation for aniline and bis(2-chloroethyl) ether. This has allowed for us to decrease run times while seeing excellent peak resolution without sacrificing quality, something I strive for as an analyst.

”

Senior Organic Chemist  
Phoenix Environmental Laboratories, Inc.



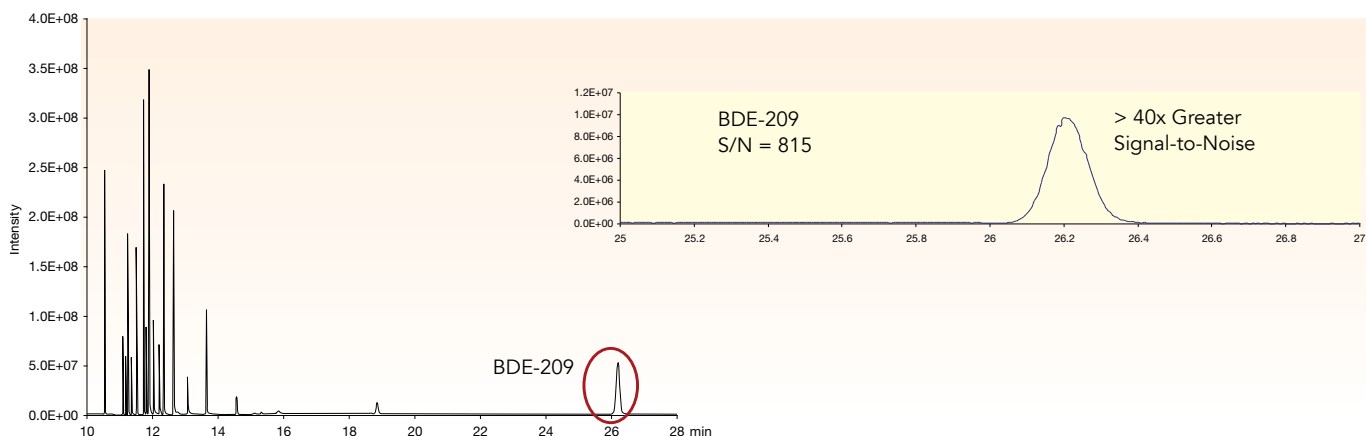
### Share With Us

We want to know what you think about Zebtron™ ZB-SemiVolatiles. Let us know at [www.phenomenex.com/ShareGC](http://www.phenomenex.com/ShareGC)

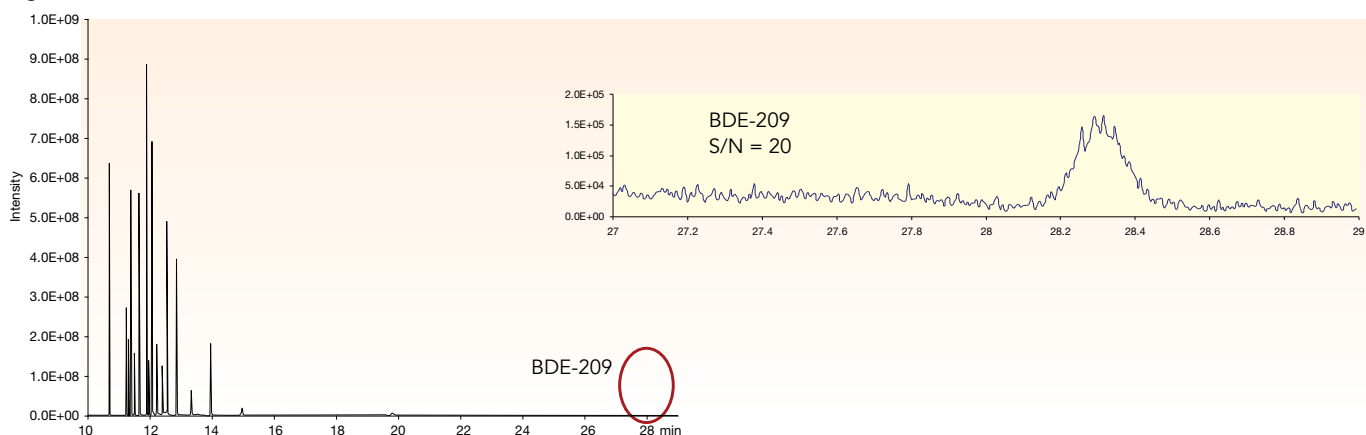
# Additional Applications

## Real Customer Results: Single-Run PBDEs Including BDE-209

### Zebron™ ZB-SemiVolatiles



### Agilent® DB-5ms Ultra Inert



“We have had great difficulties with the stability of BDE-209 with our previous GC columns, and we were forced to use a very short column (6 m) for this specific compound instead of a regular 20-30 m column. To be able to run all PBDEs in one run we decided to test Zebron ZB-SemiVolatiles.

