

“The chromatography quality and performance are excellent [with Zebron]. Column bleed is minimal at 320°C. Peak quality remains good for 5 to 6 months averaging 40 injections in a 24 hour period, 6 to 7 days per week.”

**Kevin Walkup**  
**Specialized Assays, Inc.**

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

## GC Column Selection Guidelines

|                                     |       |
|-------------------------------------|-------|
| The Master Resolution Equation..... | 84    |
| Choosing Your Selectivity.....      | 85-87 |
| Choosing Your Dimensions .....      | 88-89 |
| Our Quality Guarantee .....         | 90    |
| Column Selection Charts.....        | 91-97 |

## Zebron GC Columns

|                                  |         |
|----------------------------------|---------|
| Meet Your GC Column Family ..... | 100-101 |
| Zebron Unlimited .....           | 102-129 |
| Zebron PLUS .....                | 130-137 |
| Zebron Inferno™ .....            | 138-145 |
| Zebron Essentials .....          | 146-169 |
| Zebron Guard Columns .....       | 170-171 |

## GC Accessories

|                                 |         |
|---------------------------------|---------|
| Inlet Supplies .....            | 172-187 |
| Column Unions & Splitters ..... | 188     |
| Gas & Moisture Traps .....      | 189     |
| Tools & Maintenance .....       | 189     |
| GC Column Check Mixes .....     | 190     |



# The Master Resolution Equation

## The Basic Principle of Column Selection

How do you choose a column? Do you reach into a cabinet of mystery columns, look to your favorite 5% phenyl phase, or borrow one from a colleague? Understanding how column parameters impact key elements of the master resolution equation will help you quickly make the right column selection for successful separations.

$$R_s = \left[ \frac{\sqrt{N}}{4} \right] \times \left[ \frac{\alpha - 1}{\alpha} \right] \times \left[ \frac{k}{k + 1} \right]$$

**Efficiency Term**

**Selectivity Term**

**Retention Term**

• **Relates to:**

Column Length  
Column ID

Column Phase

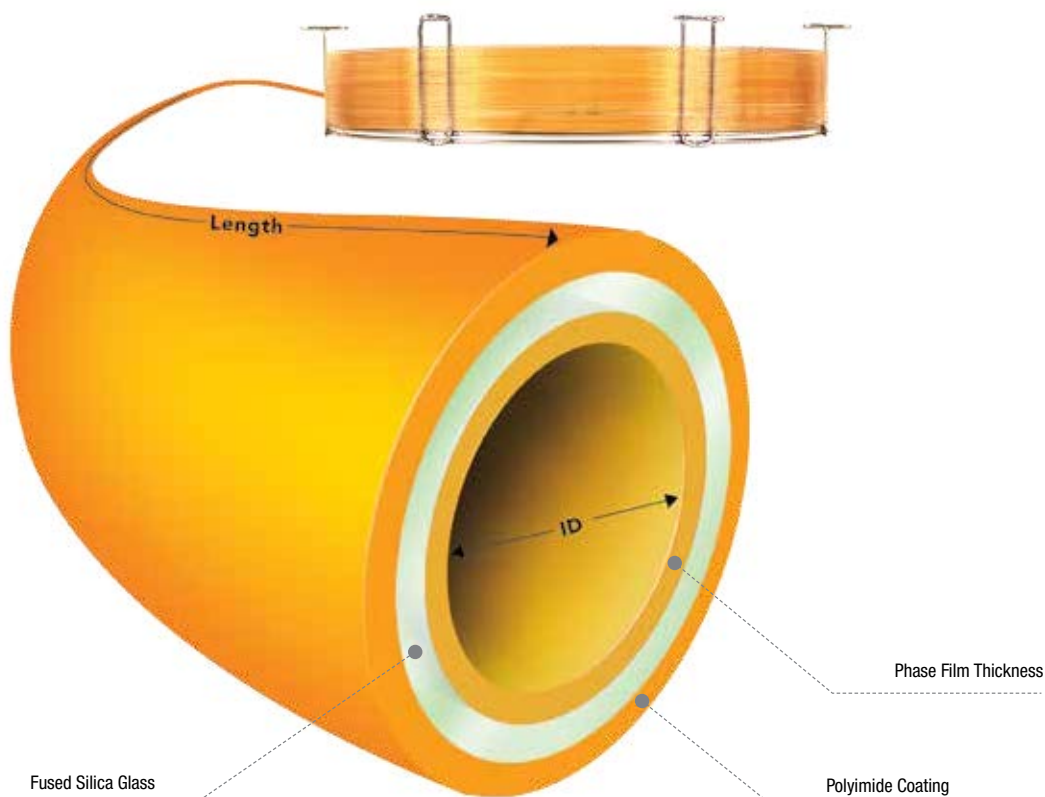
Column ID  
Film Thickness

• **Other Considerations:**

Carrier Gas  
Linear Velocity

Temperature

Temperature



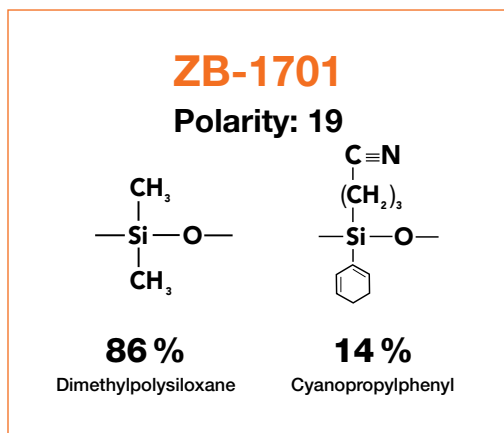
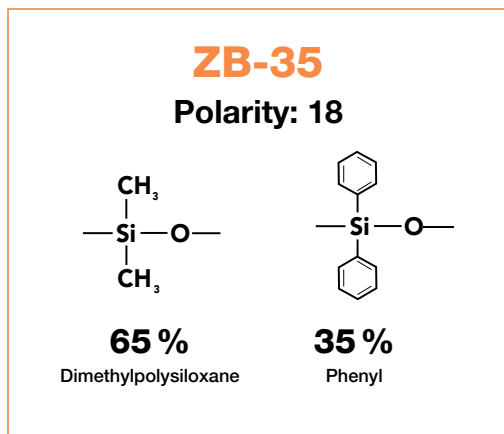
# Choosing Your Selectivity

## Selectivity Has the Biggest Impact on Resolution

Resolution between two analytes is mainly determined by the selectivity of the stationary phase. By increasing the resolution between two compounds, the total analysis time can often be reduced significantly!

### Selectivity vs. Polarity

Polarity gives a general guideline for sample capacity and separation, which can affect peak shape and resolution. However, two columns may have similar polarity but show different separation profiles due to dissimilar phase chemistries. For example, ZB-35 and ZB-1701 are close in polarity, but the cyanopropyl group makes ZB-1701 very different from ZB-35 in terms of selectivity.



## Selected Zebron® Polarities

|           |  |   |
|-----------|--|---|
| <b>5</b>  | <b>ZB-1</b><br><b>ZB-1PLUS™</b><br><b>ZB-1HT Inferno™</b><br><b>ZB-1XT SimDist</b>   | <b>For Non-Polar Analytes</b> <ul style="list-style-type: none"> <li>• Alkanes</li> <li>• Aromatics</li> <li>• Oils</li> <li>• Boiling Point Separations</li> </ul> |
| <b>8</b>  | <b>ZB-5</b><br><b>ZB-5ms</b><br><b>ZB-5MSPLUS™</b><br><b>ZB-5PLUS™</b><br><b>ZB-5HT Inferno</b><br><b>ZB-SemiVolatiles</b> |   |
| <b>9</b>  | <b>ZB-XLB</b><br><b>ZB-XLB-HT Inferno</b><br><b>ZB-PAH</b>   | <b>For Slightly Polar Analytes</b> <ul style="list-style-type: none"> <li>• Volatiles</li> <li>• Drugs</li> <li>• Pesticides</li> </ul>                             |
| <b>11</b> | <b>ZB-MultiResidue™-1</b>  |   |
| <b>13</b> | <b>ZB-624</b>  |   |
| <b>15</b> | <b>ZB-MultiResidue-2</b>   |   |
| <b>18</b> | <b>ZB-35</b><br><b>ZB-35HT Inferno</b>   |   |
| <b>19</b> | <b>ZB-1701</b><br><b>ZB-1701P</b>  |   |
| <b>24</b> | <b>ZB-50</b><br><b>ZB-FAME</b><br><b>ZB-23</b><br><b>ZB-88</b>   | <b>For Very Polar Analytes</b> <ul style="list-style-type: none"> <li>• Polar Volatiles</li> <li>• Alcohols</li> <li>• Phenols</li> <li>• Acids</li> </ul>          |
| <b>52</b> | <b>ZB-WAXPLUS™</b>   |   |
| <b>57</b> | <b>ZB-WAX</b>  |   |
| <b>58</b> | <b>ZB-FFAP</b>   |   |

# Choosing Your Selectivity

## The 3 Most Prevalent GC Interactions

The following selection guidelines can be a starting point for choosing Zebtron® columns in common selectivities. Please contact your Phenomenex representative for additional assistance.

### Dispersive Forces (Van der Waals Interactions)

- Weakest of all intermolecular forces and occurs between non-polar compounds
- Separation is based on boiling point (classic example – hydrocarbon separation in SimDist analysis)

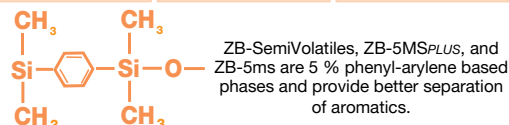
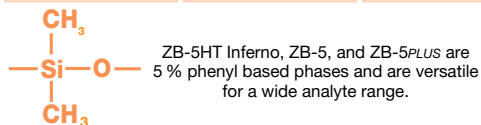
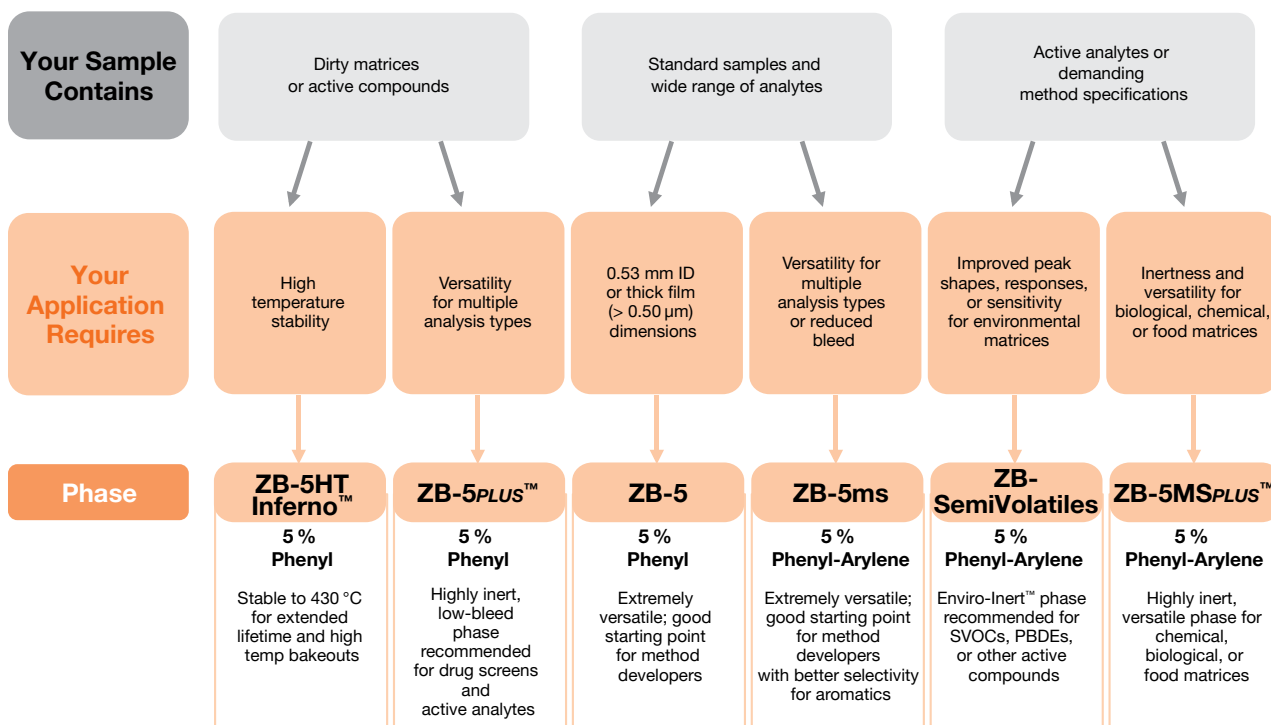
### Dipole-Dipole Interactions

- Either permanently present or induced by analyte-stationary phase interactions
- Higher dipole-dipole interaction can help separate compounds with similar boiling points, but different chemical structures

### Hydrogen Bonding (Acid-Base Interactions)

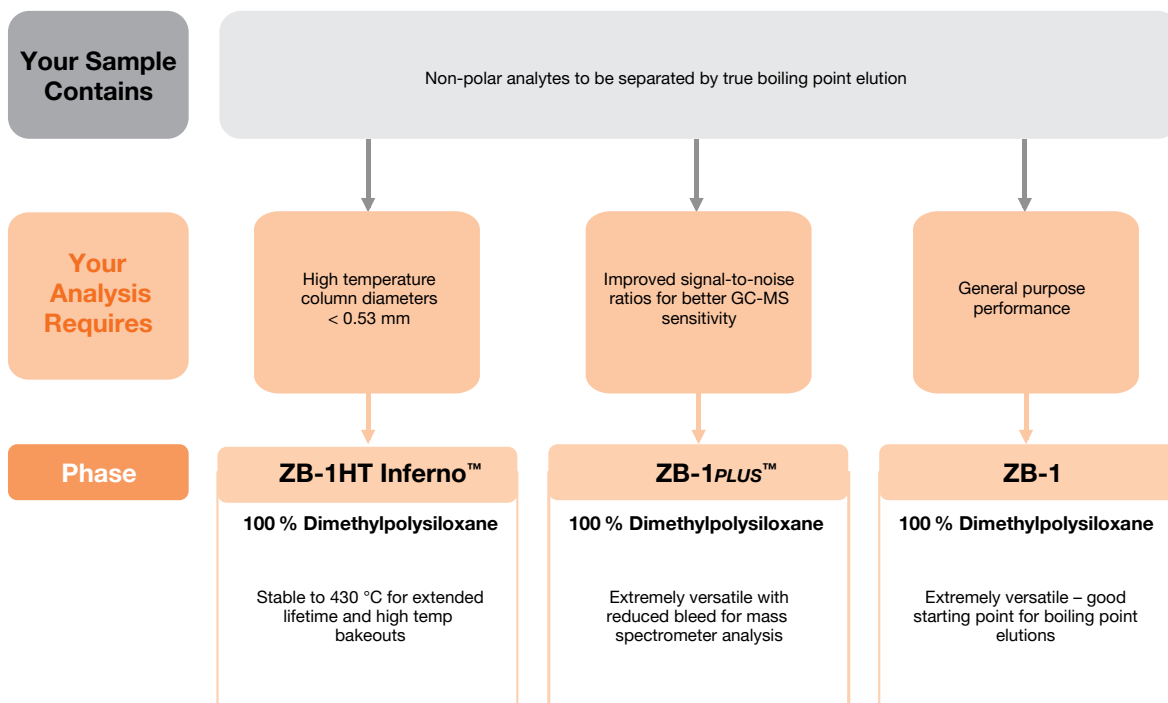
- Can cause poor peak shape or irreversible binding to the inlet liner or to the column itself
- Zebtron columns are specially deactivated to minimize these interactions

## Choosing A “5” Phase

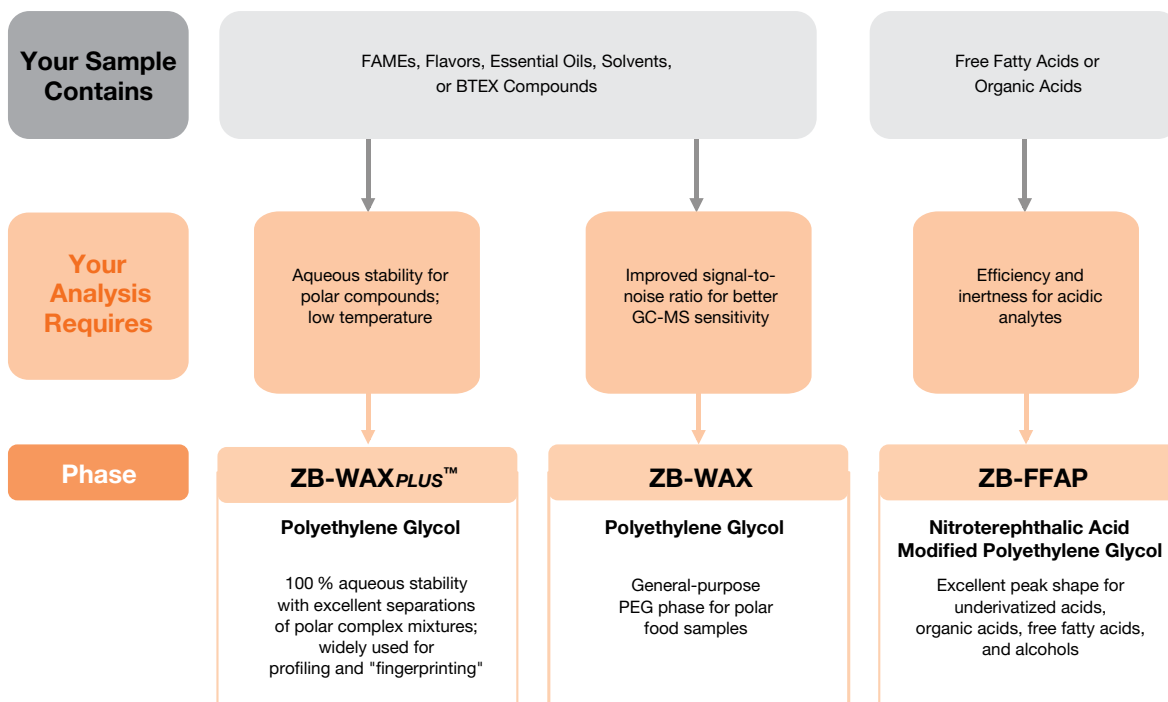


# Choosing Your Selectivity

## Choosing A “1” Phase



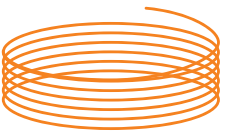
## Choosing A “PEG” Phase



# Choosing Your Dimensions

## Length

Longer columns can improve resolution, but they will also increase run times. Under isothermal conditions, doubling column length only increases resolution by 41 %, but doubles the run time! Choose a column length that balances efficiency with acceptable run times.

| Short   | Good Starting Length  | Long  |
|---|---|---|
| 15 m or less  | 30 m  | 60 m or more  |
| <p><b>Applications</b></p> <ul style="list-style-type: none"><li>• High boilers</li><li>• GC-MS applications</li></ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"><li>• Faster run times</li><li>• Higher temp. limits</li><li>• Lower bleed</li><li>• Higher efficiency</li></ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"><li>• Less inert</li><li>• Limited retention</li></ul> | <p>30 m</p>  | <p><b>Applications</b></p> <ul style="list-style-type: none"><li>• Complex samples with closely eluting peaks</li><li>• Low boilers</li><li>• Less active samples</li><li>• Complex temperature ramps</li></ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"><li>• Better resolution</li></ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"><li>• Slow run times</li></ul> |

## Try The GC Column Finder!

Easily select a column by part number, manufacturer, industry, application, or official method **in under 1 minute.**

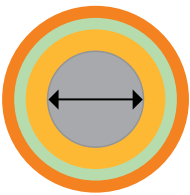


[www.phenomenex.com/FindGC](http://www.phenomenex.com/FindGC)

# Choosing Your Dimensions

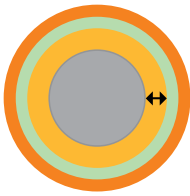
## Internal Diameter

Column internal diameter (ID) has a major impact on both resolution and sample capacity. Unlike column length, using smaller ID columns can actually lead to faster run times, because the column length required with a small ID is often shorter due to increased efficiency.

| Narrow   | Good Starting ID  | Wide  |
|--|---|---|
| 0.10, 0.18, 0.20 mm  | 0.25 mm   | 0.32, 0.53 mm   |
| <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Complex samples</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Faster run times</li> <li>• Better resolution</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• Lower sample capacity</li> <li>• Easily overloaded</li> </ul> |  | <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Dirty samples</li> <li>• Highly concentrated samples</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Increased sample capacity</li> <li>• Good for on-column injections</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• Decreased efficiency</li> <li>• May need higher flow rates unsuitable for GC-MS</li> </ul> |

## Film Thickness

Film thickness determines solute retention and plays an important role in column sample capacity. Thin film columns are faster and provide higher resolution, but lower sample capacity. In most instances, choose the thinnest film possible that still provides adequate retention. When working with active samples, using a slightly thicker film can significantly improve peak shape.

| Thin   | Good Starting Film  | Thick  |
|--|---|--|
| 0.10, 0.18 $\mu\text{m}$   | 0.25 $\mu\text{m}$  | 0.50 $\mu\text{m}$ or more   |
| <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• High boilers</li> <li>• GC-MS applications</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Faster run times</li> <li>• Higher temp. limits</li> <li>• Lower bleed</li> <li>• Higher efficiency</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• Less inert</li> <li>• Limited retention</li> </ul> |  | <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Low boilers</li> <li>• Gases, solvents, purgeables, volatiles</li> <li>• Purity testing</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Better inertness</li> <li>• Higher capacity</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• Slow run times</li> <li>• Lower temp. limits</li> <li>• Higher bleed</li> </ul> |

# Our Quality Guarantee

## Zebtron® Columns Are Guaranteed To Perform

Our GC R&D and production team has on average 25+ years of GC experience, and many spent years creating keystone phases at J&W Scientific prior to joining the Phenomenex team. This expertise means Zebtron products are designed to work out-of-the-box, headache free. We guarantee it.

- **Stringent individual QC testing – no batch tests**
- **Aggressive test mixes that check for efficiency, bleed, activity, and retention characteristics**
- **Excellent sensitivity and high temperature stability**
- **Good stability and long column lifetimes**

## Our 100% Risk-Free Guarantee

guarantee

If Zebtron 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.



**JIM ARCHER**

*VP of GC R&D and Manufacturing  
11 Years J&W Scientific  
25+ Years GC Experience*



# Cross-Reference by Manufacturer

## Upgrade to Zebron!



Our commitment to quality and innovation is what makes Zebron GC columns well-suited for any application. Performance is GUARANTEED.

| Zebron® Phase       | Zebron Composition                                  | Restek®  | Agilent®  | Supelco®  | SGE®                     | OV           |
|---------------------|---|--|---|---|--------------------------|--------------|
| ZB-1                | 100% Dimethylpolysiloxane                           | Rtx®-1, Rtx-1PONA, Rtx-1 F&F                     | DB®-1, DB-2887, DB-1 EVDX, HP-1, HP-101, HP-PONA, Ultra 1, CP-Sil 5 CB                  | SPB®-1, SPB-1 TG, SE-30, MET-1, SPB-1 Sulfur, SPB-HAP | BP1, BP1-PONA, BPX1-SimD | OV-1         |
| ZB-1 PLUS™          | 100% Dimethylpolysiloxane                           | Rtx-1ms, Rxi®-1ms                                | DB-1ms, DB-1ms Ultra Inert, HP-1ms, HP-1ms Ultra Inert, CP-Sil 5 CB MS, VF-1ms          | MDN-1, Equity®-1                                      | SolGel-1ms™              |              |
| ZB-1HT Inferno™     | 100% Dimethylpolysiloxane                           | Rxi-1HT  | DB-1ht, CP-SimDist  | Petrocol 2887   |                          |              |
| ZB-1XT SimDist      | 100% Dimethylpolysiloxane                           | MXT®-1HT SimDist, MXT-1, MXT-1 SimDist, MXT-2887 | CP-SimDist UltiMetal, CP-Sil 8 CB UltiMetal, BPX1-SimD, DB-HT SimDis, DB-PS1, DB-PS2887 |   |                          |              |
| ZB-5                | 5% Phenyl<br>95% Dimethylpolysiloxane               | Rtx-5  | DB-5, HP-5, Ultra 2, HP-PAS-5, CP-Sil 8 CB  | MDN-5, SPB-5, PTE-5, SE-54, PTA-5, Equity-5, Sac-5    | BP5, BPX5                | OV-5         |
| ZB-5 PLUS™          | 5% Phenyl<br>95% Dimethylpolysiloxane               | Rtx-5ms, Rxi-5ms, Rtx-5Amine                     | DB-5, HP-5ms, HP-5msi   | MDN-5S  |                          |              |
| ZB-5HT Inferno      | 5% Phenyl<br>95% Dimethylpolysiloxane               | Rxi-5HT, Rtx-5HT, Stx®-5HT, XTI®-5HT             | DB-5ht, VF-5ht  | HT-5  |                          |              |
| ZB-5ms              | 5% Phenyl-Arylene<br>95% Dimethylpolysiloxane       | Rtx-5SII MS, Rxi-5SII MS                         | DB-5ms, DB-5.625, DB-5ms EVDX, VF-5ms, CP-Sil 8 CB MS                                   |   |                          |              |
| ZB-5MS PLUS™        | 5% Phenyl-Arylene<br>95% Dimethylpolysiloxane       | Rxi-5SII MS                                      | DB-5ms Ultra Inert, HP-5ms Ultra Inert, DB-5ms, VF-5ms                                  | SLB®-5ms  |                          |              |
| ZB-SemiVolatiles    | 5% Phenyl-Arylene<br>95% Dimethylpolysiloxane       | Rxi-5SII MS, Rxi-5ms                             | DB-5ms Ultra Inert, HP-5ms Ultra Inert  | SLB-5ms   |                          |              |
| ZB-35               | 35% Phenyl<br>65% Dimethylpolysiloxane              | Rtx-35, Rtx-35ms                                 | DB-35, DB-35ms, HP-35, HP-35ms  | MDN-35, SPB-35, SPB-608                               | BPX35, BPX608            | OV-11        |
| ZB-35HT Inferno     | 35% Phenyl<br>65% Dimethylpolysiloxane              |  |   | Phenomenex Exclusive                                  |                          |              |
| ZB-50               | 50% Phenyl<br>50% Dimethylpolysiloxane              | Rtx-50   | DB-17, DB-17HT, DB-17ms, DB-17 EVDX, HP-50+, CP-Sil 24 CB                               | SP-2250, SPB-17, SPB-50                               | BPX50                    | OV-17        |
| ZB-624              | 6% Cyanopropylphenyl<br>94% Dimethylpolysiloxane    | Rtx-1301, Rtx-624                                | DB-1301, DB-624, DB-VRX, HP-VOC, CP-1301, CP-Select 624 CB                              | SPB-1301, SPB-624                                     | BP624                    | OV-624       |
| ZB-1701             | 14% Cyanopropylphenyl<br>86% Dimethylpolysiloxane   | Rtx-1701   | DB-1701, CP-Sil 19 CB   | SPB-1701, Equity-1701                                 | BP10                     | OV-1701      |
| ZB-1701P            | 14% Cyanopropylphenyl<br>86% Dimethylpolysiloxane   |  | DB-1701P  |   |                          |              |
| ZB-23               | 50% Cyanopropyl<br>50% Methylpolysiloxane           | Rtx-2330   | DB-23   | SP®-2330  |                          |              |
| ZB-88               | 88% Cyanopropyl<br>12% Arylpolysiloxane             | Rt®-2560   | CP-Sil 88, HP-88  | SP-2560   |                          |              |
| ZB-FAME             | High Cyanopropyl                                    |  | CP-Sil 88   | SP®-2560, SP-2380                                     |                          |              |
| ZB-WAX              | Polyethylene Glycol                                 | Rtx-WAX, Famewax, Stabilwax-DB                   | DB-WAXetr, HP-INNOWax, CP-Wax 57 CB   | MET-Wax, Omegawax                                     | SolGel-WAX™              |              |
| ZB-WAX PLUS™        | Polyethylene Glycol                                 | Stabilwax®                                       | DB-WAX, CAM, HP-20M, Carbowax 20M, CP-Wax 52 CB   | SUPELCOWAX® 10  | BP20                     | Carbowax 20M |
| ZB-FFAP             | Nitroterephthalic Acid Modified Polyethylene Glycol | Stabilwax-DA                                     | DB-FFAP, HP-FFAP, CP-Wax 58 FFAP CB, CP-FFAP CB   | Nukol, SPB-1000                                       | BP21                     | OV-351       |
| ZB-MultiResidue™ -1 | Proprietary   | Rtx-CLPesticides, Stx-CLPesticides               |   |   |                          |              |
| ZB-MultiResidue-2   | Proprietary   | Rtx-CLPesticides2, Stx-CLPesticides2             |   |   |                          |              |
| ZB-CLPesticides-1   | Proprietary   | Rtx-CLPesticides, Stx-CLPesticides               |   |   |                          |              |
| ZB-CLPesticides-2   | Proprietary   | Rtx-CLPesticides2, Stx-CLPesticides2             |   |   |                          |              |
| ZB-PAH              | Proprietary   | Rxi-PAH  | DB-EUPAH  |   |                          |              |
| ZB-XLB              | Proprietary   | Rtx-XLB  | DB-XLB, VF-XMS  | MDN-12  |                          |              |
| ZB-XLB-HT Inferno   | Proprietary   |  |   | Phenomenex Exclusive                                  |                          |              |
| ZB-Drug-1           | Proprietary   |  |   | Phenomenex Exclusive                                  |                          |              |
| ZB-BAC-1            | Proprietary   | Rtx-BAC1   | DB-ALC1   |   |                          |              |
| ZB-BAC-2            | Proprietary   | Rtx-BAC2   | DB-ALC2   |   |                          |              |
| ZB-Bioethanol       | Proprietary   |  |   | Phenomenex Exclusive                                  |                          |              |

This section is, neither in terms of manufacturers nor in terms of their products, a complete list, and the accuracy of the data is not guaranteed. Small differences in dimensions or performance might be possible and slight adjustments to your application may be necessary.

# Environmental Selection Chart


Listed below are recommended Zebron columns for environmental and EPA methods. Other columns may also be used for these analyses — please contact Phenomenex for your specific GC column needs.

| Drinking Water  | Method #  | Description  | Primary Column   | Confirmation Column                    | Page                |      |
|---|---|--|--|--|---------------------|------|
|  | 501.3   | Trihalomethanes by GC-MS with Selected Ion Monitoring (SIM)  | ZB-624   |  | 158                 |      |
|   | 502.2   | Volatile Halogenated Organics by Purge & Trap GC/PID/ELCD  | ZB-624   |  | 158                 |      |
|   | 503.1   | Volatile Aromatics and Unsaturated Organics by Purge & Trap GC   | ZB-624   |  | 158                 |      |
|   | 504.1   | 1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP) by GC | ZB-CLPesticides-1<br>ZB-MultiResidue™-1                      | ZB-CLPesticides-2<br>ZB-MultiResidue-2 | 112<br>118          |      |
|   | 505   | Organohalide Pesticides & Aroclors by GC-ECD   | ZB-CLPesticides-1<br>ZB-MultiResidue-1                       | ZB-CLPesticides-2<br>ZB-MultiResidue-2 | 112<br>118          |      |
|   | 507   | Nitrogen & Phosphorus Containing Pesticides by GC/NPD  | ZB-MultiResidue-1<br>ZB-CLPesticides-2                       | ZB-MultiResidue-2<br>ZB-CLPesticides-2 | 118<br>112          |      |
|   | 508   | Chlorinated Pesticides by GC-ECD   | ZB-CLPesticides-1<br>ZB-MultiResidue-1                       | ZB-CLPesticides-2<br>ZB-MultiResidue-2 | 112<br>118          |      |
|   | 509   | Ethylene Thiourea (ETU) by GC/NPD  | ZB-WAXPLUS™  | ZB-1701                                | 136, 160            |      |
|   | 513   | 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin by GC/HRMS  | ZB-SemiVolatiles   |  | 104                 |      |
|   | 515.3   | Chlorinated Acids by Liquid-Liquid Extraction, Derivatization and GC-ECD                               | ZB-XLB   | ZB-35                                  | 168, 154            |      |
|   | 521   | Nitrosamines by Solid Phase Extraction (SPE) and GC-MS/MS with Large Volume Injection                  | ZB-SemiVolatiles   |  | 104                 |      |
|   | 522   | 1,4-Dioxane by Solid Phase Extraction (SPE) and GC-MS with Selected Ion Monitoring (SIM)               | ZB-SemiVolatiles   |  | 104                 |      |
|   | 523   | Triazine Pesticides and their Degradates by GC-MS  | ZB-50  |  | 156                 |      |
|   | 524.3   | Purgeable Organic Compounds by GC-MS   | ZB-624   |  | 158                 |      |
|   | 525.2   | Semi-volatile Organic Chemicals by Solid Phase Extraction (SPE) and GC-MS                              | ZB-SemiVolatiles   |  | 104                 |      |
|   | 526   | Selected Semi-volatile Organic Compounds by Solid Phase Extraction (SPE) and GC-MS                     | ZB-SemiVolatiles   |  | 104                 |      |
|   | 527   | Selected Pesticides and Flame Retardants by Solid Phase Extraction (SPE) and GC-MS                     | ZB-5PLUS™  |  | 132                 |      |
|   | 528   | Phenols by Solid Phase Extraction (SPE) and GC-MS  | ZB-SemiVolatiles   | ZB-35                                  | 104, 154            |      |
|   | 529   | Explosives and Related Compounds by Solid Phase Extraction (SPE) and GC-MS                             | ZB-5PLUS™  |  | 132                 |      |
|   | 548   | Endothall by Aqueous Derivatization, Liquid-Solid Extraction, and GC-ECD                               | ZB-SemiVolatiles   | ZB-35                                  | 104, 154            |      |
|   | 551.1   | Chlorinated Solvents & Disinfection Byproducts by Liquid-Liquid Extraction and GC-ECD                  | ZB-35  |  | 154                 |      |
|   | 552.3   | Haloacetic Acids and Dalapon by Liquid-Liquid Extraction, Derivatization, and GC-ECD                   | ZB-CLPesticides-1<br>ZB-XLB                                  | ZB-CLPesticides-2                      | 112<br>168, 154     |      |
|   | 556   | Carbonyl Compounds by Pentafluorobenzylhydroxylamine Derivatization and GC-ECD                         | ZB-SemiVolatiles   | ZB-1701                                | 104, 160            |      |
|   | Waste Water   | Method #   | Description  | Primary Column                         | Confirmation Column | Page |
|   |  | 601  | Purgeable Halocarbons by Purge & Trap GC                     | ZB-624                                 |                     | 158  |
| 602   |   | Purgeable Aromatics by Purge & Trap GC   | ZB-624   |  | 158                 |      |
| 603   |   | Acrolein & Acrylonitrile Purge & Trap GC   | ZB-624   |  | 158                 |      |
| 604   |   | Phenols by GC-ECD  | ZB-SemiVolatiles   |  | 104                 |      |
| 606   |   | Phthalate Esters by GC-ECD   | ZB-5PLUS™  |  | 132                 |      |
| 607   |   | Nitrosamines by GC/NPD   | ZB-SemiVolatiles   |  | 104                 |      |
| 608   |   | Organochlorine Pesticides and PCBs by GC-ECD   | ZB-MultiResidue-1  | ZB-MultiResidue-2                      | 118                 |      |
| 609   |   | Nitroaromatics & Isophorone by GC-FID and GC-ECD   | ZB-SemiVolatiles   |  | 104                 |      |
| 610   |   | Polynuclear Aromatic Hydrocarbons by GC-FID  | ZB-SemiVolatiles   |  | 104                 |      |
| 611   |   | Haloethers by GC-ECD   | ZB-SemiVolatiles   |  | 104                 |      |
| 612   |   | Chlorinated Hydrocarbons by GC-ECD   | ZB-SemiVolatiles   |  | 104                 |      |
| 613   |   | 2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC-MS   | ZB-SemiVolatiles   |  | 104                 |      |
| 615   |   | Chlorinated Herbicides by GC-ECD   | ZB-CLPesticides-1<br>ZB-XLB                                  | ZB-CLPesticides-2<br>ZB-35             | 112<br>168, 154     |      |
| 619   |   | Triazine Herbicides by GC-MS   | ZB-50  |  | 156                 |      |
| 622   |   | Organophosphorus Pesticides by GC-MS   | ZB-MultiResidue-1  |  | 118                 |      |
| 624   |   | Purgeable Volatiles by Purge & Trap GC-MS  | ZB-624   |  | 158                 |      |
| 625   |   | Base/Neutral and Acids by GC-MS  | ZB-SemiVolatiles   |  | 104                 |      |
| 1613  |   | Tetra- through Octa-Chlorinated Dioxins & Furans by Isotope Dilution HRGC/HRMS                         | ZB-SemiVolatiles   |  | 104                 |      |
| 1614  |   | Polybrominated Diphenyl Esters (PBDEs) by HRGC/HRMS  | ZB-5HT Inferno™<br>ZB-SemiVolatiles                          |  | 140<br>104          |      |
| 1618  |   | Organohalide Pesticides, Organophosphorus Pesticides, and Phenoxy-Acid Herbicides by GC                | ZB-MultiResidue-1  | ZB-MultiResidue-2                      | 118                 |      |
| 1624  |   | Volatile Organic Compounds by Isotope Dilution GC-MS   | ZB-624   |  | 158                 |      |
| 1625  |   | Semi-volatile Organic Compounds by Isotope Dilution GC-MS  | ZB-SemiVolatiles   |  | 104                 |      |
| 1653  |   | Chlorinated Phenols by In-Situ Acetylation and GC-MS   | ZB-SemiVolatiles   |  | 104                 |      |
| 1657  |   | Organophosphorus Pesticides by GC/FPD  | ZB-MultiResidue-1  | ZB-MultiResidue-2                      | 118                 |      |
| 1658  |   | Phenoxy-Acid Herbicides by GC-ECD  | ZB-MultiResidue-1  | ZB-MultiResidue-2                      | 118                 |      |
| 1659  |   | Dazomet by GC/NPD  | ZB-MultiResidue-1  | ZB-MultiResidue-2                      | 118                 |      |
| 1666  |   | Pharmaceutical Volatile Organic Compounds by Purge & Trap GC or Isotope Dilution GC-MS                 | ZB-SemiVolatiles (Direct Injection)<br>ZB-624 (Purge & Trap) |  | 104<br>158          |      |
| 1668  |   | Polychlorinated Biphenyl (PCB) Congeners by HRGC/HRMS  | ZB-MultiResidue-1  | ZB-1                                   | 118, 146            |      |
| 1671  |   | Pharmaceutical Manufacturing Volatile Organic Compounds by GC-FID                                      | ZB-1   |  | 146                 |      |
| 7850  |   | White Phosphorus (P4) by Solvent Extraction and GC/NPD   | ZB-1   |  | 146                 |      |

# Environmental Selection Chart

Listed below are recommended Zebron columns for environmental and EPA methods. Other columns may also be used for these analyses — please contact Phenomenex for your specific GC column needs.