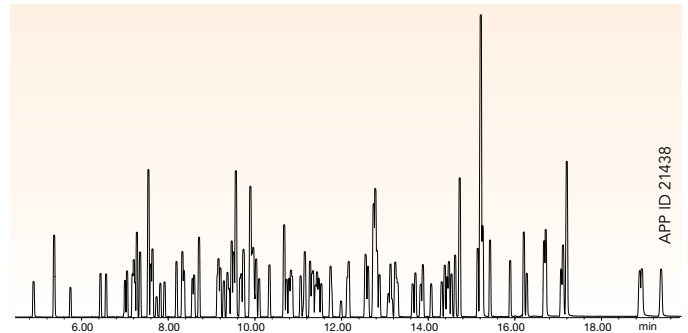
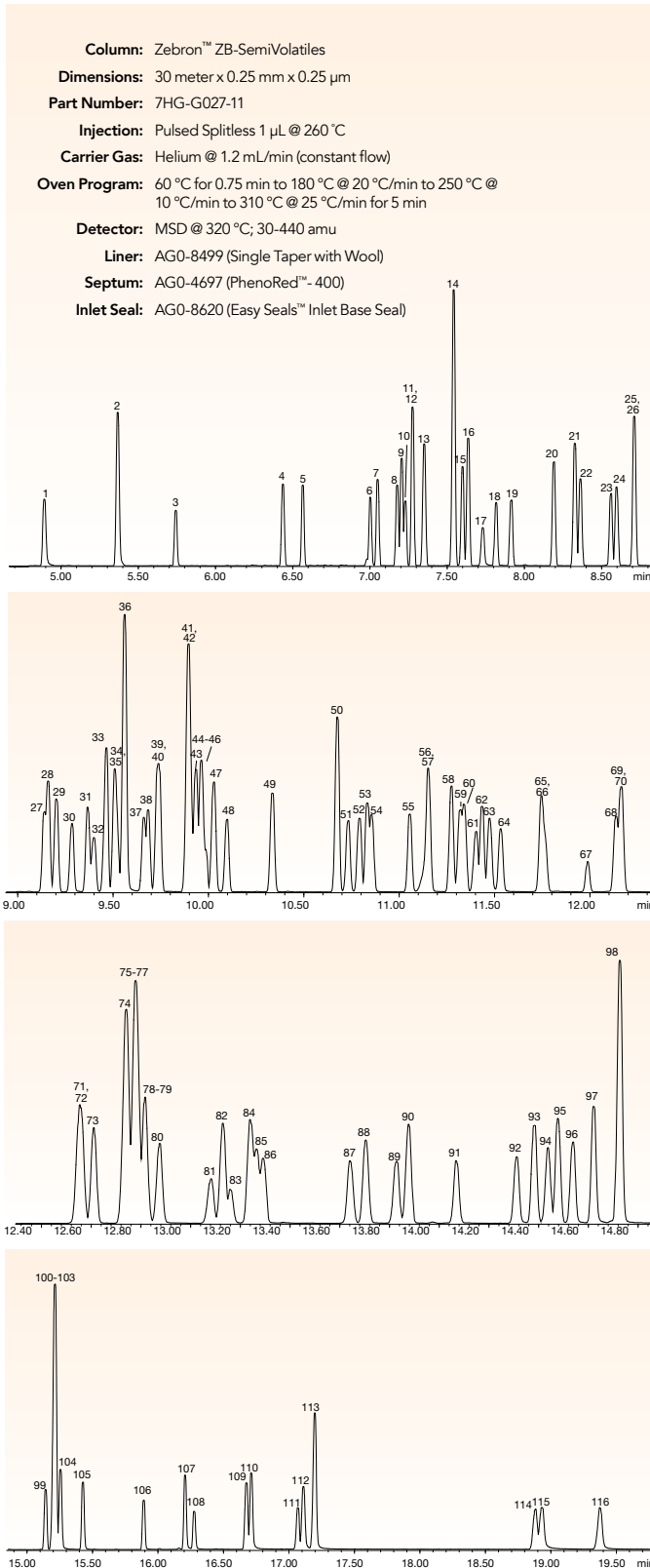
With a narrow bore 20 m x 0.18 mm ID x 0.18 µm film ZB-SemiVolatiles column we are now able to successfully analyze our suite of PBDEs from BDE-28 to BDE-209 in a single run. Peak height of BDE-209 with this column is 10-30 times higher than with a brand new column of similar (5 % phenyl) chemistry and dimensions from another well-known manufacturer. Use of ZB-SemiVolatiles roughly halves the time required for analysis as there is no longer a need for a second injection with a shorter column.

ZB-SemiVolatiles represents a major improvement in the GC analysis of highly brominated flame retardants.”

”

Panu Rantakokko  
National Institute for Health and Welfare, Finland

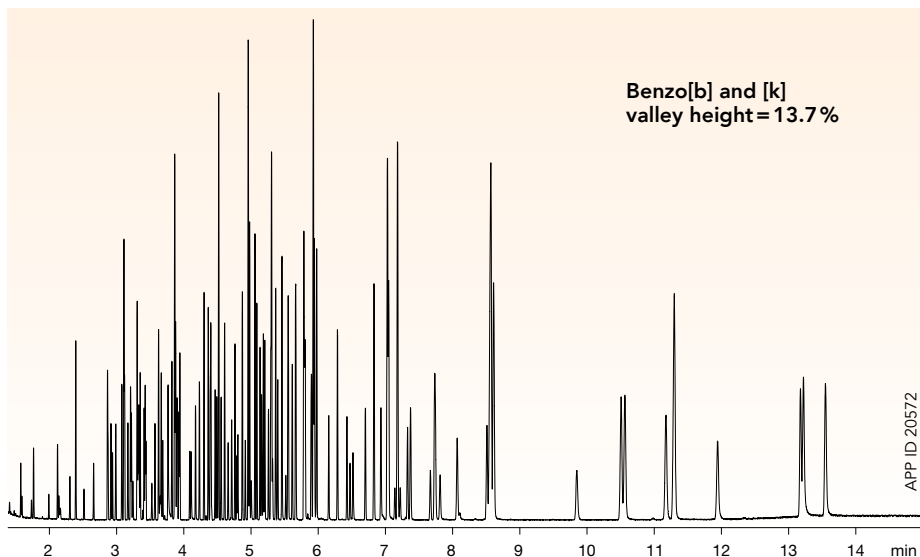
# Determination of Semivolatiles in Drinking Water by GC/MS