| Solid Waste   | Method # | Description  | Primary Column                                       | Confirmation Column                    | Page            |
|---|----------|--|--|--|-----------------|
|  | 8010B    | Halogenated Volatile Organics by GC/ELCD   | ZB-624   |  | 158             |
|   | 8015C    | Nonhalogenated Organics by GC  | ZB-5HT   |  | 140             |
|   | 8020A    | Aromatic Volatile Organics by GC/PID   | ZB-WAX,<br>ZB-WAX <sub>PLUS</sub> <sup>™</sup>       |  | 164<br>136      |
|   | 8021B    | Aromatic and Halogenated Volatiles by GC/PID or GC/ELCD  | ZB-624   | ZB-1 (thick phase)                     | 158, 146        |
|   | 8030A    | Acrolein and Acrylonitrile by GC-FID   | ZB-624   |  | 158             |
|   | 8032A    | Acrylamide by GC-ECD   | ZB-5HT Inferno <sup>™</sup>                          |  | 140             |
|   | 8041     | Phenols by GC-ECD or GC-FID  | ZB-SemiVolatiles                                     |  | 104             |
|   | 8061A    | Phthalate Esters by GC-ECD   | ZB-SemiVolatiles                                     | ZB-1701                                | 104, 160        |
|   | 8081B    | Organochlorine Pesticides by GC-ECD  | ZB-MultiResidue <sup>™</sup> -1<br>ZB-CLPesticides-1 | ZB-MultiResidue-2<br>ZB-CLPesticides-2 | 118<br>112      |
|   | 8082A    | Polychlorinated Biphenyls (PCBs) by GC-ECD   | ZB-MultiResidue-1<br>ZB-CLPesticides-1               | ZB-MultiResidue-2<br>ZB-CLPesticides-2 | 118<br>112      |
|   | 8091     | Nitroaromatics and Cyclic Ketones by GC-ECD or GC/NPD  | ZB-SemiVolatiles                                     | ZB-1701                                | 104, 160        |
|   | 8095     | Explosives by GC-ECD   | ZB-50  |  | 156             |
|   | 8100     | Polynuclear Aromatic Hydrocarbons by GC-FID  | ZB-SemiVolatiles, ZB-PAH,<br>ZB-35                   |  | 104, 110<br>154 |
|   | 8121     | Chlorinated Hydrocarbons by GC-ECD   | ZB-MultiResidue-1                                    | ZB-MultiResidue-2                      | 118             |
|   | 8131     | Aniline and Selected Derivatives by GC/NPD   | ZB-SemiVolatiles                                     | ZB-1                                   | 104, 146        |
|   | 8141B    | Organophosphorus Pesticides by GC/FPD or GC/NPD  | ZB-MultiResidue-1<br>ZB-CLPesticides-1               | ZB-MultiResidue-2<br>ZB-CLPesticides-2 | 118<br>112      |
|   | 8151A    | Chlorinated Herbicides by GC-ECD   | ZB-CLPesticides-1<br>ZB-XLB                          | ZB-CLPesticides-2<br>ZB-35             | 112<br>168, 154 |
|   | 8260B    | Volatile Organic Compounds by GC-MS  | ZB-624   |  | 158             |
|   | 8270D    | Semi-volatile Organic Compounds by GC-MS   | ZB-SemiVolatiles                                     |  | 104             |
|   | 8272     | Polynuclear Aromatic Hydrocarbons (PAHs) by SPME and GC-MS with Selected Ion Monitoring (SIM)    | ZB-SemiVolatiles,<br>ZB-35, ZB-PAH                   |  | 104<br>154, 110 |
|   | 8280B    | Polychlorinated Dibenzo-P-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) By HRGC/LRMS | ZB-SemiVolatiles                                     |  | 104             |
|   | 8290A    | Polychlorinated Dibenzo-P-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) By HRGC/HRMS | ZB-SemiVolatiles                                     |  | 104             |
|   | 8410     | Semi-Volatile Organic Compounds by GC/FTIR   | ZB-SemiVolatiles                                     |  | 104             |
|   | 8430     | Bis(2-chloroethyl) Ether and Hydrolysis Products by Direct Aqueous Injection GC/FT-IR            | ZB-WAX <sub>PLUS</sub>                               |  | 136             |

| Air   | Method # | Description  | Primary Column                    | Page |
|---|----------|--|-----------------------------------|------|
|  | TO-1     | Volatile Organic Compounds by Thermal Adsorption and GC-MS   | ZB-1 <sub>PLUS</sub> <sup>™</sup> | 130  |
|   | TO-2     | Volatile Organic Compounds by Carbon Molecular Sieve Adsorption and GC-MS                                    | ZB-1 <sub>PLUS</sub>              | 130  |
|   | TO-3     | Volatile Organic Compounds by Cryogenic Preconcentration Techniques and GC-FID /ECD                          | ZB-1 <sub>PLUS</sub>              | 130  |
|   | TO-4A    | Pesticides and Polychlorinated Biphenyls (PCBs) by High Volume Polyurethane Foam (PUF) Sampling and GC       | ZB-MultiResidue-1                 | 118  |
|   | TO-7     | N-Nitrosodimethylamine by GC-MS  | ZB-WAX <sub>PLUS</sub>            | 136  |
|   | TO-9A    | Polychlorinated, Polybrominated, and Brominated/Chlorinated Dibenzo-p-Dioxins and Dibenzofurans by HRGC/HRMS | ZB-SemiVolatiles                  | 104  |
|   | TO-10A   | Pesticides and Polychlorinated Biphenyls (PCBs) by Low Volume Polyurethane Foam (PUF) Sampling and GC        | ZB-MultiResidue-1                 | 118  |
|   | TO-13A   | Polycyclic Aromatic Hydrocarbons (PAHs) by GC-MS   | ZB-SemiVolatiles                  | 104  |
|   | TO-14A   | Volatile Organic Compounds by Specially Prepared Canisters and GC  | ZB-1 <sub>PLUS</sub>              | 130  |
|   | TO-15    | Volatile Organic Compounds by Specially Prepared Canisters and GC-MS   | ZB-1 <sub>PLUS</sub>              | 130  |

# Food & Flavors Selection Chart

Listed below are recommended Zebron columns for food safety, food quality, and flavor/fragrance methods. Other columns may also be used for these analyses — please contact Phenomenex for your specific GC column needs.

| Food Safety   | Compound Class   | Analysis   | Recommended Columns                            | Page  |
|---|--|--|--|---|
|  | <b>Pesticides &amp; Antimicrobials</b>                   | Multi-Residue Pesticide Screening                    | ZB-MultiResidue™-1 and -2                      | 118   |
|   |  | Organochlorine Pesticides in Water                   | ZB-MultiResidue-1 and -2                       | 118   |
|   |  | Organochlorine Pesticides in Foods of Plant Origin   | ZB-MultiResidue-1 and -2                       | 118   |
|   |  | Organophosphorus Pesticides in Foods of Plant Origin | ZB-MultiResidue-1 and -2                       | 118   |
|   |  | Triazine Pesticides in Water                         | ZB-50  | 156   |
|   |  | Triazine Pesticides in Foods of Plant Origin         | ZB-50  | 156   |
|   |  | Chloramphenicol in Foods of Animal Origin            | ZB-1 <sup>PLUS</sup> ™                         | 130   |
|   |  | <b>Environmental Contaminants</b>                    | Polybrominated Diphenyl Ethers (PBDEs) in Food | ZB-5MS <sup>PLUS</sup> ™, ZB-SemiVolatiles, ZB-35 |
| Polychlorinated Biphenyls (PCBs) in Water   | ZB-MultiResidue-1, ZB-XLB-HT Inferno™                    |  | 118, 144                                       |   |
| Polychlorinated Dibenzo-dioxins (PCDDs) in Food                                   | ZB-5MS <sup>PLUS</sup> , ZB-SemiVolatiles                |  | 134, 104                                       |   |
| Polychlorinated Dibenzo-furans (PCDFs) in Food                                    | ZB-5MS <sup>PLUS</sup> , ZB-SemiVolatiles                |  | 134, 104                                       |   |
| Polycyclic Aromatic Hydrocarbons (PAHs) in Water                                  | ZB-5MS <sup>PLUS</sup> , ZB-SemiVolatiles, ZB-35, ZB-PAH |  | 134, 104, 154, 110                             |   |
| <b>Food Contact Materials</b>   | Food Packaging Volatiles                                 |  | ZB-624   | 104   |
|   | Melamine in Food   | ZB-XLB-HT Inferno                                    | 144  |   |
|   | Cyanuric Acid in Food                                    | ZB-XLB-HT Inferno                                    | 144  |   |
|   | Phthalates in Food                                       | ZB-5MS <sup>PLUS</sup>                               | 134  |   |
|   | Residual Solvents in Food                                | ZB-624, ZB-WAX <sup>PLUS</sup>                       | 158, 136                                       |   |
|   | Bisphenol A & F (BPA/BPF) in Food                        | ZB-5MS <sup>PLUS</sup>                               | 134  |   |
| <b>Additives &amp; Preservatives</b>  | Parabens in Food   | ZB-5MS <sup>PLUS</sup>                               | 134  |   |
|   | Chloropropanols (3-MCPD) in Food                         | ZB-5MS <sup>PLUS</sup>                               | 134  |   |
|   | Flavor Additives (Borneol)                               | ZB-MultiResidue-1                                    | 118  |   |
|   | Phenolic Antioxidants (BHA & BHT) in Food                | ZB-50  | 156  |   |
|   | Tocopherols in Food                                      | ZB-5MS <sup>PLUS</sup>                               | 134  |   |
| <b>Process Contaminants</b>   | Acrylamide in Foods                                      | ZB-5HT Inferno                                       | 140  |   |
|   | Acrylamide, Acrylonitrile, and Acrolein in Water         | ZB-624   | 158  |   |
|   | Benzene in Food  | ZB-WAX <sup>PLUS</sup>                               | 136  |   |
|   | Glycols in Food  | ZB-WAX <sup>PLUS</sup>                               | 136  |   |
| <b>Hormones</b>   | Steroid Hormones in Food                                 | ZB-5MS <sup>PLUS</sup> , ZB-1 <sup>PLUS</sup>        | 134, 130                                       |   |

## Try The GC Column Finder!


Easily select a column by part number, manufacturer, industry, application, or official method **in under 1 minute.**




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

# Food & Flavors Selection Chart


Listed below are recommended Zebron columns for food safety, food quality, and flavor/fragrance methods. Other columns may also be used for these analyses — please contact Phenomenex for your specific GC column needs.


| Food Quality  | Compound Class                 | Analysis  | Recommended Columns            | Page          |
|---|--------------------------------|---|--------------------------------|---------------|
|  | <b>Fatty Acids &amp; FAMES</b> | Food Industry Fatty Acid Methyl Esters (FAMES)              | ZB-FAME, ZB-23, ZB-88          | 102, 152, 153 |
|   |                                | Marine Oil Fatty Acid Methyl Esters (FAMES)                 | ZB-FAME, ZB-23                 | 102, 152      |
|   |                                | Saw Palmetto Fatty Acid Methyl Esters (FAMES)               | ZB-FAME, ZB-88                 | 102, 153      |
|   |                                | Free Fatty Acids  | ZB-FFAP                        | 166           |
|   |                                | Essential Fatty Acids (EFAs) Omega-3 and Omega-6            | ZB-FAME, ZB-88                 | 102, 153      |
|   | <b>Triglycerides</b>           | Butter, Canola Oil, Olive Oil, and Peanut Oil Triglycerides | ZB-5HT Inferno™                | 140           |
|   | <b>Alcoholic Beverages</b>     | Cognac Compounds  | ZB-WAX <sub>PLUS</sub> ™       | 136           |
|   |                                | Distilled Liquor Screen                                     | ZB-FFAP                        | 166           |
|   |                                | Ethanol in Beer   | ZB-Bioethanol                  | 122           |
|   |                                | Sulfur in Beer  | ZB-1 <sub>PLUS</sub> ™         | 130           |
|   |                                | Whiskey Compounds   | ZB-WAX <sub>PLUS</sub>         | 136           |
|   |                                | Wine Compounds  | ZB-WAX, ZB-WAX <sub>PLUS</sub> | 164, 136      |
|   | <b>Other Acids</b>             | Organic Acids   | ZB-FFAP                        | 166           |
|   |                                | Amino Acids   | ZB-50                          | 156           |
|   | <b>Sterols</b>                 | Sterols in Lard, Margarine, Peanut Butter, or Olive Oil     | ZB-5HT Inferno                 | 140           |
| <b>Sugars</b>   | Alditol Acetates               | ZB-5MS <sub>PLUS</sub> ™                                    | 134                            |               |
|   | Trimethylsilyl (TMS) Sugars    | ZB-MultiResidue™-1  | 118                            |               |

| Flavors & Fragrances   | Compound Class        | Analysis   | Recommended Columns                                    | Page                            |
|--|-----------------------|--|--|---------------------------------|
|  | <b>Essential Oils</b> | Cold-Pressed Orange Oil                              | ZB-WAX <sub>PLUS</sub>                                 | 136                             |
|  |                       | Ginkgo Biloba Oil, Lavender Oil, and Ylang Ylang Oil | ZB-1 <sub>PLUS</sub>                                   | 130                             |
|  |                       | Peppermint Oil                                       | ZB-WAX   | 164                             |
|  |                       | Rose Oil   | ZB-XLB   | 168                             |
|  |                       | Spearmint Oil  | ZB-5MS <sub>PLUS</sub>                                 | 134                             |
|  | <b>Flavors</b>        | Flavors Screening                                    | ZB-FFAP  | 166                             |
|  |                       | Flavor Allergens                                     | ZB-5MS <sub>PLUS</sub>                                 | 134                             |
|  |                       | Flavor Volatiles                                     | ZB-1 <sub>PLUS</sub> , ZB-WAX <sub>PLUS</sub> , ZB-624 | 130, 136, 158                   |
|  |                       | Alcoholic Beverage Profile                           | ZB-FFAP  | 166                             |
|  |                       | Honey Profile  | ZB-WAX <sub>PLUS</sub>                                 | 136                             |
|  |                       | <b>Fragrances</b>                                    | Fragrance Screening                                    | ZB-WAX <sub>PLUS</sub> , ZB-624 |
|  | Fragrance Allergens   |  | ZB-1 <sub>PLUS</sub>                                   | 130                             |

# Pharmaceutical Selection Chart

Listed below are recommended Zebtron columns for USP and pharmaceutical methods. Other columns may also be used for these analyses – please contact Phenomenex for your specific GC column needs.

| USP   | Phase Composition  | Recommended Columns   | Page          |
|---|--|---|---------------|
|  | G1 Dimethylpolysiloxane Oil  | ZB-1, ZB-1 <sup>PLUS</sup> <sup>™</sup> , ZB-1HT Inferno <sup>™</sup> | 146, 130, 138 |
|   | G2 Dimethylpolysiloxane Gum  | ZB-1, ZB-1 <sup>PLUS</sup> , ZB-1HT Inferno                           | 146, 130, 138 |
|   | G3 50 % Phenyl 50 % Methylpolysiloxane                                     | ZB-50   | 156           |
|   | G5 Not less than 70 % of 3-Cyanopropylpolysiloxane                         | ZB-FAME, ZB-23, ZB-88   | 102, 152, 153 |
|   | G8 80 % Bis (3-Cyanopropyl-20 % 3-Cyanopropylphenylpolysiloxane)           | ZB-FAME, ZB-23, ZB-88   | 102, 152, 153 |
|   | G9 Methylvinylpolysiloxane   | ZB-1 <sup>PLUS</sup> , ZB-1HT Inferno, ZB-1                           | 130, 138, 146 |
|   | G14 Polyethylene Glycol (Average MW 950-1,050)                             | ZB-WAX, ZB-WAX <sup>PLUS</sup> <sup>™</sup>                           | 164, 136      |
|   | G15 Polyethylene Glycol (Average MW 3,000-3,700)                           | ZB-WAX, ZB-WAX <sup>PLUS</sup>  | 164, 136      |
|   | G16 Polyethylene Glycol (Average MW 15,000)                                | ZB-WAX, ZB-WAX <sup>PLUS</sup>  | 164, 136      |
|   | G17 75 % Phenyl 25 % Methylpolysiloxane                                    | ZB-50   | 156           |
|   | G20 Polyethylene Glycol (Average MW of 380-420)                            | ZB-WAX, ZB-WAX <sup>PLUS</sup>  | 164, 136      |
|   | G25 Polyethylene Glycol TPA (Carbowax 20M Terephthalic Acid)               | ZB-FFAP   | 166           |
|   | G27 5 % Phenyl 95 % Methylpolysiloxane                                     | ZB-5, ZB-5 <sup>PLUS</sup> <sup>™</sup> , ZB-5HT Inferno              | 148, 132, 140 |
|   | 5 % Phenyl-Arylene 95 % Methylpolysiloxane                                 | ZB-5ms, ZB-5MS <sup>PLUS</sup> <sup>™</sup> , ZB-SemiVolatiles        | 150, 134, 104 |
|   | G28 25 % Phenyl 75 % Methylpolysiloxane                                    | ZB-35, ZB-35HT Inferno  | 154, 142      |
|   | G32 20 % Phenylmethyl 80 % Dimethylpolysiloxane                            | ZB-35, ZB-35HT Inferno  | 154, 142      |
|   | G35 Polyethylene Glycol & Diepoxide Esterified with Nitroterephthalic Acid | ZB-FFAP   | 166           |
|   | G36 1 % Vinyl 5 % Phenylmethylpolysiloxane                                 | ZB-5, ZB-5 <sup>PLUS</sup> , ZB-5HT Inferno                           | 148, 132, 140 |
|   | G38 Phase G1 Plus A Tailing Inhibitor                                      | ZB-1, ZB-1 <sup>PLUS</sup> , ZB-1HT Inferno                           | 146, 130, 138 |
|   | G39 Polyethylene Glycol (Average MW 1,500)                                 | ZB-WAX, ZB-WAX <sup>PLUS</sup> <sup>™</sup>                           | 164, 136      |
|   | G41 Phenylmethyldimethylsilicone (10 % Phenyl Substituted)                 | ZB-5, ZB-5 <sup>PLUS</sup> , ZB-5HT Inferno                           | 148, 132, 140 |
|   | G42 35 % Phenyl 65 % Dimethylpolysiloxane                                  | ZB-35, ZB-35HT Inferno  | 154, 142      |
|   | G43 6 % Cyanopropylphenyl 94 % Dimethylpolysiloxane                        | ZB-624  | 158           |
|   | G46 14 % Cyanopropylphenyl 86 % Methylpolysiloxane                         | ZB-1701, ZB-1701P   | 160, 162      |
|   | G47 Polyethylene glycol (average MW 8,000)                                 | ZB-WAX <sup>PLUS</sup> , ZB-WAX                                       | 136, 164      |
|   | G48 Highly polar, partially cross-linked cyanopolysiloxane                 | ZB-FAME, ZB-88  | 102, 153      |

| Residual Solvents   | USP <467> Procedure | USP Phase for Residual Solvents                 | Recommended Columns              | Page     |
|---|---------------------|---|----------------------------------|----------|
|  | Procedure A         | G43 (6 % Cyanopropyl 94 % Dimethylpolysiloxane) | ZB-624                           | 158      |
|   | Procedure B         | G16 (Polyethylene Glycol)                       | ZB-WAX <sup>PLUS</sup>           | 136      |
|   | Procedure C         | G43 or G16                                      | ZB-624 or ZB-WAX <sup>PLUS</sup> | 154, 136 |



Doing Headspace Testing?

Find the right headspace vial for your analysis and learn more about Verex Certified Vial Products with our interactive web tool.

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

# ASTM Method Selection Chart

Listed below are recommended Zebron columns for ASTM methods. Other columns may also be used for these analyses — please contact Phenomenex for your specific GC column needs.

| ASTM  | Method                        | Description   | Recommended Columns  | Page          |
|---|-------------------------------|---|--|---------------|
|  | D 1946                        | Reformed gas  | ZB-1   | 146           |
|   | D 2268                        | Analysis of n-heptane and iso-octane (high purity)                      | ZB-1   | 146           |
|   | D 2306-96                     | Xylene isomers  | ZB-WAX, ZB-WAX <sub>PLUS</sub> <sup>™</sup>                      | 164, 136      |
|   | D 2426                        | Butadiene and styrene in butadiene concentrates                         | ZB-1   | 146           |
|   | D 2504                        | Non-condensable gases in C1-C3 hydrocarbons                             | ZB-1 (thick phase)   | 146           |
|   | D 2580                        | Phenols in water  | ZB-WAX <sub>PLUS</sub>   | 136           |
|   | D 2600                        | Aromatic traces in light saturated hydrocarbons                         | ZB-WAX   | 164           |
|   | D 2804                        | Purity of methyl ethyl ketone   | ZB-WAX   | 164           |
|   | D 2887                        | SimDist analysis of petroleum fractions                                 | ZB-1, ZB-1XT SimDist   | 164, 124      |
|   | D 2908                        | Volatile organics in water  | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 2998                        | Polyhydric alcohols in alkyd resins                                     | ZB-1   | 146           |
|   | D 2999                        | Monopentaerythritol in commercial pentaerythritol                       | ZB-1   | 146           |
|   | D 3009                        | Composition of turpentine   | ZB-WAX <sub>PLUS</sub>   | 136           |
|   | D 3054                        | Purity and benzene content of cyclohexane                               | ZB-1   | 146           |
|   | D 3086                        | Organochlorine pesticides in water                                      | ZB-CLPesticides-1 or -2<br>ZB-MultiResidue <sup>™</sup> -1 or -2 | 112<br>118    |
|   | D 3168                        | Polymers in emulsion paints   | ZB-1   | 146           |
|   | D 3271                        | Solvent analysis in paints  | ZB-WAX <sub>PLUS</sub>   | 136           |
|   | D 3304                        | PCBs in environmental materials   | ZB-MultiResidue-1 or -2  | 118           |
|   | D 3328                        | Comparison of waterborne petroleum oils                                 | ZB-1   | 146           |
|   | D 3329                        | Purity of methyl isobutyl ketone  | ZB-WAX <sub>PLUS</sub>   | 136           |
|   | D 3432                        | Toluene diisocyanates in urethane prepolymers                           | ZB-1   | 146           |
|   | D 3447                        | Purity of trichlorotrifluoroethane (CFC-113)                            | ZB-1, ZB-624   | 146, 158      |
|   | D 3452                        | Identification of rubber  | ZB-1HT Inferno <sup>™</sup>                                      | 138           |
|   | D 3465                        | Purity of monomeric plasticizers  | ZB-1   | 146           |
|   | D 3524                        | Diesel fuel in lubricating oil (SAE 30)                                 | ZB-1HT Inferno   | 138           |
|   | D 3534                        | PCBs in water   | ZB-5, ZB-5 <sub>PLUS</sub> <sup>™</sup>                          | 148, 132      |
|   | D 3606                        | Benzene and toluene in gasoline   | ZB-1   | 146           |
|   | D 3687                        | Volatile organic compounds  | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 3710                        | Gasoline fractions  | ZB-1XT SimDist   | 124           |
|   | D 3725                        | Fatty acids in drying oils  | ZB-FFAP  | 166           |
|   | D 3760                        | Analysis of cumene  | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 3797                        | Analysis of o-xylene  | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 3798                        | Analysis of p-xylene impurities   | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 3876                        | Methoxyl and hydroxypropyl substitution in cellulose ether products     | ZB-1   | 146           |
|   | D 3962                        | Impurities in styrene   | ZB-FFAP  | 166           |
|   | D 4059                        | PCBs in insulating liquids  | ZB-5 <sub>PLUS</sub> , ZB-5HT Inferno                            | 132, 140      |
|   | D 4275                        | Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymers | ZB-1   | 146           |
|   | D 4367                        | Benzene in hydrocarbon solvent  | ZB-1   | 146           |
|   | D 4420                        | Aromatics in gasoline   | ZB-1   | 146           |
|   | D 4735                        | Thiophene impurities in benzene   | ZB-FFAP  | 166           |
|   | D 4768                        | Phenol and cresol inhibitors in insulating oils                         | ZB-FFAP  | 166           |
|   | D 5060                        | Impurities in ethylbenzene  | ZB-FFAP, ZB-WAX, ZB-WAX <sub>PLUS</sub>                          | 166, 164, 136 |
|   | D 5134                        | Petroleum naphthas through n-nonane                                     | ZB-1   | 146           |
|   | D 5135-95                     | Analysis of styrene   | ZB-WAX, ZB-WAX <sub>PLUS</sub>                                   | 164, 136      |
|   | D 5501                        | Determination of denatured bioethanol                                   | ZB-1, ZB-Bioethanol  | 146, 122      |
|   | D 5580                        | Aromatics in finished gasoline  | ZB-1   | 146           |
|   | D 6352                        | Extended SimDist  | ZB-1HT Inferno, ZB-1XT SimDist                                   | 138, 124      |
|   | D 6584                        | Determination of glycerine in biodiesel                                 | ZB-5HT Inferno   | 140           |
|   | D 7169                        | Crude Oil; Vacuum distillates   | ZB-1XT SimDist   | 124           |
|   | E 0202                        | Analysis of glycols   | ZB-WAX <sub>PLUS</sub> , ZB-1                                    | 136, 146      |
| E 1100  | Analysis of denatured ethanol | ZB-WAX <sub>PLUS</sub> , ZB-Bioethanol                                  | 136, 122   |               |



## Unlimited

Designed for the truly bold GC scientist, Unlimited phases unleash the power of selectivity for targeted performance that breaks from the mold.



## Plus

Plus phases offer a suite of upgrades compared to their Essentials counterparts – from exceptional inertness to enhanced aqueous stability.



## Inferno™

Resilient under even the most intense GC conditions, Inferno phases dare to defy high boilers, contaminants, and carry-overs.



## Essentials

A collection of tried-and-true selectivities, Essentials phases are the smart starting point for the GC method developer.



**Meet Your GC Column Family**.....100-101

**Zebron Unlimited**

**Food Testing**

ZB-FAME ..... 102

**Environmental Testing**

ZB-PAH ..... 110

ZB-SemiVolatiles ..... 104

ZB-CLPesticides-1 & -2 ..... 112

ZB-MultiResidue™ -1 & -2 ..... 118

**Fuels**

ZB-Bioethanol ..... 122

ZB-1XT SimDist ..... 124

**Forensics & Toxicology**

ZB-Drug-1 ..... 126

ZB-BAC-1 & -2 ..... 128

**Zebron Plus**

ZB-1<sup>PLUS</sup>™ ..... 130

ZB-5<sup>PLUS</sup>™ ..... 132

ZB-5MS<sup>PLUS</sup>™ ..... 134

ZB-WAX<sup>PLUS</sup>™ ..... 136

**Zebron Inferno™**

ZB-1HT Inferno ..... 138

ZB-5HT Inferno ..... 140

ZB-35HT Inferno ..... 142

ZB-XLB-HT Inferno ..... 144

**Zebron Essentials**

ZB-1 ..... 146

ZB-5 ..... 148

ZB-5ms ..... 150

ZB-23 ..... 152

ZB-35 ..... 154

ZB-50 ..... 156

ZB-88 ..... 153

ZB-624 ..... 158

ZB-1701 ..... 160

ZB-1701P ..... 162

ZB-WAX ..... 164

ZB-FFAP ..... 166

ZB-XLB ..... 168

**Zebron Guard Columns**

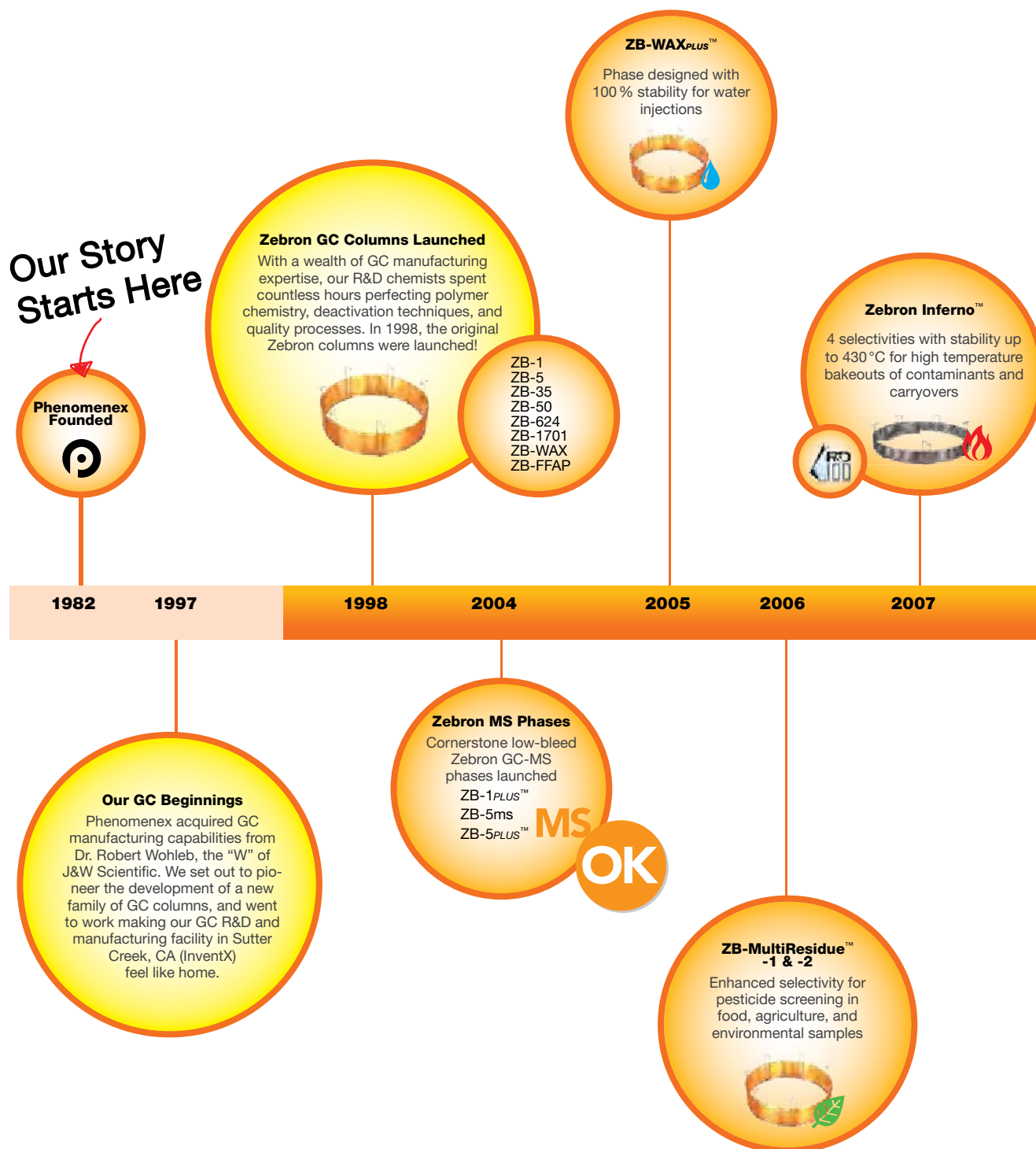
Guardian™ Integrated Guard Columns ..... 170

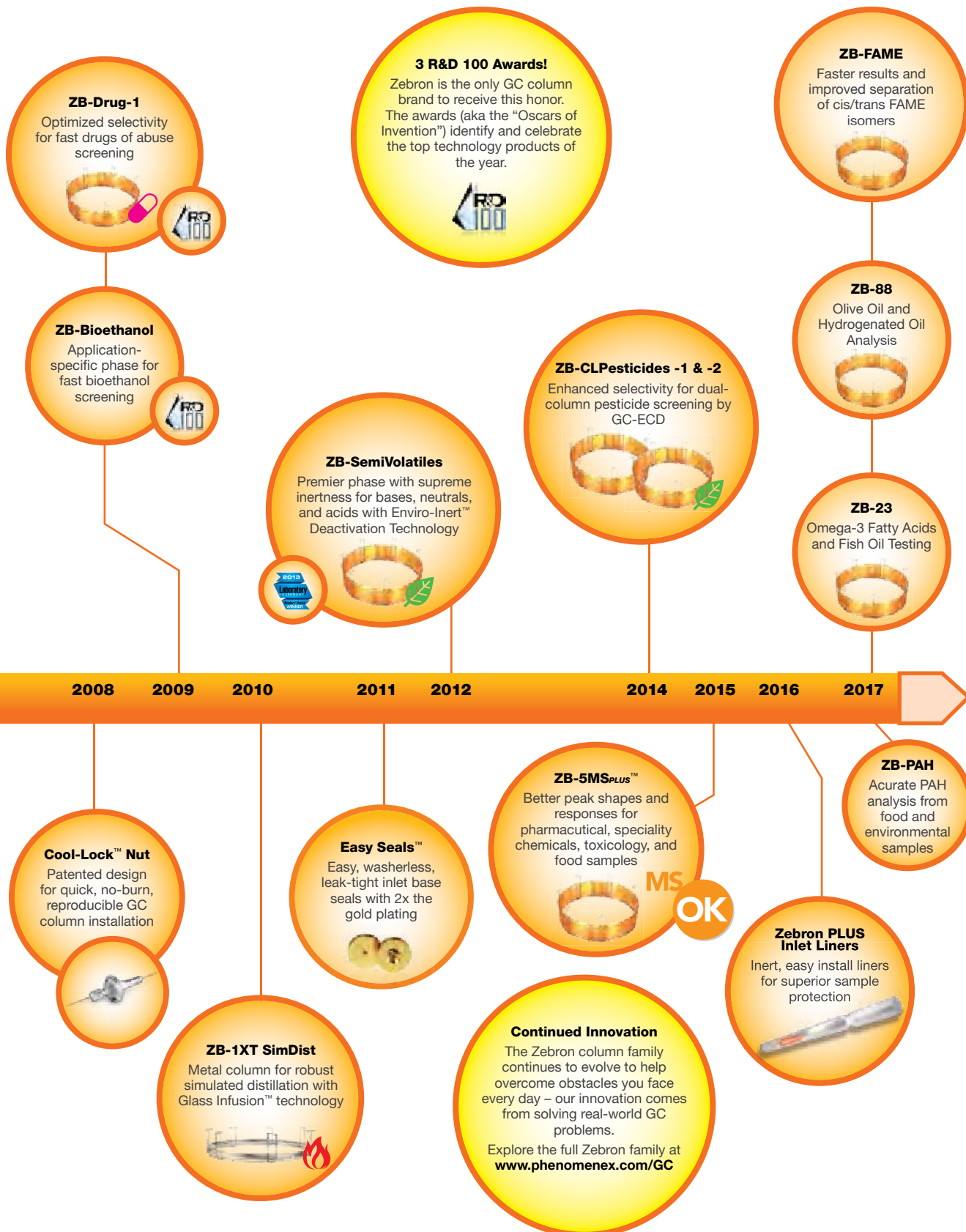
Z-Guard™ Columns ..... 171

# Your GC Column Family

Zebtron GC columns come to life through a coupling of innovative spirit and a strong foundation in technological excellence! Our expertise brings you award-winning innovations to GC technology

– meet your Zebtron GC column family!





## ZB-FAME

- Reduce traditional run times up to 75%
- Improve separation of cis/trans FAME isomers
- Suitable with AOAC, AOCS, and IOC methods

Upgrade to Zebron from any high cyanopropyl phase:

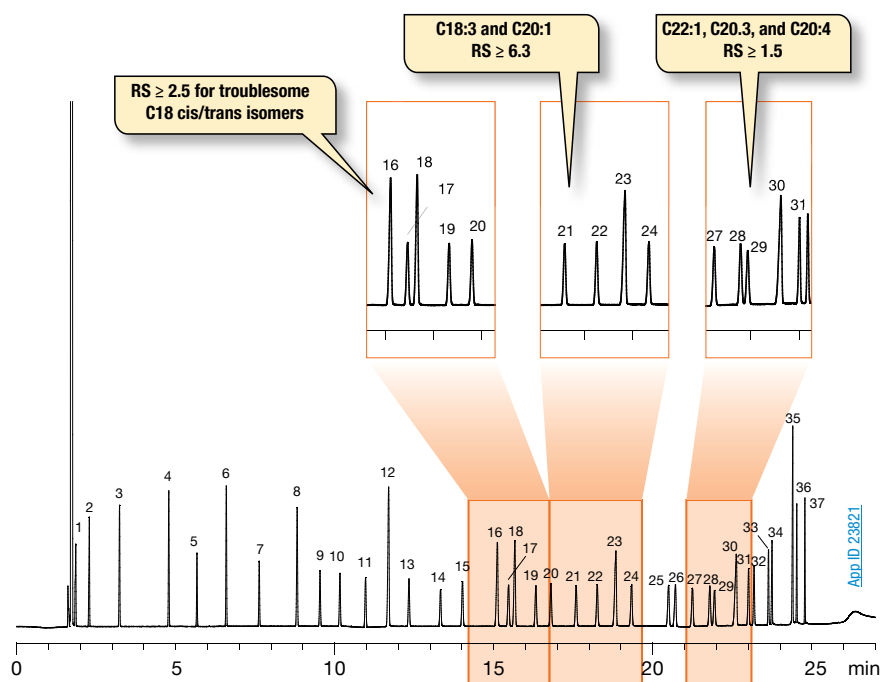
**Agilent®**

- CP-Sil 88

**Supelco®**

- SP®-2380
- SP-2560

### Baseline Separation of Common Isomers



**Column:** Zebron ZB-FAME

**Dimensions:** 30 meter x 0.25 mm x 0.20 µm

**Part No.:** [ZHG-G033-10](#)

**Injection:** Split 50:1 @ 240 °C, 1 µL

**Recommended Liner:** Zebron PLUS Single Taper with Wool

**Liner Part No.:** [AG2-0A11-05](#) (for Agilent® systems)

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

**Oven Program:** 100 °C for 2 min to 140 °C @ 10 °C/min  
to 190 °C @ 3 °C/min to 260 °C @  
30 °C/min for 2 min

**Detector:** FID @ 260 °C

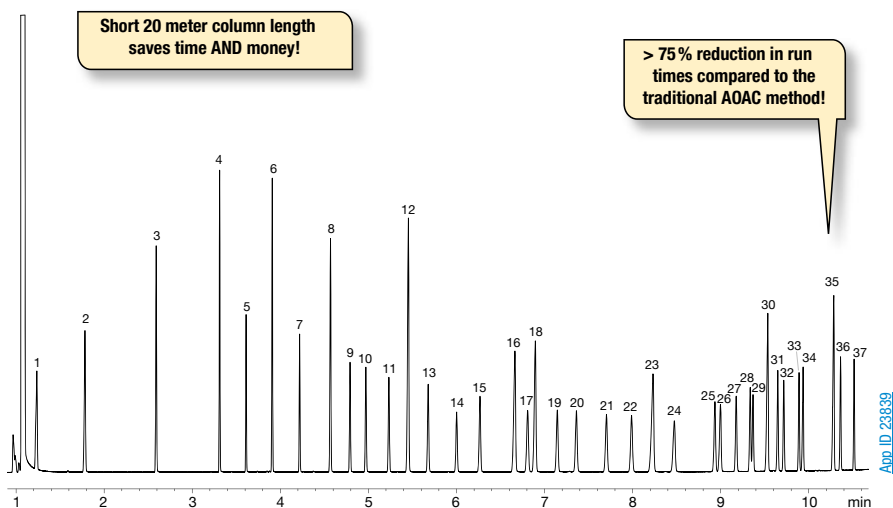
**Sample:** 37 FAME standard

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.

## The Fast FAME GC Column

Traditionally, cis/trans FAME separations require the use of long (100 meters or more) columns and can run up to 60 minutes, resulting in a bottleneck to higher productivity. Zebron ZB-FAME provides targeted selectivity that allows for reduced column length – run times as short as 11 minutes without compromising your results!

### 37 FAMES In A Short 11 Minute Run



**Column:** Zebron ZB-FAME

**Dimensions:** 20 meter x 0.18 mm x 0.15 µm

**Part No.:** [7FD-G033-05](#)

**Injection:** Split 100:1 @ 250 °C, 1 µL

**Recommended Liner:** Zebron PLUS Single Taper Z-Liner™

**Liner Part No.:** [AG2-0A13-05](#) (for Agilent® systems)

**Carrier Gas:** Helium @ 1.0 mL/min (constant flow)

**Oven Program:** 80 °C for 1.5 min to 160 °C @ 40 °C/min to 185 °C @ 5 °C/min to 260 °C @ 30 °C/min

**Detector:** FID @ 260 °C

**Sample:** 37 FAME standard

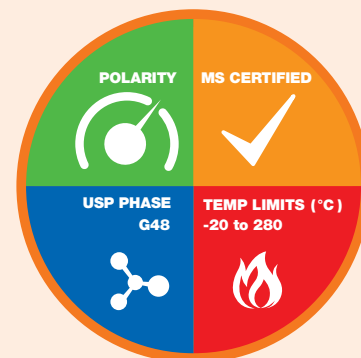


### Ordering Information

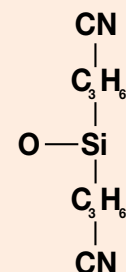
#### Zebron ZB-FAME GC Columns

| ID (mm)   | df (µm) | Temp. Limits °C | Part No.                        |
|---|---------|-----------------|---------------------------------|
| <b>20-Meter</b>   |         |                 |                                 |
| 0.18  | 0.15    | -20 to 280      | <a href="#">7FD-G033-05</a>     |
| <b>30-Meter</b>   |         |                 |                                 |
| 0.25  | 0.20    | -20 to 280      | <a href="#">7HG-G033-10</a>     |
| <b>30-Meter with 5-Meter Guardian™ Integrated Guard</b> |         |                 |                                 |
| 0.25  | 0.20    | -20 to 280      | <a href="#">7HG-G033-10-GGA</a> |
| <b>60-Meter</b>   |         |                 |                                 |
| 0.25  | 0.20    | -20 to 280      | <a href="#">7KG-G033-10</a>     |

### Column Profile



### Phase Chemistry



High Cyanopropyl

### Recommended Applications

- Fatty Acid Methyl Ester (FAMES)
- cis/trans FAME isomers



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.