- Sample:**
- |  |  |
|--|--|
| 1. Isophorone                              | 59. Metolachlor                                    |
| 2. 1,3-Dimethyl-2-nitrobenzene (surrogate) | 60. Chlorpyrifos                                   |
| 3. Dichlorvos (DDVP)                       | 61. Cyanazine                                      |
| 4. Hexachlorocyclopentadiene               | 62. Dacthal (DCPA)                                 |
| 5. EPTC (Eptam)                            | 63. Aldrin   |
| 6. Mevinphos (Phosdrin)                    | 64. Triadimefon                                    |
| 7. Butylate                                | 65. Diphenamide                                    |
| 8. Vernolate                               | 66. MGK-264  |
| 9. Dimethyl phthalate                      | 67. MGK-264 (isomer)                               |
| 10. Etridiazole                            | 68. Heptachlor epoxide                             |
| 11. 2,6-Dinitrotoluene                     | 69. Merphos  |
| 12. Pebulate (Tillam)                      | 70. BZ# 98   |
| 13. Acenaphthylene                         | 71. trans-Chlordane                                |
| 14. Acenaphthene-d10 (internal standard)   | 72. Tetrachlorvinphos                              |
| 15. Chloroneb                              | 73. Butachlor                                      |
| 16. BZ# 1                                  | 74. Pyrene d10                                     |
| 17. Tebuthiuron                            | 75. Pyrene   |
| 18. 2,4-Dinitrotoluene                     | 76. cis-Chlordane                                  |
| 19. Molinate                               | 77. Endosulfan I                                   |
| 20. Diethyl phthalate                      | 78. Fenamiphos                                     |
| 21. Fluorene                               | 79. trans-Nonachlor                                |
| 22. Propachlor                             | 80. Napropamide                                    |
| 23. Ethoprop (Ethoprophos)                 | 81. Tricyclazole                                   |
| 24. Cycloate                               | 82. DDE  |
| 25. Trifluralin                            | 83. DEF  |
| 26. Chlorpropham                           | 84. BZ# 154  |
| 27. alpha-BHC                              | 85. Dieldrin                                       |
| 28. BZ# 5                                  | 86. Carboxin                                       |
| 29. Hexachlorobenzene                      | 87. Endrin   |
| 30. Atraton                                | 88. Chlorobenzilate                                |
| 31. Prometon                               | 89. Endosulfan II                                  |
| 32. Simazine                               | 90. DDD  |
| 33. Atrazine                               | 91. Endrin aldehyde                                |
| 34. beta-BHC                               | 92. Norflurazon                                    |
| 35. Propazine                              | 93. Benzyl butyl phthalate                         |
| 36. Pentachlorophenol                      | 94. Endosulfan sulfate                             |
| 37. gamma-BHC                              | 95. DDT (Chlorophenothane)                         |
| 38. Terbufos (Terbuphos)                   | 96. Hexazinone                                     |
| 39. Pronamide (Propyzamide)                | 97. bis(2-Ethylhexyl)adipate                       |
| 40. Diazinon                               | 98. Triphenyl phosphate (Disflamoll TP, surrogate) |
| 41. Phenanthrene-d10 (internal standard)   | 99. BZ# 171  |
| 42. Chlorthalonil                          | 100. Benz[a]anthracene                             |
| 43. Phenanthrene                           | 101. BZ# 200                                       |
| 44. Disulfoton                             | 102. Methoxychlor                                  |
| 45. Methyl paraoxon                        | 103. Chrysene-d12 (internal standard)              |
| 46. Terbacil                               | 104. Chrysene                                      |
| 47. Anthracene                             | 105. Bis[2-ethylhexyl]phthalate                    |
| 48. delta-BHC                              | 106. Fenarimol                                     |
| 49. BZ# 29                                 | 107. cis-Permethrin                                |
| 50. Alachlor                               | 108. trans-Permethrin                              |
| 51. Simetryn                               | 109. Benzo[b]fluoranthene                          |
| 52. Ametryn                                | 110. Benzo[k]fluoranthene                          |
| 53. Prometryn                              | 111. Fluridone                                     |
| 54. Heptachlor                             | 112. Benzo[a]pyrene                                |
| 55. Terbutryn                              | 113. Perylene-d12 (internal standard)              |
| 56. Bromacil                               | 114. Indeno[1,2,3-cd]pyrene                        |
| 57. Dibutyl phthalate                      | 115. Dibenzo[a,h]anthracene                        |
| 58. BZ# 47                                 | 116. Benzo[g,h,i]perylene                          |