## ZB-SemiVolatiles

### Maximize Inertness

- Specifically designed to overcome obstacles for sensitive semi-volatiles methods
- **Enviro-Inert™ Technology** provides a rugged 5% phenyl-arylene phase – reduce activity without compromising selectivity
- Rugged QC test includes EPA 8270 tuning standard to ensure column is ready to pass suitability requirements
- Popular for EPA Methods 525, 610, 625, 8100, and 8270D

Upgrade to Zebron from any 5%-phenyl or 5% phenyl-arylene / 95% dimethylpolysiloxane phase:

#### Agilent<sup>®</sup>

- DB<sup>®</sup>-5ms
- DB-5ms Ultra Inert
- DB-5.625
- DB-UI 8270D
- HP-5ms
- HP-5ms Ultra Inert
- VP-5ms
- CP-5il 8 CB MS

#### Restek<sup>®</sup>

- Rxi<sup>®</sup>-5Sil MS
- Rxi-5ms

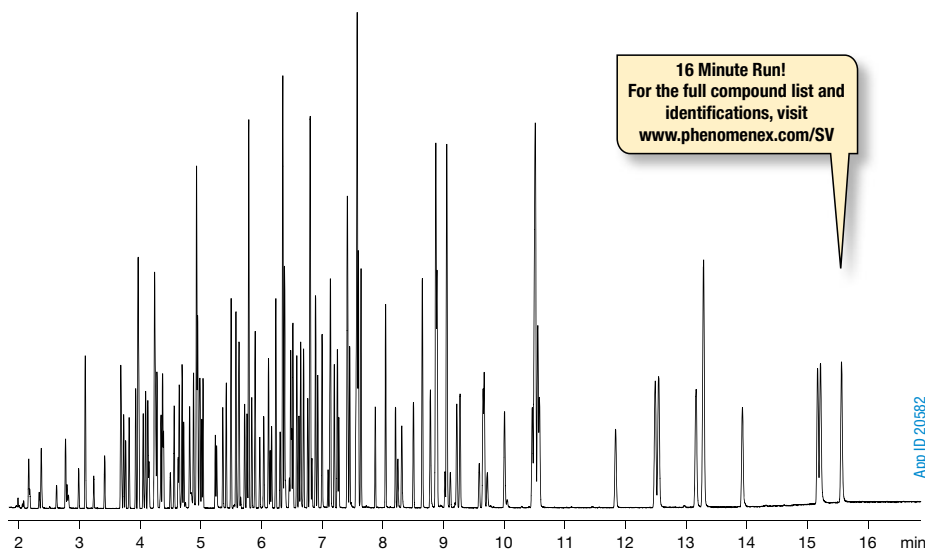
#### Supelco<sup>®</sup>

- SLB<sup>®</sup>-5ms

### 135 Compounds in Under 16 Minutes

ZB-SemiVolatiles provides improved productivity with shorter run times for EPA 8270D, while maintaining resolution of key critical pairs.

#### Semivolatile Organic Compounds



**Column:** Zebron ZB-SemiVolatiles

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

**Part No.:** [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

**Liner:** [AG0-8499](#) (Single Taper with Wool)

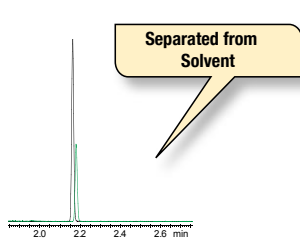
**Septum:** [AG0-4697](#) (PhenoRed™-400)

**Inlet Seal:** [AG0-8620](#) (Easy Seals™ Inlet Base Seal)

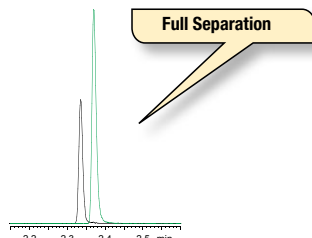
**Sample:** Analytes are 25 ppm in Dichloromethane  
135 compounds in EPA Method 8270D

## ZB-SemiVolatiles (cont'd)

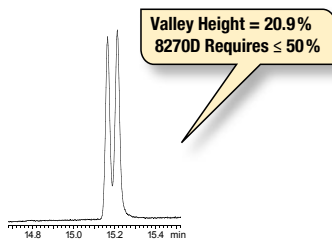
### Improved Peak Shapes



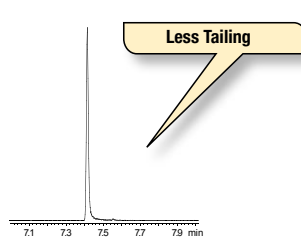
1,4-Dioxane-D8 and 1,4-Dioxane



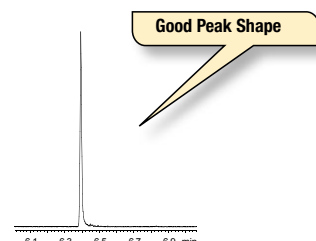
N-Nitrosodimethylamine and Pyridine



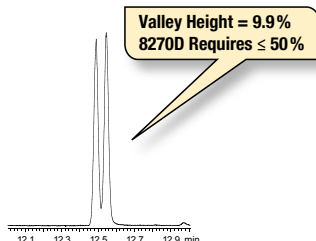
Indeno[1,2,3-cd]pyrene and Dibenz[a,h]anthracene, both share mass 276



Pentachlorophenol

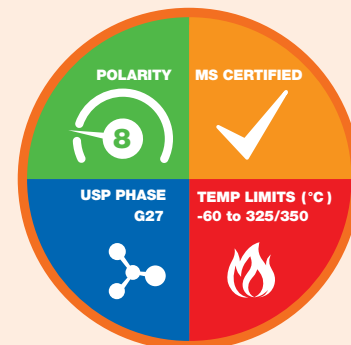


2,4-Dinitrophenol



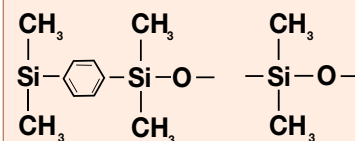
Benzo[b]fluoranthene and Benzo[k]fluoranthene

#### Column Profile



#### Phase Chemistry

5 % Phenyl-Arylene



95 % Dimethylpolysiloxane

#### Recommended Applications

- Semivolatiles (SVOCs)
- EPA Methods (525, 610, 625, 8100, 8270D)
- PAHs
- PBDEs



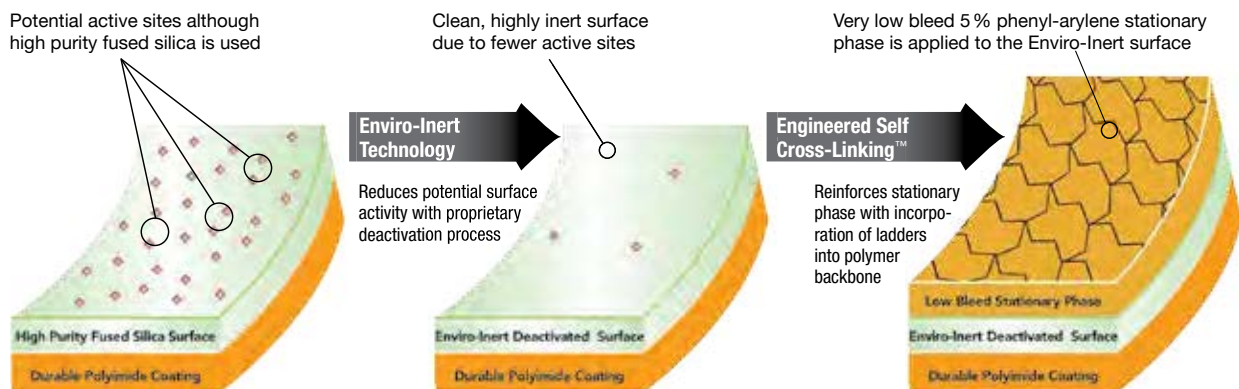
Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

## ZB-SemiVolatiles (cont'd)

### Supreme Inertness for Active Compounds

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



#### 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.**

 The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.



## ZB-SemiVolatiles (cont'd)

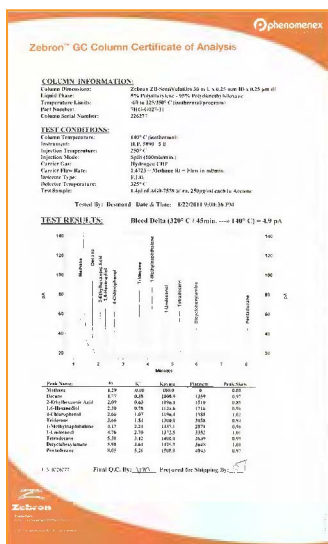
### We QC Test For the Compounds You Analyze

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

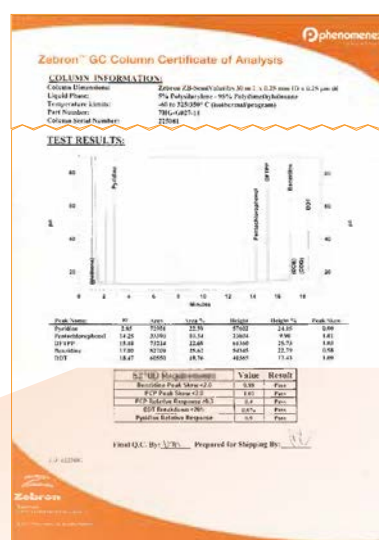
Rigorous test for efficiency, bleed, activity, and retention.



### QC TEST 2

#### ZB-SemiVolatiles Performance QC Test Mix

Includes the GC-MS tuning standard for EPA Method 8270D and Pyridine.



### Meet Requirements Out-of-the-Box

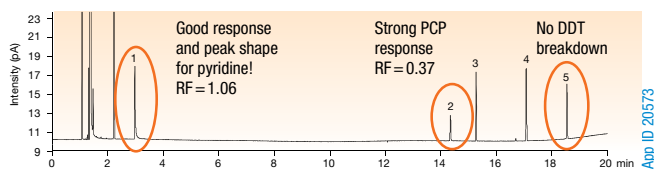
| Test Probe  | Criteria      | EPA Requirement         | Our Requirement  |
|---|---------------|-------------------------|------------------|
| <b>Pyridine</b><br>Very active amine that exposes even the smallest amount of column activity. This ensures that our Enviro-Inert™ deactivated column performs at the highest possible level for difficult basic compounds. | Peak Response | Not Specified           | ≥ 0.6            |
| <b>Pentachlorophenol</b><br>Disappears and tails on active columns; it is important to measure relative response and peak skew criteria.  | Peak Skew     | ≤ 2.0                   | ≤ 2.0            |
|   | Peak Response | Not Specified           | ≥ 0.3            |
| <b>Benzidine</b><br>Active amine that tails when column activity is present, complicating peak quantification.  | Peak Skew     | ≤ 2.0                   | ≤ 2.0            |
| <b>DDT</b><br>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     | < 20 %                  | < 20 %           |
| <b>Injection</b><br>To ensure trace-level sensitivity, QC is performed with a 20 ppm mix using a 100:1 split injection – effectively 250 times less than the EPA maximum allowed.   | Sensitivity   | 50 ng or less on column | 0.2 ng on column |

## ZB-SemiVolatiles (cont'd)

### Leading Competitor Columns Put to Our Test

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

#### Zebron™ ZB-SemiVolatiles

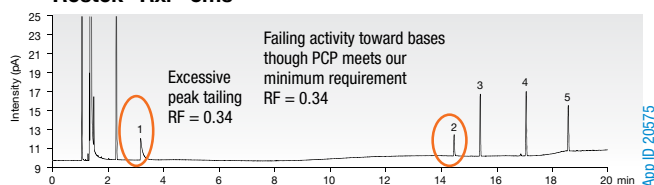


#### Response Factor (RF)

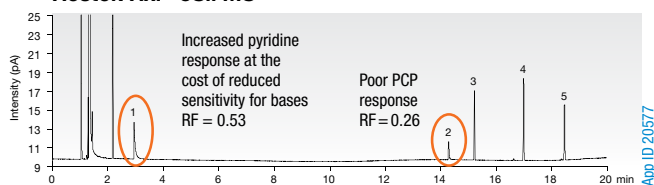
|                    | PYR  | PCP  |
|--------------------|------|------|
| ZB-SemiVolatiles   | 1.06 | 0.37 |
| Rxi-5ms            | 0.34 | 0.34 |
| Rxi-5Sil MS        | 0.53 | 0.26 |
| HP-5ms Ultra Inert | 0.28 | 0.40 |
| DB-5ms Ultra Inert | 0.66 | 0.20 |

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

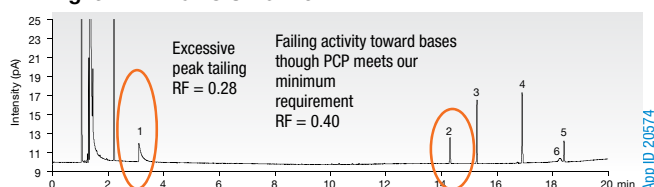
#### Restek® Rxi®-5ms



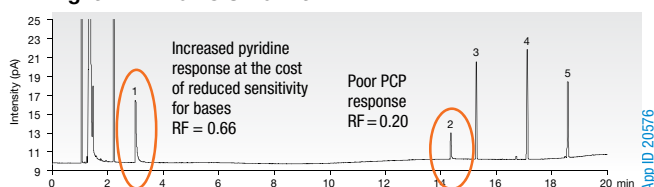
#### Restek Rxi®-5Sil MS



#### Agilent® HP-5ms Ultra Inert



#### Agilent DB®-5ms Ultra Inert



#### 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 20 ppm in Dichloromethane

1. Pyridine (PYR)
2. Pentachlorophenol (PCP)
3. DFTPP
4. Benzidine
5. DDT
6. DDD

Comparative separations may not be representative of all applications.

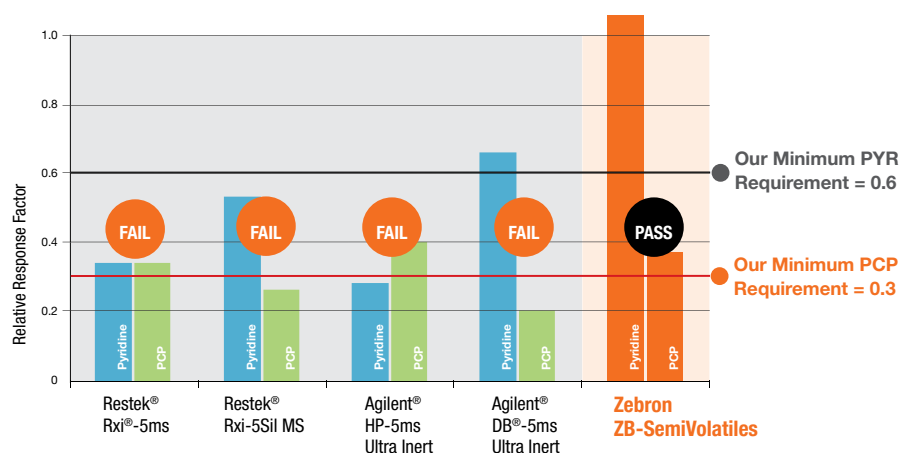
If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-SemiVolatiles (cont'd)

### 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



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

#### Ordering Information

| Zebron ZB-SemiVolatiles GC Columns                      |         |                 |                                 |
|---|---------|-----------------|---------------------------------|
| ID (mm)   | df (µm) | Temp. Limits °C | Part No.                        |
| <b>15-Meter</b>   |         |                 |                                 |
| 0.25  | 0.25    | -60 to 325/350  | <a href="#">7EG-G027-11</a>     |
| 0.25  | 0.50    | -60 to 325/350  | <a href="#">7EG-G027-17</a>     |
| <b>20-Meter</b>   |         |                 |                                 |
| 0.18  | 0.18    | -60 to 325/350  | <a href="#">7FD-G027-08</a>     |
| 0.18  | 0.36    | -60 to 325/350  | <a href="#">7FD-G027-53</a>     |
| <b>30-Meter</b>   |         |                 |                                 |
| 0.25  | 0.25    | -60 to 325/350  | <a href="#">7HG-G027-11</a>     |
| 0.25  | 0.50    | -60 to 325/350  | <a href="#">7HG-G027-17</a>     |
| <b>30-Meter with 5-Meter Guardian™ Integrated Guard</b> |         |                 |                                 |
| 0.25  | 0.25    | -60 to 325/350  | <a href="#">7HG-G027-11-GGA</a> |
| 0.25  | 0.50    | -60 to 325/350  | <a href="#">7HG-G027-17-GGA</a> |
| <b>30-Meter with 10-Meter Guardian Integrated Guard</b> |         |                 |                                 |
| 0.25  | 0.25    | -60 to 325/350  | <a href="#">7HG-G027-11-GGC</a> |
| 0.25  | 0.50    | -60 to 325/350  | <a href="#">7HG-G027-17-GGC</a> |
| <b>60-Meter</b>   |         |                 |                                 |
| 0.25  | 0.25    | -60 to 325/350  | <a href="#">7KG-G027-11</a>     |

### Easy Liner Selection



Our GC liner finder tool makes liner selection a breeze. You can even search by application, injection type, GC system, or your current liner part number.

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

## **new** ZB-PAH

- Accurately quantitate EU and EPA PAHs in less than 28 minutes
- Excellent separation for critical PAH isomers
- QC tested for PAHs
- Exceptional thermal stability and low column bleed

Upgrade to Zebron from traditional phases used for PAHs:

**Agilent®**

- DB®-EUPAH

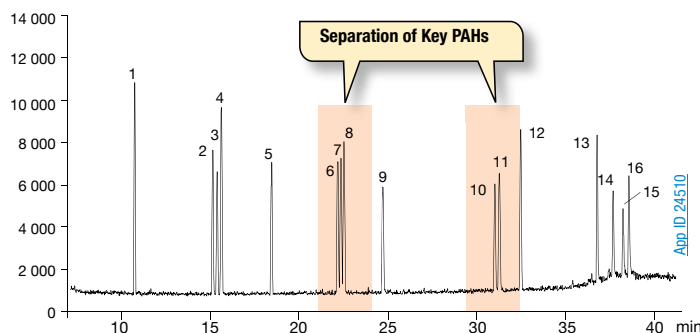
**Restek®**

- Rxi®-PAH

### Fit for Purpose Testing

Zebron ZB-PAH columns are manufactured and tested to provide the most optimal performance for EU-regulated polycyclic aromatic hydrocarbons (PAHs). The columns are individually tested with an application-specific QC test probe mixture and deliver excellent resolution of critical PAH isomers, such as benzo[b,j,k]fluoranthene.

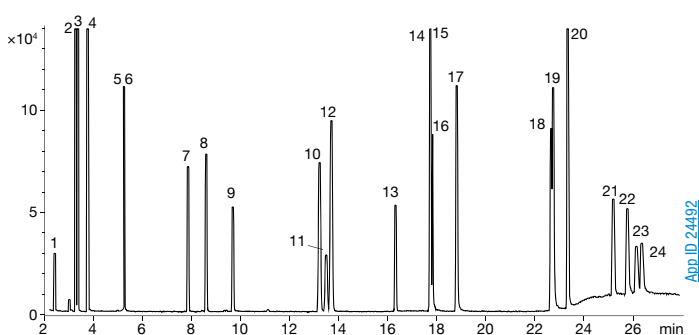
#### EU 15+1 PAH Analysis



**Column:** Zebron ZB-PAH  
**Dimension:** 20 meter x 0.18 mm x 0.14 µm  
**Part No.:** [7FD-G038-47](#)  
**Injection:** Splitless @ 325 °C, 0.5 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 45 °C for 0.8 min to 200 °C @ 45 °C/min to 225 °C @ 2.5 °C/min to 266 °C @ 3 °C/min to 300 °C @ 5 °C/min to 320 °C @ 10 °C/min for 4.5 min  
**Detector:** MS @ 300 °C; 50-550 amu  
**Sample:**

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

#### Expanded EU 15+1 and EPA 610 PAH Analysis



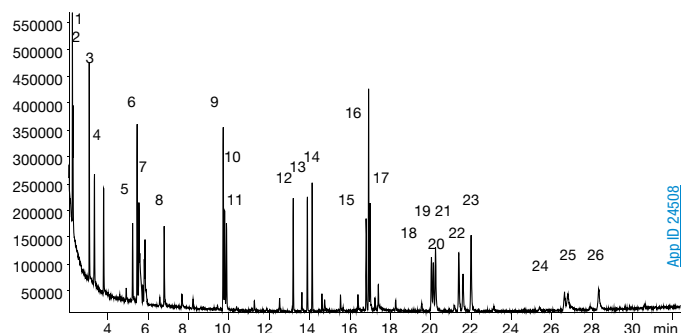
**Column:** Zebron ZB-PAH  
**Dimension:** 20 meter x 0.18 mm x 0.14 µm  
**Part No.:** [7FD-G038-47](#)  
**Injection:** Splitless @ 300 °C, 0.5 µL  
**Carrier Gas:** Helium @ 1.8 mL/min (constant flow)  
**Oven Program:** 70 °C for 0.8 min to 180 °C @ 70 °C/min to 230 °C @ 7 °C/min for 6 min to 280 °C @ 40 °C/min for 5 min to 335 °C @ 25 °C/min for 5 min  
**Detector:** MS @ 340 °C; 50-400 amu  
**Sample:**

|                           |                            |
|---------------------------|----------------------------|
| 1. Naphthalene            | 13. N5-Methylchrysene      |
| 2. Acenaphthylene         | 14. Benzo[b]fluoranthene   |
| 3. Acenaphthene           | 15. Benzo[k]fluoranthene   |
| 4. Fluorene               | 16. Benzo[j]fluoranthene   |
| 5. Phenanthrene           | 17. Benzo[a]pyrene         |
| 6. Anthracene             | 18. Indeno[1,2,3-cd]pyrene |
| 7. Flouranthene           | 19. Dibenzo[a,h]anthracene |
| 8. Pyrene                 | 20. Benzo[g,h,i]perylene   |
| 9. Benzo[c]fluorene       | 21. Dibenzo[a,l]pyrene     |
| 10. Benz[a]anthracene     | 22. Dibenzo[a,e]pyrene     |
| 11. Cyclopenta[c,d]pyrene | 23. Dibenzo[a,i]pyrene     |
| 12. Chrysene              | 24. Dibenzo[a,h]pyrene     |

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.

## ZB-PAH

### GC-MS Analysis of PAHs in Rubber and Plastic



**Column:** Zebron ZB-PAH

**Dimension:** 20 meter x 0.18 mm x 0.14 µm

**Part No.:** [ZFD-G038-47](#)

**Injection:** Splitless @ 290 °C, 1 µL

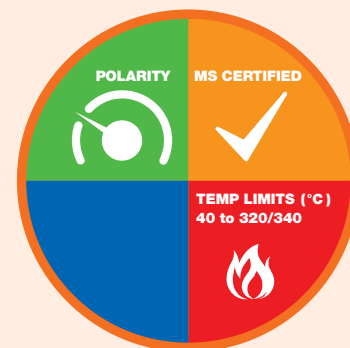
**Carrier Gas:** Helium @ 52 cm/sec (constant flow)

**Oven Program:** 120 °C for 1.0 min to 200 °C @ 8 °C/min for 0.5 min to 270 °C @ 11 °C/min to 300 °C @ 2 °C/min

**Detector:** MS @ 250 °C; 50-450 amu

|                |                        |                            |
|----------------|------------------------|----------------------------|
| <b>Sample:</b> | 1. Naphthalene-d8      | 14. p-Terphenyl-d14        |
|                | 2. Naphthalene         | 15. Benz[a]anthracene      |
|                | 3. 2-Methylnaphthalene | 16. Chrysene-d12           |
|                | 4. 1-Methylnaphthalene | 17. Chrysene               |
|                | 5. Acenaphthylene      | 18. Benzo[b]fluoranthene   |
|                | 6. Acenaphthylene-d10  | 19. Benzo[k]fluoranthene   |
|                | 7. Acenaphthene        | 20. Benzo[j]fluoranthene   |
|                | 8. Fluorene            | 21. Benzo[e]pyrene         |
|                | 9. Phenanthrene-d10    | 22. Benzo[a]pyrene         |
|                | 10. Phenanthrene       | 23. Perylene-d12           |
|                | 11. Anthracene         | 24. Indeno[1,2,3-cd]pyrene |
|                | 12. Fluoranthene       | 25. Dibenzo[a,h]anthracene |
|                | 13. Pyrene             | 26. Benzo[g,h,i]perylene   |

#### Column Profile



#### Phase Chemistry

- Proprietary

#### Recommended Applications

- Polycyclic Aromatic Hydrocarbons (PAHs)
- Smoked Food Products
- Seafood
- Plastics, Rubbers, Fuels
- Environmental Contaminants



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

#### Ordering Information

##### Zebron ZB-PAH GC Columns

| ID (mm)         | df (µm) | Temp. Limits °C | Part No.                    |
|-----------------|---------|-----------------|-----------------------------|
| <b>20-Meter</b> |         |                 |                             |
| 0.18            | 0.14    | 40 to 320/340   | <a href="#">ZFD-G038-47</a> |
| <b>30-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | 40 to 320/340   | <a href="#">ZHG-G038-11</a> |
| <b>60-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | 40 to 320/340   | <a href="#">ZKG-G038-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [ZHG-G038-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

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.

## ZB-CLPesticides-1 and -2

### 7 EPA Methods, One Column Set

- Guaranteed alternative to Restek Rtx-CLPesticides
- Optimized, versatile selectivity for chlorinated pesticides and herbicides
- Well-suited for dual-column configurations using GC-ECD
- Run EPA Methods 8081 and 8081 extended, 8082, 8151, 504, 505, 508, and 552 without changing columns – save time

Upgrade to Zebron from these similar\* phases:

#### Restek®

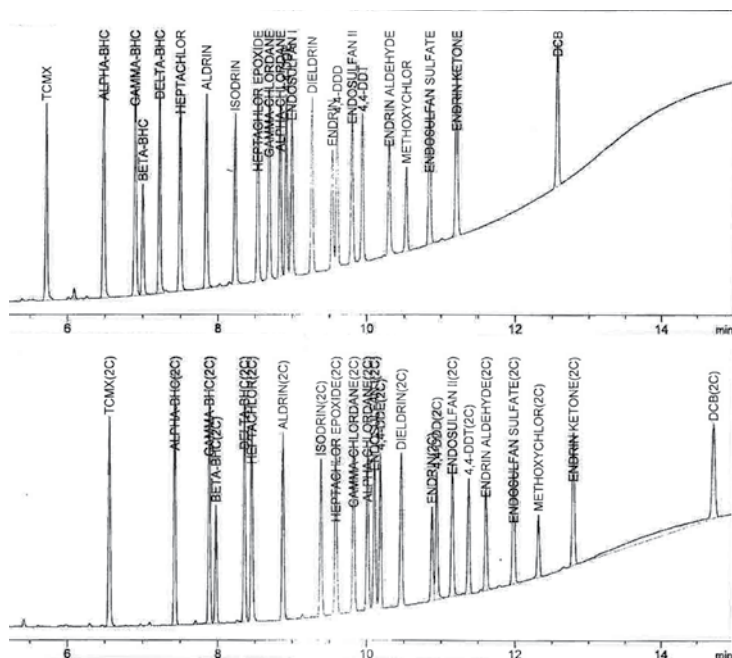
- Rtx®-CLPesticides
- Rtx-CLPesticides2
- Stx®-CLPesticides
- Stx-CLPesticides2

\*not exact equivalent, selectivity may differ

### Direct Replacement for Restek Rtx-CLPesticides Phases

You asked for optimized performance for pesticides by GC-ECD detectors, without time-consuming method development. We've delivered a direct replacement\*\*! ZB-CLPesticides-1 and -2 provide guaranteed drop-in performance compared to your current Rtx-CLPesticides column set, without the hassle.

### Drop-In Results: Real Customer Data, Real Performance



“ I was able to install the ZB-CLPesticides-1 and ZB-CLPesticides-2 columns as a direct replacement for the Restek Rtx-CLPesticides and Rtx-CLPesticides2 columns that I currently use. I made no changes to the method and saw very little difference between the two columns. ”

**Joanne Foy, Chemist**  
TriMatrix Laboratories, Inc.

\*\*Direct replacement: this category indicates an alternative column which will likely give a similar selectivity.

**i** The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

## ZB-CLPesticides-1 and -2 (cont'd)

### Run Faster Methods With Minimal Development Time

“ We installed Zebron™ ZB-CLPesticides-1 and -2 columns with our current method and did no further optimization. Overall, the Zebron columns are fairly impressive. ZB-CLPesticides columns are comparable to our current columns, with the added benefit of no co-eluting peaks. There is also the potential to optimize our method parameters using these columns to run a slightly faster analysis. ”

**Shealy Environmental Services, Inc.**

### Equivalent Elution Orders & Calibration Success

“ I tried the Zebron ZB-CLPesticides column pair and compared them to the Restek® Rtx®-CLPesticides and Rtx-CLPesticides2 columns. The elution of the Aroclor 1016/1260 standards looked very similar to the Restek columns. I ran a five point curve for the 1016/1260 Aroclors and single points for the rest of the Aroclors (1221 through 1268). The % RSD for the 1016/1260 peaks were also very similar to the Restek column results. ”

**TriMatrix Laboratories, Inc.**

| Column Profile  |  |
|---|--|
| <p><b>CLP-1</b></p> <p>POLARITY*</p> <p>TEMP LIMITS (°C)<br/>40 to 320/340</p>  | <p>*Similar polarity to ZB-35.</p>             |
| <p><b>CLP-2</b></p> <p>POLARITY**</p> <p>TEMP LIMITS (°C)<br/>40 to 320/340</p>   | <p>**Similar polarity to ZB-MultiResidue-2</p> |
| Phase Chemistry   |  |
| <ul style="list-style-type: none"> <li>Proprietary</li> </ul>   |  |
| Recommended Applications  |  |
| <ul style="list-style-type: none"> <li>Dual-Column Chlorinated Pesticide Methods</li> <li>EPA Methods (8081 and 8081 extended, 8082, 8151, 504, 505, 508, 552)</li> </ul> |  |



The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

## ZB-CLPesticides-1 and -2 (cont'd)

### Drop-In and Run With Complex Separations

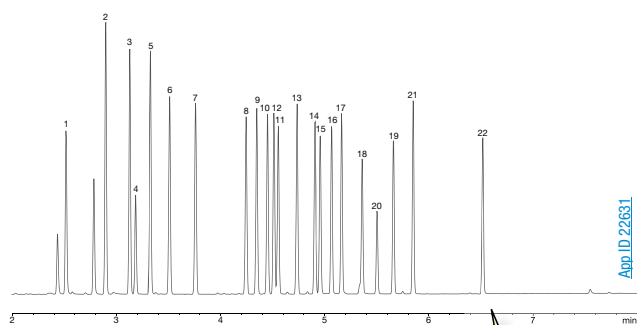
ZB-CLPesticides columns combine Zebron high quality with drop-in selectivity. Achieve near-exact elution profiles and run times, without the time-consuming method development and headaches typical of traditional selectivities!

#### Polychlorinated Biphenyls (PCBs) by GC-ECD (EPA 8082)

##### Zebron

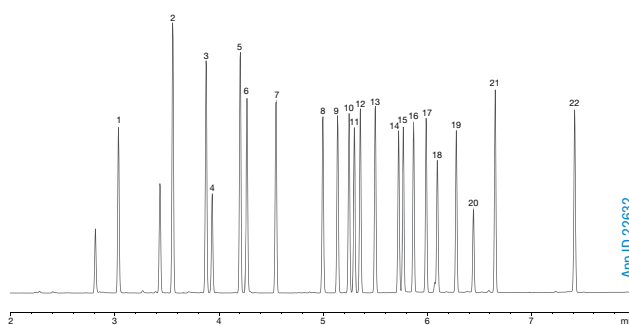
##### ZB-CLPesticides-1

30 m x 0.32 mm x 0.32  $\mu$ m



##### ZB-CLPesticides-2

30 m x 0.32 mm x 0.25  $\mu$ m

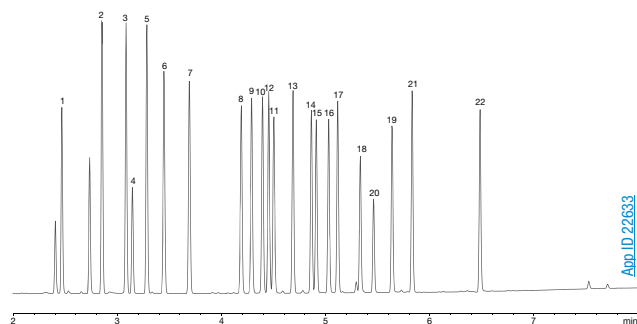


Equivalent Elution Profiles

##### Restek<sup>®</sup>

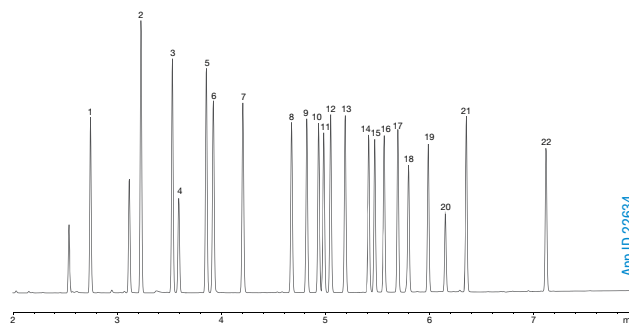
##### Rtx<sup>®</sup>-CLPesticides

30 m x 0.32 mm x 0.32  $\mu$ m



##### Rtx-CLPesticides2

30 m x 0.32 mm x 0.25  $\mu$ m



#### Conditions for all columns:

**Columns:** As listed  
**Dimensions:** As listed  
**Part No.:** [ZHM-G028-51](#) (ZB-CLPesticides-1)  
[ZHM-G029-11](#) (ZB-CLPesticides-2)  
**Injection:** Splitless (hold 0.3 min) @ 250 °C, 1  $\mu$ L  
**Carrier Gas:** Helium @ 3.9 mL/min (constant flow)  
**Oven Program:** 120 °C to 200 °C @ 45 °C/min to 230 °C @ 15 °C/min to 330 °C @ 30 °C/min for 2 min

**Detector:** ECD @ 330 °C  
**Y-Connector:** [AG0-4717](#) (Fused Quartz)  
**Guard Column:** [7AM-G000-00-GZ0](#) (5 m Z-Guard™)  
**Liner:** [AG0-8499](#) (Single Taper with Wool at Bottom)  
**Septum:** [AG0-4696](#) (PhenoRed™-400)  
**Inlet Seal:** [AG0-8620](#) (Gold-Plated Easy Seals™)  
**Sample:** Analytes are 250 ng/mL in hexane.

See page 115 for compound list.

Conditions for each method were the same for all columns tested. Comparative separations may not be representative of all applications.

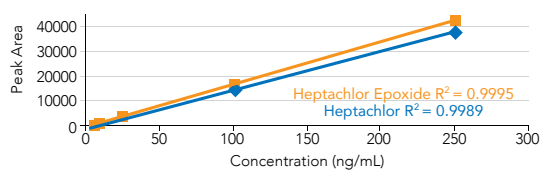


## ZB-CLPesticides-1 and -2 (cont'd)

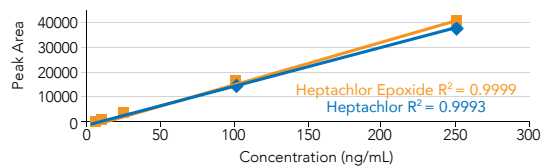
### Easily Meet EPA Specifications

The EPA outlines strict performance requirements for compound linearity, percent relative standard deviation (% RSD), and breakdown of DDT and Endrin. The ZB-CLPesticides column pair meets these guidelines, providing accurate data well-suited for your analysis.

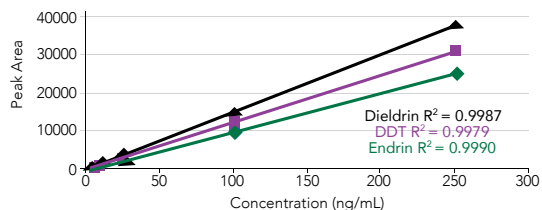
#### ZB-CLPesticides-1



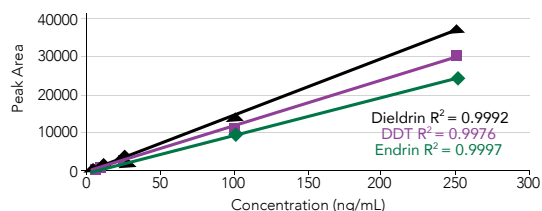
#### ZB-CLPesticides-2



#### ZB-CLPesticides-1



#### ZB-CLPesticides-2



#### Five-Point Calibration Curve at 5, 15, 25, 100, and 250 ng/mL

| Peak No. | Analyte                   | ZB-CLPesticides-1 % RSD* | ZB-CLPesticides-2 % RSD* | US EPA Specifications |
|----------|---------------------------|--------------------------|--------------------------|-----------------------|
| 1        | 2,4,5,6-TCMX (Surr)       | 3.8                      | 3.0                      | < 20                  |
| 2        | α-BHC                     | 8.3                      | 3.8                      | < 20                  |
| 3        | γ-BHC                     | 5.9                      | 5.6                      | < 20                  |
| 4        | β-BHC                     | 6.9                      | 6.9                      | < 20                  |
| 5        | δ-BHC                     | 4.9                      | 5.7                      | < 20                  |
| 6        | Heptachlor                | 8.0                      | 6.5                      | < 20                  |
| 7        | Aldrin                    | 4.2                      | 2.3                      | < 20                  |
| 8        | Heptachlor epoxide        | 3.8                      | 2.3                      | < 20                  |
| 9        | trans-Chlordane           | 4.1                      | 3.8                      | < 20                  |
| 10       | cis-Chlordane             | 4.0                      | 3.3                      | < 20                  |
| 11       | 4,4'-DDE                  | 4.8                      | 2.9                      | < 20                  |
| 12       | Endosulfan I              | 6.0                      | 2.5                      | < 20                  |
| 13       | Dieldrin                  | 7.7                      | 4.9                      | < 20                  |
| 14       | Endrin                    | 9.4                      | 6.6                      | < 20                  |
| 15       | 4,4'-DDD                  | 9.2                      | 3.6                      | < 20                  |
| 16       | Endosulfan II             | 6.6                      | 4.1                      | < 20                  |
| 17       | 4,4'-DDT                  | 11.6                     | 6.9                      | < 20                  |
| 18       | Endrin aldehyde           | 8.3                      | 7.3                      | < 20                  |
| 19       | Endosulfan sulfate        | 8.0                      | 7.1                      | < 20                  |
| 20       | Methoxychlor              | 6.7                      | 6.1                      | < 20                  |
| 21       | Endrin ketone             | 6.5                      | 7.2                      | < 20                  |
| 22       | Decachlorobiphenyl (Surr) | 6.7                      | 6.6                      | < 20                  |
| Average  |                           | 6.6%                     | 4.9%                     | < 20                  |

\*Calculated using response factors as per EPA guidelines



#### Tech Tip: Minimize Activity

Inlet deactivation is critical for obtaining stable calibration curves. Use a well-deactivated liner and remember to change your gold seal regularly when working with Agilent® 5890, 6890, and 7890 instruments.