# Additional Applications

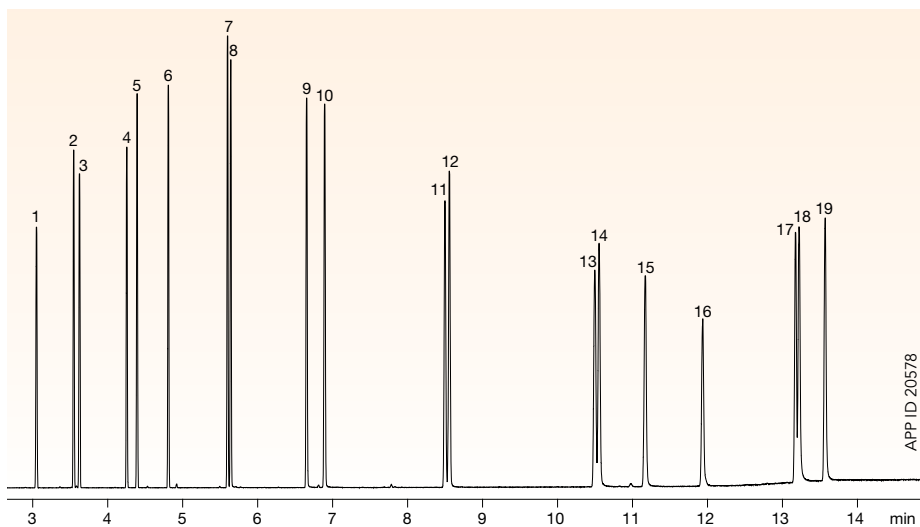
## 135 SVOCs in Under 14 Minutes



**Column:** Zebron™ ZB-SemiVolatiles  
**Dimensions:** 20 meter x 0.18 mm x 0.36 μm  
**Part Number:** 7FD-G027-53  
**Injection:** Split 10:1 @ 300 °C, 1 μL  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45 – 450 amu  
**Sample:** Analytes are 25ppm in Dichloromethane  
**Liner:** AG0-8499 (Single Taper with Wool)  
**Septum:** AG0-4697 (PhenoRed™ - 400)  
**Inlet Seal:** AG0-8620 (Easy Seals™ Inlet Base Seal)

See the full compound list at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

## Polycyclic Aromatic Hydrocarbons (PAHs)



**Column:** Zebron ZB-SemiVolatiles  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Part Number:** 7HG-G027-11  
**Injection:** Split 10:1 @ 280 °C, 1 μL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 100 °C for 0.5 min to 260 °C @ 30 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45 – 450 amu  
**Sample:** Analytes are 25ppm in Dichloromethane

1. Naphthalene
2. 2-Methylnaphthalene
3. 1-Methylnaphthalene
4. Acenaphthylene
5. Acenaphthene
6. Fluorene
7. Phenanthrene
8. Anthracene
9. Fluoranthene
10. Pyrene
11. Benz[a]anthracene
12. Chrysene
13. Benzo[b]fluoranthene
14. Benzo[k]fluoranthene
15. Benzo[a]pyrene
16. 3-Methylcholanthrene
17. Indeno[1,2,3-cd]pyrene
18. Dibenzo[a,h]anthracene
19. Benzo[g,h,i]perylene

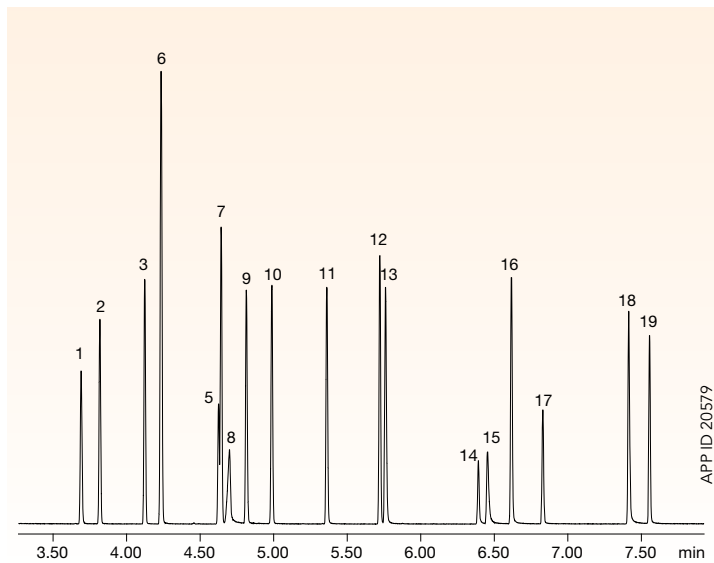
### Need Resolution of Benzo[b], [j], and [k]?

You can get separation of all three compounds on a Zebron ZB-35!  
Download the full application note at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

## Want Even More Applications?

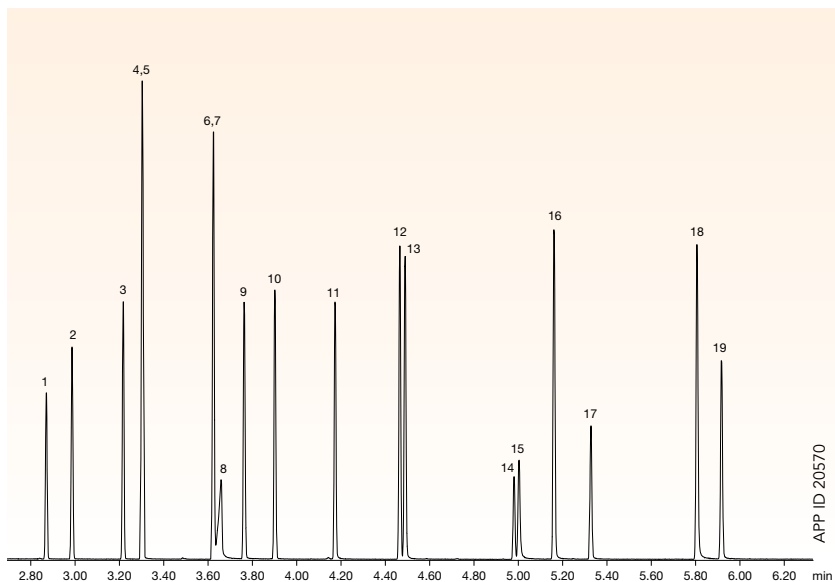
Free technical tips, guides, and hundreds of applications are at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

## Phenols



**Column:** Zebron™ ZB-SemiVolatiles  
**Dimensions:** 30 meter x 0.25 mm x 0.25  $\mu$ m  
**Part Number:** 7HG-G027-11  
**Injection:** Split 10:1 @ 280 °C, 1  $\mu$ L  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 30 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45 – 450 amu  
**Samples:** Analytes are 25ppm in Dichloromethane  
1. Phenol  
2. 2-Chlorophenol  
3. 2-Methylphenol  
4. 4-Methylphenol  
5. 3-Methylphenol  
6. 2-Nitrophenol  
7. 2,4-Dimethylphenol  
8. Benzoic Acid  
9. 2,4-Dichlorophenol  
10. 2,6-Dichlorophenol  
11. 4-Chloro-3-methylphenol  
12. 2,4,6-Trichlorophenol  
13. 2,4,5-Trichlorophenol  
14. 2,4-Dinitrophenol  
15. 4-Nitrophenol  
16. 2,3,4,6-Tetrachlorophenol  
17. 2-Methyl-4,6-dinitrophenol  
18. Pentachlorophenol  
19. Dinoseb

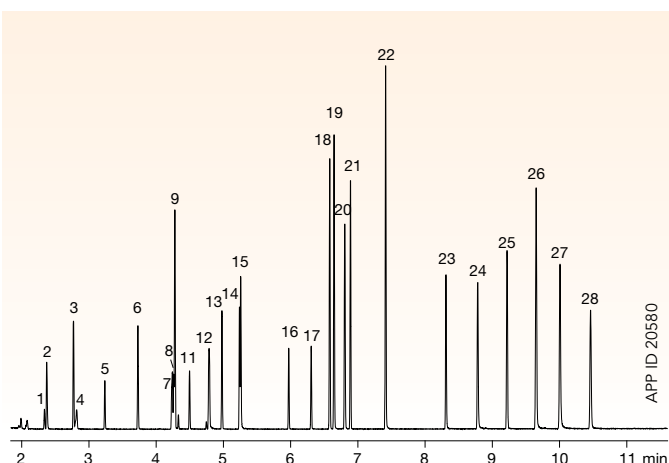
## Fast Phenols



**Column:** Zebron ZB-SemiVolatiles  
**Dimensions:** 20 meter x 0.18 mm x 0.36  $\mu$ m  
**Part Number:** 7FD-G027-53  
**Injection:** Pulsed Split 10:1 @ 300 °C, 30 psi, 1  $\mu$ L  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45-450 amu  
**Samples:** Analytes are 25ppm in Dichloromethane  
1. Phenol  
2. 2-Chlorophenol  
3. 2-Methylphenol  
4. 4-Methylphenol  
5. 3-Methylphenol  
6. 2-Nitrophenol  
7. 2,4-Dimethylphenol  
8. Benzoic Acid  
9. 2,4-Dichlorophenol  
10. 2,6-Dichlorophenol  
11. 4-Chloro-3-methylphenol  
12. 2,4,6-Trichlorophenol  
13. 2,4,5-Trichlorophenol  
14. 2,4-Dinitrophenol  
15. 4-Nitrophenol  
16. 2,3,4,6-Tetrachlorophenol  
17. 2-Methyl-4,6-dinitrophenol  
18. Pentachlorophenol  
19. Dinoseb