## ZB-CLPesticides-1 and -2 (cont'd)

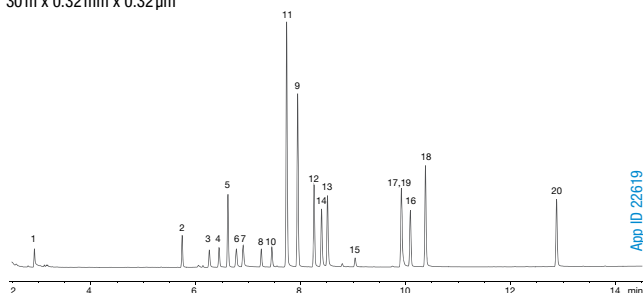
### Performs for Multiple Compound Classes

#### Chlorinated Herbicides by GC-ECD

##### Zebron

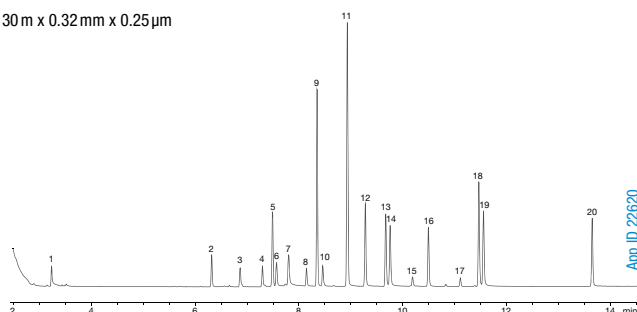
##### ZB-CLPesticides-1

30 m x 0.32 mm x 0.32 µm



##### ZB-CLPesticides-2

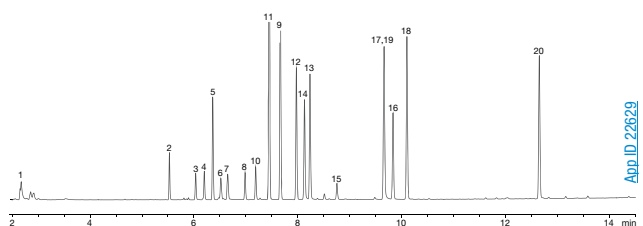
30 m x 0.32 mm x 0.25 µm



##### Restek®

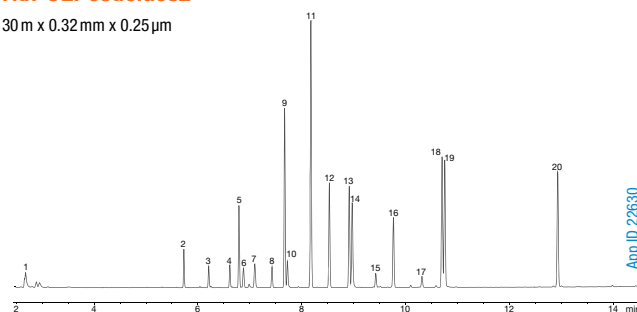
##### Rtx®-CLPesticides

30 m x 0.32 mm x 0.32 µm



##### Rtx-CLPesticides2

30 m x 0.32 mm x 0.25 µm



#### Conditions for all columns:

- Columns:** As listed
- Dimensions:** As listed
- Part No.:** [ZHM-G028-51](#) (ZB-CLPesticides-1)  
[ZHM-G029-11](#) (ZB-CLPesticides-2)
- Injection:** Splitless (hold 0.75 min) @ 250 °C, 1 µL
- Carrier Gas:** Helium @ 36 cm/sec (constant flow)
- Oven Program:** 70 °C for 0.5 min to 190 °C @ 25 °C/min for 1 min to 300 °C @ 11 °C/min for 5 min
- Detector:** ECD @ 325 °C
- Y-Connector:** [AGO-4717](#) (Fused Quartz)
- Guard Column:** [ZAM-G000-00-GZ0](#) (5 m Z-Guard™)
- Liner:** [AGO-8499](#) (Single Taper with Wool at Bottom)
- Septum:** [AGO-4696](#) (PhenoRed™-400)
- Inlet Seal:** [AGO-8620](#) (Gold-Plated Easy Seals™)

#### Sample: Analytes are 100 ng/mL in hexane

1. Dalapon methyl ester
2. 3,5-Dichlorobenzoic acid methyl ester\*
3. 4-Nitroanisole
4. DCAA methyl ester\*
5. Dicamba methyl ester
6. MCPP methyl ester
7. MCPA methyl ester
8. Dichlorprop, methyl ester
9. 4,4'-DBOB\*\*
10. 2,4-D methyl ester
11. Pentachloroanisole
12. 2,4,5-TP methyl ester
13. 2,4,5-T methyl ester
14. Chloramben methyl ester
15. 2,4-DB methyl ester
16. Dinoseb methyl ester
17. Bentazon methyl ester
18. DCPA methyl ester (Chlorthal-dimethyl)
19. Pichloram methyl ester
20. Acifluorfen methyl ester

\* surrogate standard  
\*\* internal standard

Comparative separations may not be representative of all applications.

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.

## ZB-CLPesticides-1 and -2 (cont'd)

### ZB-CLPesticides GC Columns

#### Ordering Information

| ZB-CLPesticides-1 GC Columns |         |                 |                             |
|------------------------------|---------|-----------------|-----------------------------|
| ID (mm)                      | df (µm) | Temp. Limits °C | Part No.                    |
| <b>30-Meter</b>              |         |                 |                             |
| 0.25                         | 0.25    | 40 to 320/340   | <a href="#">7HG-G028-11</a> |
| 0.32                         | 0.32    | 40 to 320/340   | <a href="#">7HM-G028-51</a> |
| 0.32                         | 0.50    | 40 to 320/340   | <a href="#">7HM-G028-17</a> |
| 0.53                         | 0.50    | 40 to 320/340   | <a href="#">7HK-G028-17</a> |

| ZB-CLPesticides-2 GC Columns |         |                 |                             |
|------------------------------|---------|-----------------|-----------------------------|
| ID (mm)                      | df (µm) | Temp. Limits °C | Part No.                    |
| <b>30-Meter</b>              |         |                 |                             |
| 0.25                         | 0.20    | 40 to 320/340   | <a href="#">7HG-G029-10</a> |
| 0.32                         | 0.25    | 40 to 320/340   | <a href="#">7HM-G029-11</a> |
| 0.32                         | 0.50    | 40 to 320/340   | <a href="#">7HM-G029-17</a> |
| 0.53                         | 0.42    | 40 to 320/340   | <a href="#">7HK-G029-16</a> |

### ZB-CLPesticides GC Column Kits

#### Ordering Information

| 0.25 mm ID Kit<br>(includes 1 of each below) Part No.: <a href="#">KG0-9285</a> |                              |                                 |
|---|------------------------------|---------------------------------|
| Description   | Dimension                    | Part No.                        |
| ZB-CLPesticides-1   | 30 meter x 0.25 mm x 0.25 µm | <a href="#">7HG-G028-11</a>     |
| ZB-CLPesticides-2   | 30 meter x 0.25 mm x 0.20 µm | <a href="#">7HG-G029-10</a>     |
| Z-Guard™ Column   | 5 meter x 0.25 mm            | <a href="#">7AG-G000-00-GZ0</a> |
| Y-Connector   | Fused Quartz                 | <a href="#">AGO-4717</a>        |
| Polyimide Resin   | 0.5 mL, rated to 350 °C      | <a href="#">AGO-5722</a>        |

| 0.32 mm ID Kit<br>(includes 1 of each below) Part No.: <a href="#">KG0-9286</a> |                              |                                 |
|---|------------------------------|---------------------------------|
| Description   | Dimension                    | Part No.                        |
| ZB-CLPesticides-1   | 30 meter x 0.32 mm x 0.32 µm | <a href="#">7HM-G028-51</a>     |
| ZB-CLPesticides-2   | 30 meter x 0.32 mm x 0.25 µm | <a href="#">7HM-G029-11</a>     |
| Z-Guard Column  | 5 meter x 0.32 mm            | <a href="#">7AM-G000-00-GZ0</a> |
| Y-Connector   | Fused Quartz                 | <a href="#">AGO-4717</a>        |
| Polyimide Resin   | 0.5 mL, rated to 350 °C      | <a href="#">AGO-5722</a>        |

| 0.53 mm ID Kit<br>(includes 1 of each below) Part No.: <a href="#">KG0-9290</a> |                              |                                 |
|---|------------------------------|---------------------------------|
| Description   | Dimension                    | Part No.                        |
| ZB-CLPesticides-1   | 30 meter x 0.53 mm x 0.50 µm | <a href="#">7HK-G028-17</a>     |
| ZB-CLPesticides-2   | 30 meter x 0.53 mm x 0.42 µm | <a href="#">7HK-G029-16</a>     |
| Z-Guard Column  | 5 meter x 0.53 mm            | <a href="#">7AK-G000-00-GZ0</a> |
| Y-Connector   | Fused Quartz                 | <a href="#">AGO-4717</a>        |
| Polyimide Resin   | 0.5 mL, rated to 350 °C      | <a href="#">AGO-5722</a>        |



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

## ZB-MultiResidue™ -1 and -2

### Optimized Selectivity for Pesticides

- Specially designed for the separation of all types of pesticides, herbicides, and insecticides
- Baseline resolution and confirmation of all 20 chlorinated pesticides regulated under EPA Method 8081 in  $\leq 10$  min
- Decreased breakdown of sensitive pesticides such as DDT
- Robust performance for high temperature bakeouts
- Low bleed performance for pesticide confirmation by MS

Upgrade to Zebron from these similar\* phases:

**Agilent®**

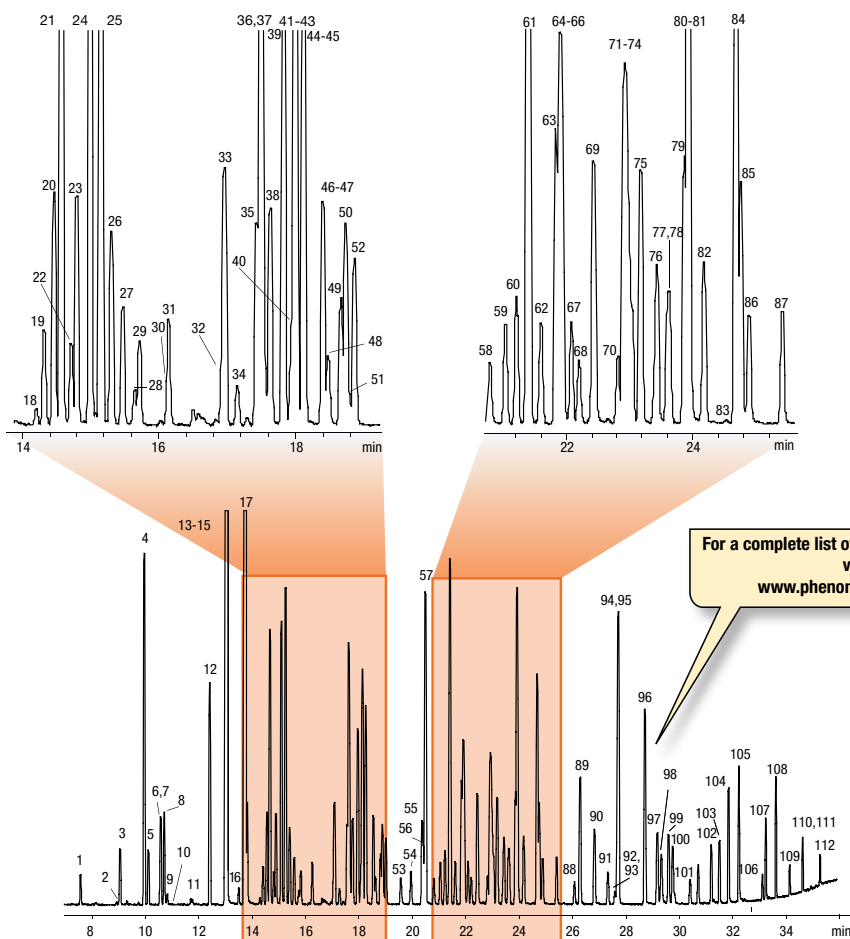
- DB®-CLP1
- DB-CLP2

**Restek®**

- Rtx®-CLPesticides
- Rtx-CLPesticides2
- Stx®-CLPesticides
- Stx-CLPesticides2

\*not exact equivalent, selectivity may differ

### Improved Multi-Residue Pesticide Screening by GC-MS



For a complete list of all 112 compounds, visit [www.phenomenex.com/MR](http://www.phenomenex.com/MR)

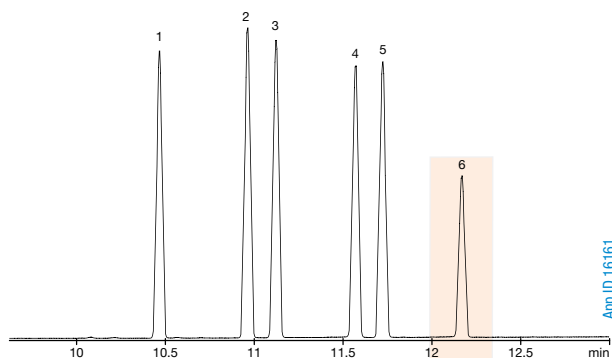
App ID: 16184

**Column:** Zebron MultiResidue™ -1  
**Dimensions:** 30 meter x 0.25 mm x 0.25  $\mu$ m  
**Part No.:** ZHG-G016-11  
**Injection:** Splitless @ 260 °C, 1  $\mu$ L  
**Carrier Gas:** Helium @ 0.9 mL/min (constant flow)  
**Oven Program:** 80 °C for 0.5 min to 150 °C @ 10 °C/min to 240 °C @ 4 °C/min to 320 °C @ 15 °C/min for 3 min  
**Detector:** MSD @ 320 °C; 45-400 amu  
**Sample:** Analytes were 1 ppm in Dichloromethane

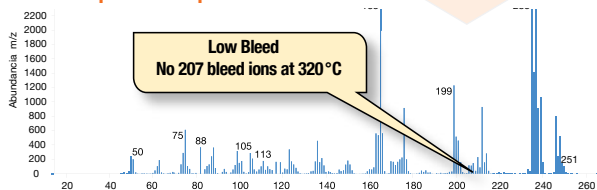
## ZB-MultiResidue™ -1 and -2 (cont'd)

### Resolve Common Pesticide Isomers

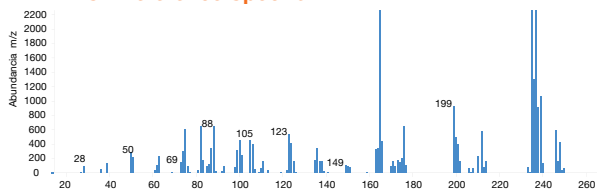
ZB-MultiResidue optimized selectivities improve resolution of complex pesticide, herbicide, and insecticide isomers. Our extremely stable siloxane-based polymer contains absolutely no nitrogen or halogenated functionality, which can be unfriendly to NPD and ECD detectors. Engineered Self-Crosslinking™ (ESC) bonding incorporates ladders into the phase backbone for low bleed and unmatched spectral integrity – even for trace-level samples.



#### Acquisition Spectra



#### NIST Reference Spectra



**Column:** Zebron ZB-MultiResidue-1

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

**Part No.:** [7HG-G016-11](#)

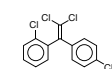
**Injection:** Splitless (hold 0.5 min) @ 260 °C, 1 µL

**Carrier Gas:** Helium @ 0.8 mL/min (constant flow)

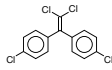
**Oven Program:** 100 °C for 0.5 min to 200 °C at 25 °C/min to 320 °C at 15 °C/min for 2 min

**Detector:** MSD @ 320 °C, 45-400 amu

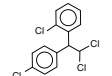
**Sample:** 1. o,p-DDE



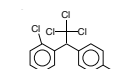
2. p,p-DDE



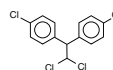
3. o,p-DDD



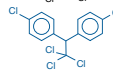
4. o,p-DDT



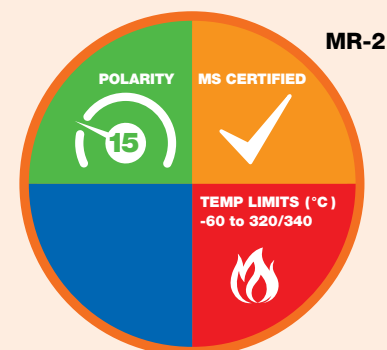
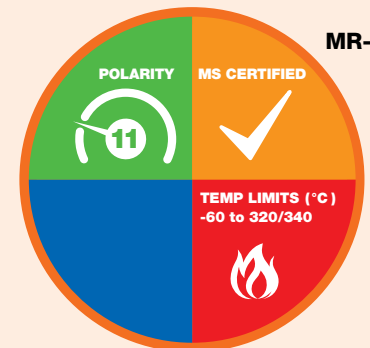
5. p,p-DDD



6. p,p-DDT



#### Column Profile



#### Phase Chemistry

- Proprietary

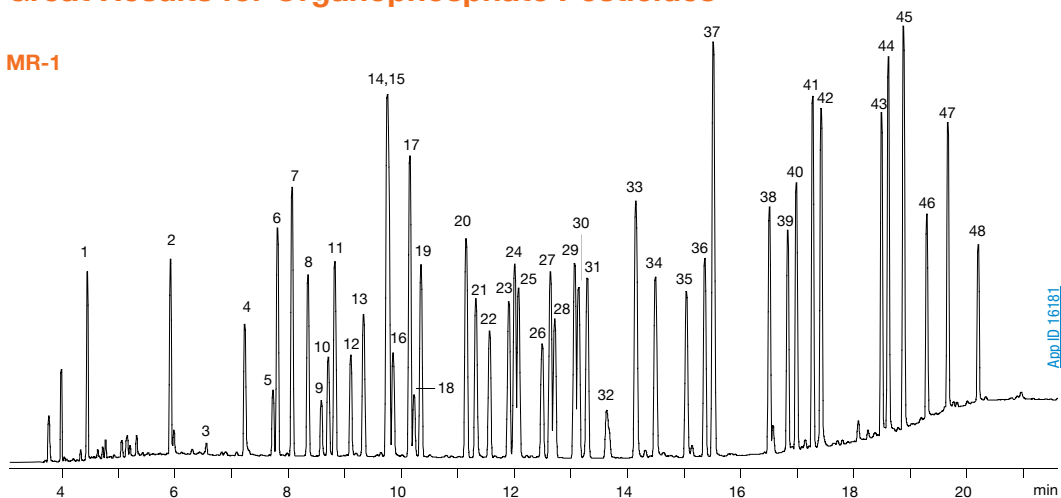
#### Recommended Applications

- Haloacetic Acids (HAAs)
- Herbicides / Insecticides
- Multi-Pesticide Screening
- Nitrogen Containing Pesticides
- Organochlorine Pesticides
- Organophosphorous Pesticides
- PCBs / Aroclors

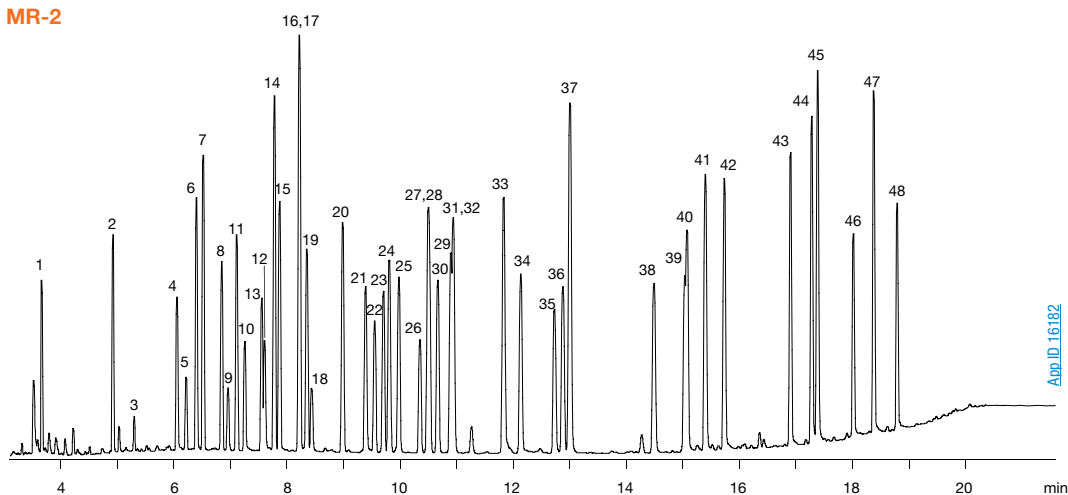
## ZB-MultiResidue<sup>™</sup> -1 and -2 (cont'd)

### Great Results for Organophosphate Pesticides

#### MR-1



#### MR-2



#### Conditions for both column

**Columns:** Zebron MultiResidue-1  
Zebron MultiResidue-2

**Dimensions:** 30 meter x 0.32 mm x 0.50 μm  
30 meter x 0.32 mm x 0.25 μm

**Part No.:** [7HM-G016-17](#)  
[7HM-G017-11](#)

**Injection:** On-Column @ 103 °C, 1 μL

**Carrier Gas:** Helium @ 2.8 mL/min (constant flow)

**Oven Program:** 100 °C for 0.5 min to 180 °C @ 20 °C/min to 240 °C @ 6 °C/min to 320 °C @ 15 °C/min for 2 min

**Detector:** FID @ 340 °C

Note: Columns connected using a 5m Z-Guard Column and a 'Y' splitter.

**Sample:** Analytes are 2 ppm in Dichloromethane.

- |                                    |                         |                              |
|------------------------------------|-------------------------|------------------------------|
| 1. Dichlorvos                      | 17. Fonofos             | 33. Chlorfenvinphos          |
| 2. Mevinphos                       | 18. Phosphamidon Isomer | 34. Crotoxyphos              |
| 3. Trichlorfon                     | 19. Disulfoton          | 35. Stirofos                 |
| 4. TEPP (Tetraethyl Pyrophosphate) | 20. Dichlofenthion      | 36. Tokuthion                |
| 5. Demeton Isomer                  | 21. Phosphamidon        | 37. Merphos Oxide (Tribufos) |
| 6. Thionazin                       | 22. Chlorpyrifos Methyl | 38. Ethion                   |
| 7. Ethoprop                        | 23. Ronnel              | 39. Fensulfothion            |
| 8. Sulfotep                        | 24. Aspon               | 40. Contaminant              |
| 9. Naled                           | 25. Methyl Parathion    | 41. Carbophenothion          |
| 10. Dicrotophos                    | 26. Malathion           | 42. Famfur                   |
| 11. Phorate                        | 27. Fenitrothion        | 43. EPN                      |
| 12. Monocrotophos                  | 28. Chlorpyrifos        | 44. Phosmet                  |
| 13. Demeton                        | 29. Fenthion            | 45. Leptophos                |
| 14. Terbufos                       | 30. Trichloronate       | 46. Azinphos Methyl          |
| 15. Diazinon                       | 31. Parathion           | 47. Azinphos Ethyl           |
| 16. Dimethoate                     | 32. Merphos             | 48. Coumaphos                |

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.