# Additional Applications

## Amines

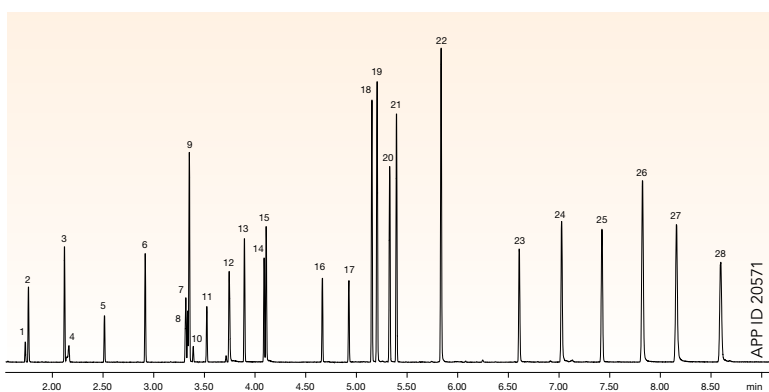


**Column:** Zebron™ ZB-SemiVolatiles  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part Number:** 7HG-G027-11  
**Injection:** Split 10:1 @ 280 °C, 1 µL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45 – 450 amu  
**Samples:** Analytes are 25ppm in Dichloromethane  
 1. N-Nitrosodimethylamine  
 2. Pyridine  
 3. 2-Picoline  
 4. N-Nitrosomethylethylamine  
 5. N-Nitrosodiethylamine  
 6. Aniline  
 7. N-Nitrosopyrrolidine  
 8. N-Nitrosodi-n-propylamine  
 9. N-Nitrosomorpholine  
 10. o-Toluidine  
 11. N-Nitrosopiperidine  
 12. a,a-Dimethylphenethylamine  
 13. 4-Chloroaniline  
 14. N-Nitrosodi-n-butylamine  
 15. p-Phenylenediamine  
 16. 2-Nitroaniline  
 17. 3-Nitroaniline  
 18. 1-Naphthylamine  
 19. 2-Naphthylamine  
 20. 4-Nitroaniline  
 21. Diphenylamine  
 22. 4-Aminobiphenyl  
 23. Methapyrilene  
 24. Benzidine  
 25. o-Tolidine  
 26. p-Dimethylaminoazobenzene  
 27. 2-Acetylaminofluorene  
 28. 3,3'-Dichlorobenzene

### Speed It Up With Fast GC!

Increase throughput and maintain resolution using the 20 meter ZB-SemiVolatiles GC column. Find fast applications for PAHs, phenols, and amines online at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

## Fast Amines



**Column:** Zebron ZB-SemiVolatiles  
**Dimensions:** 20 meter x 0.18 mm x 0.36 µm  
**Part Number:** 7FD-G027-53  
**Injection:** Pulsed Split 10:1 @ 300 °C, 30 psi, 1 µL  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 340 °C; 45-450 amu  
**Sample:** 1. N-Nitrosodimethylamine  
 2. Pyridine  
 3. 2-Picoline  
 4. N-Nitrosomethylethylamine  
 5. N-Nitrosodiethylamine  
 6. Aniline  
 7. N-Nitrosopyrrolidine  
 8. N-Nitrosodi-n-propylamine  
 9. N-Nitrosomorpholine  
 10. o-Toluidine  
 11. N-Nitrosopiperidine  
 12. alpha,alpha-Dimethylphenethylamine (Phentermine)  
 13. 4-Chloroaniline  
 14. N-Nitrosodi-n-butylamine  
 15. p-Phenylenediamine  
 16. 2-Nitroaniline  
 17. 3-Nitroaniline  
 18. 1-Naphthylamine  
 19. 2-Naphthylamine  
 20. 4-Nitroaniline  
 21. Diphenylamine  
 22. 4-Aminobiphenyl  
 23. Methapyrilene  
 24. Benzidine  
 25. o-Tolidine  
 26. p-Dimethylaminoazobenzene  
 27. 2-Acetylaminofluorene  
 28. 3,3'-Dichlorobenzene



## Testing Pesticides or Herbicides?

See the full pesticide solution guide at

[www.phenomenex.com/PesticidesGC](http://www.phenomenex.com/PesticidesGC)

# Organochlorine Pesticides by GC/MS

**Column:** Zebron™ ZB-SemiVolatiles

**Dimensions:** 30 meter x 0.25 mm x 0.25 µm

**Part Number:** 7HG-G027-11

**Injection:** Pulsed Splitless 1 µL @ 260 °C @ 30 psi for 0.55 min

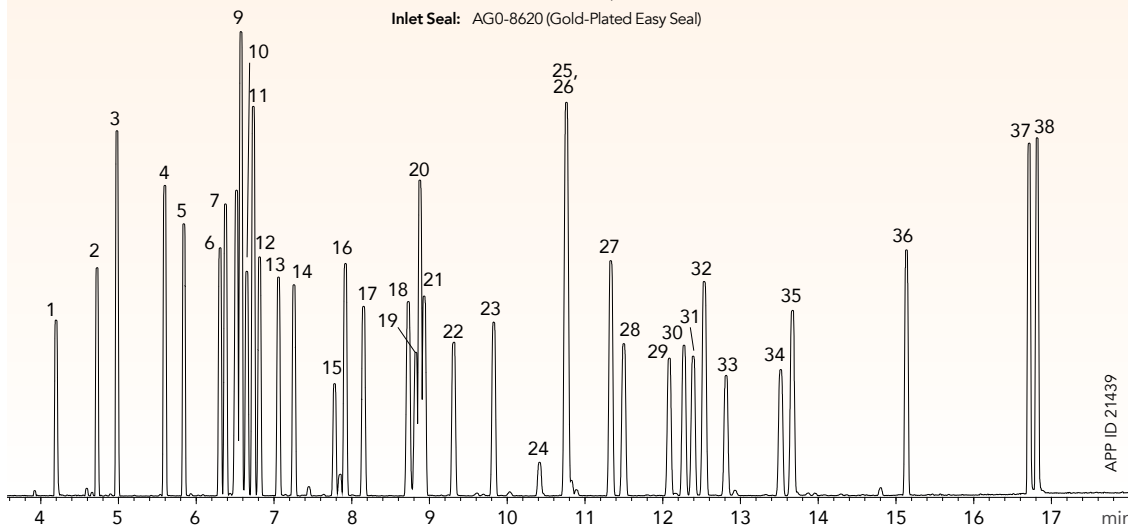
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)

**Oven Program:** 80 °C for 0.75 min to 190 °C @ 35 °C/min to 240 °C @ 5 °C/min to 300 °C @ 20 °C/min for 2 min

**Detector:** MSD @ 320 °C; 30-450 amu

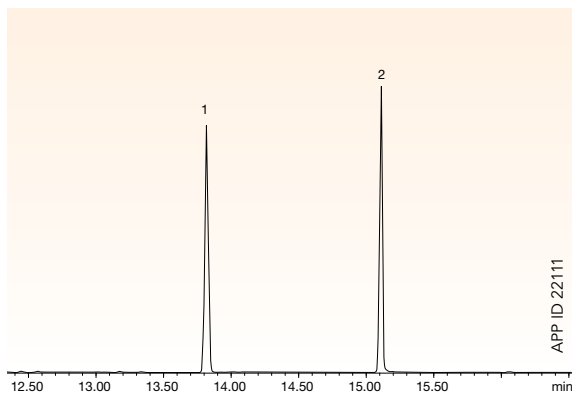
**Liner:** AG0-8499 (Single Taper with Wool at Bottom)

**Inlet Seal:** AG0-8620 (Gold-Plated Easy Seal)



1. Hexachlorocyclopentadiene	11. Pentachloronitrobenzene	21. Aldrin	31. Endosulfan II
2. Etridiazole	12. beta-BHC	22. 4,4-Dibromophenol	32. DDD
3. Chloroneb	13. Chlorothalonil	23. Heptachlor epoxide	33. Endrin aldehyde
4. Propachlor	14. delta-BHC	24. gamma-Chlordane	34. Endosulfan sulfate
5. Trifluralin	15. Metribuzin	25. alpha-Chlordane	35. DDT (Chlorophenothane)
6. alpha-BHC	16. Alachlor	26. Endosulfan II	36. Methoxychlor
7. Hexachlorobenzene	17. Heptachlor	27. DDE	37. cis-Permethrin
8. Simazine	18. Metolachlor	28. Dieldrin	38. trans-Permethrin
9. Atrazine	19. Cyanazine	29. Endrin	
10. gamma-BHC	20. Dacthal (DCPA)	30. Chlorobenzilate	

## Endothall Testing by EPA 548.1



**Column:** Zebron ZB-SemiVolatiles

**Dimensions:** 30 meter x 0.25 mm x 0.25 µm

**Part No.:** 7HG-G027-11

**Injection:** Pulsed 2 µL @ 200 °C

**Carrier Gas:** Helium @ 1 mL/min (constant flow)

**Oven Program:** 80 °C for 5 min to 260 °C @ 10 °C/min for 10 min

**Detector:** MSD @ 320 °C, 45-450 amu

**Note:** Pulsed splitless injection @ 30 psi for 0.55 min



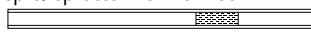
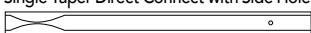
**Sample:** 1. Acenaphthene-d10  
2. Endothall (derivatized)

# Recommended GC Accessories

This is a partial list of accessories available – contact your GC Specialist for more at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

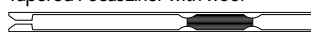
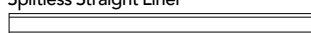
## Liners

Liners for Agilent® Technologies (HP) GC Systems  
(GC Model No. 5880/5890/6890/7890)

Description	Benefits / Uses	Dimensions ID x L x OD (mm)	Units	Similar to Mfr. No.**	Part No.	Unit	Price
Split / Splitless, FocusLiner™ Single Taper with wool 	General use or dirty samples	4 x 78.5 x 6.3	ea	5183-4711	20994	–	
			5/pk	5183-4712	20995	AG0-4680	5/pk
			25/pk	5183-4713	20996	AG0-7514	25/pk
Splitless, Single Taper Liner with wool 	Large injection, trace analysis	4 x 78.5 x 6.3	5/pk	5183-4693	20995	AG0-8499	5/pk
			25/pk	5183-4694		AG0-9170	25/pk
Split / Splitless Liner with wool 	Large injection, trace analysis	4 x 78.5 x 6.3	5/pk	5183-4691	20995	AG0-8653	5/pk
			25/pk	5183-4692		AG0-8654	25/pk
Single Taper Direct Connect with Side Hole (top) 	Great recovery and linearity for trace analysis of active compounds	4 x 78.5 x 6.3	ea	G1544	21054	–	
			5/pk		21055	AG0-7850	5/pk
			25/pk		20998	–	

Column Installs This End

Liners for Shimadzu® GC Systems  
(GC Model No. 17A, 17B, 2010,2014)

Description	Benefits / Uses	Dimensions ID x L x OD (mm)	Units	Similar to Mfr. No.**	Part No.	Unit	Price
Split/Splitless Single Taper / Gooseneck Tapered FocusLiner with wool 	Great recovery and linearity for trace analysis of active compounds	3.4 x 95 x 5	–	092068	AG0-4683	5/pk	
Splitless Straight Liner 	Small injection, trace analysis	2.6 x 95 x 5	–	–	AG0-4667	5/pk	

Note: Large injection ≥ 2 µL. Small injection ≤ 2 µL \*\* Similar to but not always an exact equivalent to the original manufacturer's product.

## Easy Seals™ for Agilent GCs

Easy, Washerless, and Leak-Tight



Part No.	Description	Unit	Price
Standard, single groove for splitless applications, 0.8 mm dia. inlet hole			
AG0-8619	Easy Seals Inlet Base Seal, Gold Plated, for Agilent GCs	2/pk	
AG0-8620	Easy Seals Inlet Base Seal, Gold Plated, for Agilent GCs	10/pk	

## Cool-Lock™ Nut

Fast GC Column Installation Without the Burn

- Avoid burning your fingers – cools with the oven
- Increased reproducibility—locks insertion depth before installation
- No need for wrench with hand-tightened connections



Patented Technology  
U.S. Patent No. 8, 062, 516

## Septa

Part No.	Description	Diameter	Unit	Price
PhenoRed™-400 GuideRight™ Injector Hole Septa				
AG0-7916	PhenoRed-400, 400 °C	3/16 in. (9.5 mm)	50/pk	
AG0-7917	PhenoRed-400, 400 °C	1/4 in. (11 mm)	50/pk	



Cool-Lock Nut For Agilent GC Systems*			
Part No.	Description	Unit	Price
AG0-8319	Cool-Lock Nut For Use With Short-Style Ferrules	ea	
AG0-8320	Cool-Lock Nut For Use With Long-Style Ferrules	ea	

\* Guaranteed fit for Agilent 5850, 5890, 6850, 6890, and 7890 GC systems  
Note: Cool-Lock GC Capillary Nut also available for Shimadzu GC systems, Part No. AG0-8419

# Ordering Information



## Zebron ZB-SemiVolatiles GC Columns

Length (m)	ID (mm)	df (µm)	Temperature Limits (°C)	Part No.	Price	Part No.	Price	Part No.	Price
				Standard		with 5 m Guardian™		with 10 m Guardian	
15	0.25	0.25	-60 to 325/350	7EG-G027-11		-		-	
	0.25	0.50	-60 to 325/350	7EG-G027-17		-		-	
20	0.18	0.18	-60 to 325/350	7FD-G027-08		-		-	
	0.18	0.36	-60 to 325/350	7FD-G027-53		-		-	
30	0.25	0.25	-60 to 325/350	7HG-G027-11		7HG-G027-11-GGA		7HG-G027-11-GGC	
	0.25	0.50	-60 to 325/350	7HG-G027-17		7HG-G027-17-GGA		7HG-G027-17-GGC	
60	0.25	0.25	-60 to 325/350	7KG-G027-11		-		-	

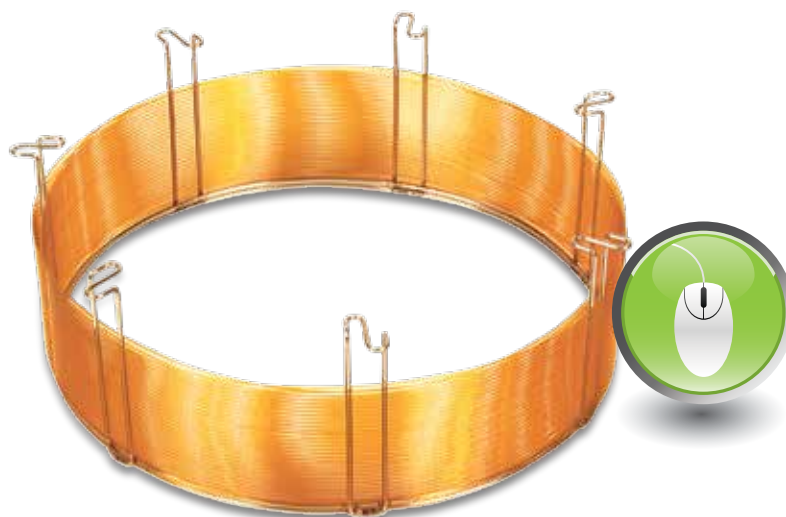
guarantee

If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## Order Online for Exclusive Savings!

You may qualify for new special offers—just sign in or register for a Phenomenex account to start saving today!

[www.phenomenex.com/GC](http://www.phenomenex.com/GC)





# ZB-SemiVolatiles

“ This column has REDUCED  
TestAmerica's DOWNTIME and  
INCREASED our PRODUCTIVITY ”

— TestAmerica Laboratories, Inc. Buffalo

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f: 02-9428-6445  
auinfo@phenomenex.com

## Austria

t: 01-319-1301  
f: 01-319-1300  
anfrage@phenomenex.com

## Belgium

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t: 02 511 8666 (Dutch)  
f: +31 (0)30-2383749  
beinfo@phenomenex.com

## Canada

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f: (310) 328-7768  
info@phenomenex.com

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ukinfo@phenomenex.com

## United States

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info@phenomenex.com

## All other countries: Corporate Office USA

t: (310) 212-0555  
f: (310) 328-7768  
info@phenomenex.com



## www.phenomenex.com

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Cool-Lock Nut is patented by Phenomenex. U.S. Patent No. 8,062,516

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