## ZB-MultiResidue™ -1 and -2 (cont'd)

### Ordering Information

#### Zebron ZB-MultiResidue -1 GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>20-Meter</b> |        |                 |                             |
| 0.18            | 0.18   | -60 to 320/340  | <a href="#">7FD-G016-08</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 320/340  | <a href="#">7HG-G016-11</a> |
| 0.32            | 0.25   | -60 to 320/340  | <a href="#">7HM-G016-11</a> |
| 0.32            | 0.50   | -60 to 320/340  | <a href="#">7HM-G016-17</a> |
| 0.53            | 0.50   | -60 to 320/340  | <a href="#">7HK-G016-17</a> |

### Ordering Information

#### Zebron ZB-MultiResidue -2 GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.20   | -60 to 320/340  | <a href="#">7HG-G017-10</a> |
| 0.32            | 0.25   | -60 to 320/340  | <a href="#">7HM-G017-11</a> |
| 0.53            | 0.50   | -60 to 320/340  | <a href="#">7HK-G017-17</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G016-11-B](#) or [7HG-G017-10-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



## ZB-MultiResidue Column Kits

### Ordering Information

| 0.25 mm ID<br>(kit consists of products below)       |                                 |                                 | Part No.: <a href="#">KGO-8237</a> |
|--|---------------------------------|---------------------------------|------------------------------------|
| Description  | Dimension                       | Part No.                        |                                    |
| ZB-MultiResidue-1 Column                             | 30 meter x 0.25 mm x 0.25 µm df | <a href="#">7HG-G016-11</a>     |                                    |
| ZB-MultiResidue-2 Column                             | 30 meter x 0.25 mm x 0.20 µm df | <a href="#">7HG-G017-10</a>     |                                    |
| Z-Guard™   | 5 meter x 0.25 mm               | <a href="#">7AG-G000-00-GZ0</a> |                                    |
| Universal Capillary Column Y-connector, Fused Quartz |                                 | <a href="#">AGO-4717</a>        |                                    |
| Polyimide Resin                                      | 0.5 mL, rated to 350 °C         | <a href="#">AGO-5722</a>        |                                    |
| 0.32 mm ID<br>(kit consists of products below)       |                                 |                                 | Part No.: <a href="#">KGO-8238</a> |
| Description  | Dimension                       | Part No.                        |                                    |
| ZB-MultiResidue-1 Column                             | 30 meter x 0.32 mm x 0.50 µm df | <a href="#">7HM-G016-17</a>     |                                    |
| ZB-MultiResidue-2 Column                             | 30 meter x 0.32 mm x 0.25 µm df | <a href="#">7HM-G017-11</a>     |                                    |
| Z-Guard  | 5 meter x 0.32 mm               | <a href="#">7AM-G000-00-GZ0</a> |                                    |
| Universal Capillary Column Y-connector, Fused Quartz |                                 | <a href="#">AGO-4717</a>        |                                    |
| Polyimide Resin                                      | 0.5 mL, rated to 350 °C         | <a href="#">AGO-5722</a>        |                                    |
| 0.53 mm ID<br>(kit consists of products below)       |                                 |                                 | Part No.: <a href="#">KGO-8239</a> |
| Description  | Dimension                       | Part No.                        |                                    |
| ZB-MultiResidue-1 Column                             | 30 meter x 0.53 mm x 0.50 µm df | <a href="#">7HK-G016-17</a>     |                                    |
| ZB-MultiResidue-2 Column                             | 30 meter x 0.53 mm x 0.50 µm df | <a href="#">7HK-G017-17</a>     |                                    |
| Z-Guard  | 5 meter x 0.53 mm               | <a href="#">7AK-G000-00-GZ0</a> |                                    |
| Universal Capillary Column Y-connector, Fused Quartz |                                 | <a href="#">AGO-4717</a>        |                                    |
| Polyimide Resin                                      | 0.5 mL, rated to 350 °C         | <a href="#">AGO-5722</a>        |                                    |



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-Bioethanol

### Quicker Bioethanol Testing

- Specially designed for fast and accurate bioethanol testing
- Provides accurate and reproducible results for Certificate of Analysis (COA)
- Resolve methanol and ethanol from all other denaturant peaks
- Great resolution of fusel alcohols
- Allows for quick bake out in between runs to eliminate contaminants

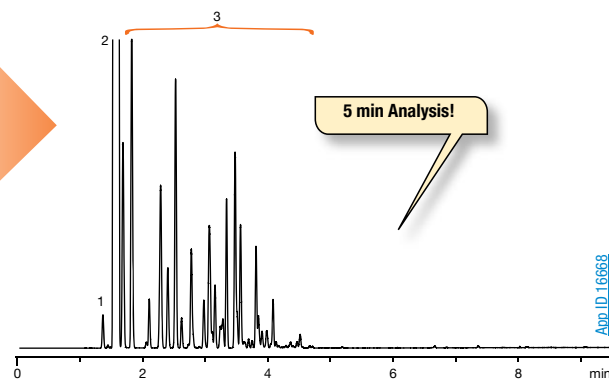
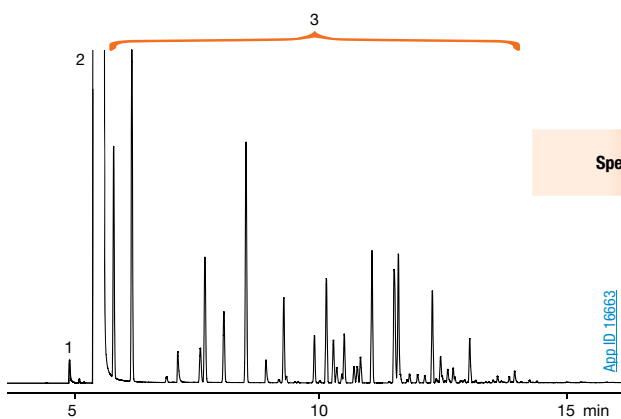
Upgrade to Zebron from traditional phases used for bioethanol:

| Agilent®      | Restek®    | SGE®  | Supelco® |
|---------------|------------|-------|----------|
| • DB®-1       | • Rtx®-1   | • BP1 | • SPB®-1 |
| • HP-1        | • Rxi®-1ms |       | • SE-30  |
| • CP-Sil 5 CB |            |       |          |



### Fast, Accurate Analysis

Determination of Denatured Bioethanol: ASTM Method D5501



**Column:** Zebron ZB-1

**Dimensions:** 100 meter x 0.25 mm x 0.50 µm

**Part No.:** ZMG-G001-17

**Injection:** Split 50:1 @ 300 °C, 1 µL

**Carrier Gas:** Helium @ 35 cm/sec (constant flow)

**Oven Program:** 45 °C for 7 min to 255 °C @ 30 °C/min for 6 min

**Detector:** FID @ 300 °C

**Instrument:** Shimadzu®GC-2010 with Flame Ionization

**Sample:** 1. Methanol  
2. Ethanol  
3. Denaturant

**Column:** Zebron ZB-Bioethanol

**Dimensions:** 15 meter x 0.25 mm x 1.00 µm

**Part No.:** ZEG-G020-22

**Injection:** Split 50:1 @ 300 °C, 1 µL

**Carrier Gas:** Hydrogen @ 25 cm/sec (constant flow)

**Oven Program:** 55 °C for 1.7 min to 260 °C @ 40 °C/min (hold 2.67 min)

**Detector:** FID @ 300 °C

**Instrument:** Shimadzu®GC-2010 with Flame Ionization Detection and AOC-20i Automatic Liquid

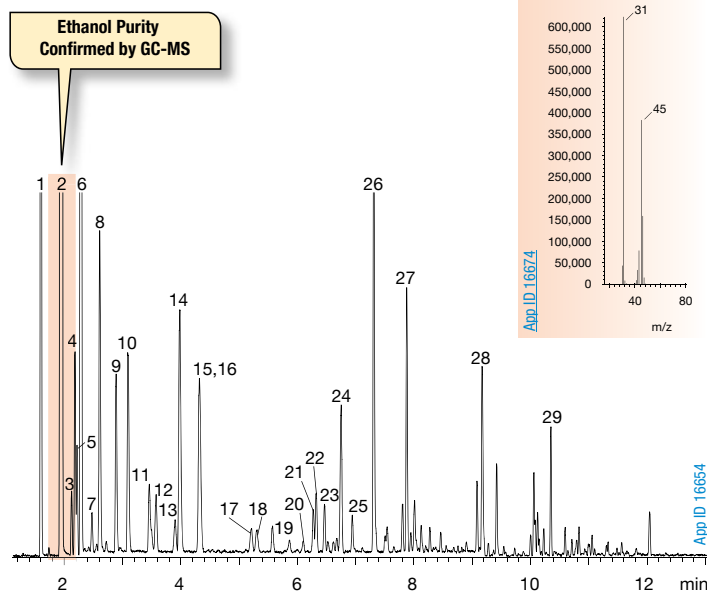
**Sample:** 1. Methanol  
2. Ethanol  
3. Denaturant



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.

## ZB-Bioethanol

### Resolve Fusel Alcohols

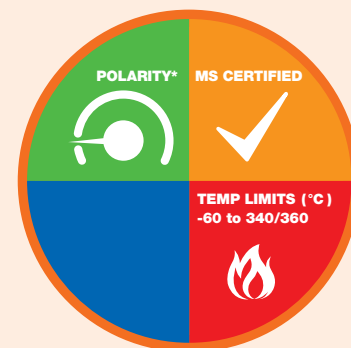


**Column:** Zebron ZB-Bioethanol  
**Dimensions:** 30 meter x 0.25 mm x 1.00 µm  
**Part No.:** [7HG-G020-22](#)  
**Injection:** Split 100:1 @ 240 °C, 0.1 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 40 °C for 5 min to 300 °C @ 25 °C/min  
**Detector:** MSD @ 230 °C; 30-450 amu

**Sample:**

|                        |                            |
|------------------------|----------------------------|
| 1. Methanol            | 17. Methylcyclopentane     |
| 2. Ethanol             | 18. 2,4-Dimethylpentane    |
| 3. Acrolein            | 19. Benzene                |
| 4. Acetone             | 20. Cyclohexane            |
| 5. 2-Methylbutane      | 21. 2-Methylhexane         |
| 6. Isopropyl alcohol   | 22. 2,3-Dimethylpentane    |
| 7. Pentane             | 23. 3-Methylhexane         |
| 8. t-Butanol           | 24. 2,2,4-Trimethylpentane |
| 9. Allyl alcohol       | 25. Heptane                |
| 10. n-Propanol         | 26. Acetal                 |
| 11. 2,3-Dimethylbutane | 27. Toluene                |
| 12. 2-Methylpentane    | 28. Xylene                 |
| 13. 3-Methylpentane    | 29. Trimethylbenzene       |
| 14. 2-Butanol          |                            |
| 15. Ethyl acetate      |                            |
| 16. Hexane             |                            |

#### Column Profile



\*Similar polarity to ZB-1.

#### Phase Chemistry

- Proprietary

#### Recommended Applications

- Alcohols
- Ethanol Testing
- Fusel Alcohols

**i** Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

**➔** For Bioethanol fermentation monitoring, use Rezex-ROA HPLC columns, see p. 319

#### Ordering Information

##### Zebron ZB-Bioethanol GC Columns

| ID (mm)         | df (µm) | Temp. Limits °C | Part No.                    |
|-----------------|---------|-----------------|-----------------------------|
| <b>15-Meter</b> |         |                 |                             |
| 0.25            | 1.00    | -60 to 340/360  | <a href="#">7EG-G020-22</a> |
| <b>30-Meter</b> |         |                 |                             |
| 0.25            | 1.00    | -60 to 340/360  | <a href="#">7HG-G020-22</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G020-22-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

## ZB-1XT SimDist

### High Efficiency Metal Column Performance

- Glass Infusion™ technology for higher efficiency and greater column-to-column reproducibility
- Individual QC testing for every column
- Up to 70% higher efficiency than other columns
- Increased accuracy for high temperature simulated distillation



Upgrade to Zebron from any 100% dimethylpolysiloxane phase:

#### Agilent®

- DB®-1
- DB-HT SimDis
- DB-PS1
- DB-PS2887
- CP-SimDist
- CP-SimDist UltiMetal

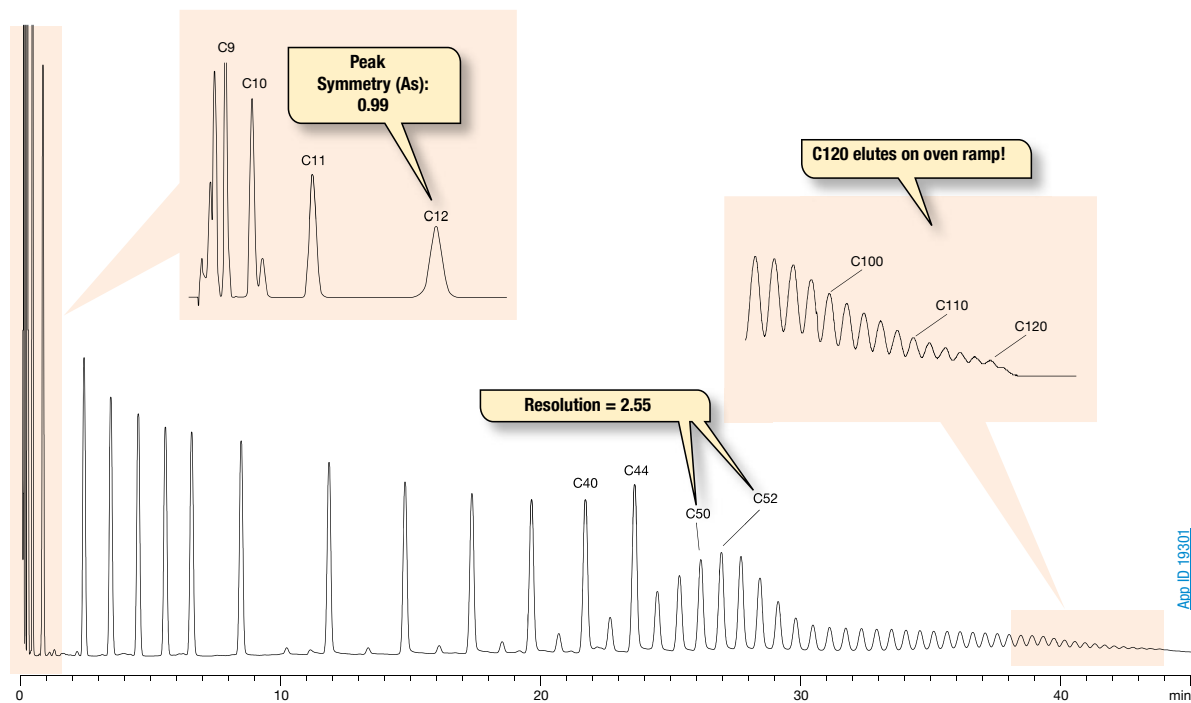
#### Restek®

- Rtx®-1
- Rxi®-1HT
- MXT®-1HT SimDist

#### SGE®

- BP1
- BPX1-SimD

### ASTM D7169: Simulated Distillation



App ID: 19301

| Method Requirement   | ZB-1XT SimDist Value      | Pass |
|--|---------------------------|------|
| Resolution of C50 / C52 is between 1.8 and 4.0             | 2.55                      | •    |
| Peak skew for any peak from C12-C24 is between 0.8 and 1.2 | C12 Skew = 0.99           | •    |
| C100 elutes on temperature ramp                            | Up to C120 elutes on ramp | •    |

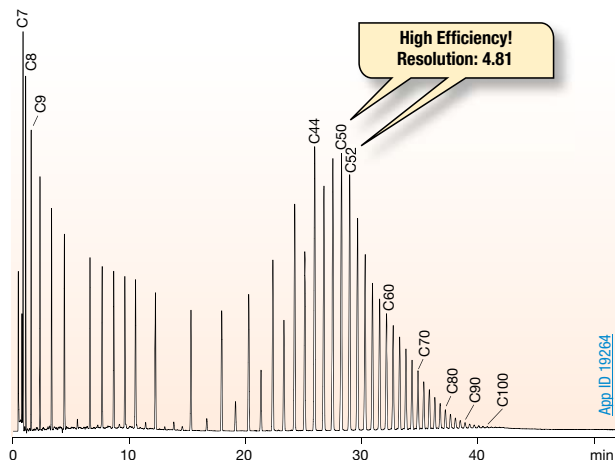
**Column:** Zebron ZB-1XT SimDist  
**Dimensions:** 5 meter x 0.53 mm x 0.09 µm  
**Part No.:** [7AK-G026-55](#)  
**Injection:** On-Column @ 53°C, 1 µL  
**Carrier Gas:** Helium @ 34 mL/min (constant flow)  
**Oven Program:** 35°C to 430°C @ 9°C/min for 10 min  
**Detector:** FID @ 450°C  
**Sample:** D2887 calibration mix with POLYWAX® 1000 in CS<sub>2</sub>  
 Note: This chromatogram has been baseline subtracted.

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.

## ZB-1XT SimDist

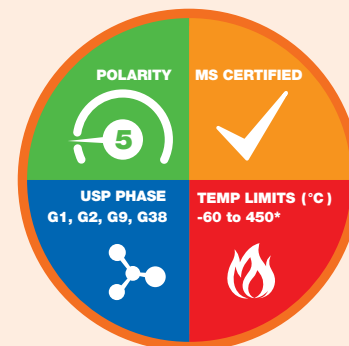
### Improve Results for Simulated Distillation

Hydrocarbons C7–C100+: ASTM Method D7169



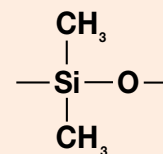
**Column:** Zebron ZB-1XT SimDist  
**Dimensions:** 5 meter x 0.53 mm x 0.15 µm  
**Part No.:** [7AK-G026-05](#)  
**Injection:** On-Column @ 33 °C, 1 µL  
**Carrier Gas:** Helium @ 7 mL/min (constant flow)  
**Oven Program:** 30 °C to 450 °C @ 10 °C/min for 10 min  
**Detector:** FID @ 450 °C  
**Sample:** C7 to C44 hydrocarbons and POLYWAX® 655 in CS<sub>2</sub>  
 Note: Chromatogram is baseline subtracted.

#### Column Profile



\*Thicker film (2.65 µm) is rated to 400 °C.

#### Phase Chemistry



100 % Dimethylpolysiloxane

#### Recommended Applications

- ASTM Methods (D2887, D3710, D6352, D7169)
- Crude Oil
- Gasoline Fractions
- Petroleum Distillates
- Petroleum Fractions
- Simulated Distillation
- Vacuum Distillates

#### Ordering Information

##### Zebron ZB-1XT SimDist GC Columns

| ID(mm)   | df(µm) | Temp. Limits °C | Part No.                        |
|--|--------|-----------------|---------------------------------|
| <b>5-Meter</b>   |        |                 |                                 |
| 0.53   | 0.09   | -60 to 450      | <a href="#">7AK-G026-55</a>     |
| 0.53   | 0.15   | -60 to 450      | <a href="#">7AK-G026-05</a>     |
| <b>5-Meter with 2-Meter Guardian™ Integrated Guard</b> |        |                 |                                 |
| 0.53   | 0.09   | -60 to 450      | <a href="#">7AK-G026-55-GGT</a> |
| 0.53   | 0.15   | -60 to 450      | <a href="#">7AK-G026-05-GGT</a> |
| <b>10-Meter</b>  |        |                 |                                 |
| 0.53   | 0.15   | -60 to 450      | <a href="#">7CK-G026-05</a>     |
| 0.53   | 0.88   | -60 to 450      | <a href="#">7CK-G026-49</a>     |
| 0.53   | 2.65   | -60 to 400      | <a href="#">7CK-G026-35</a>     |
| <b>15-Meter</b>  |        |                 |                                 |
| 0.53   | 0.25   | -60 to 450      | <a href="#">7EK-G026-11</a>     |

If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7CK-G026-05-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



**ZB-1XT SimDist Test Mix**  
 Part No.: [AG0-8645](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Guard Column Connections  
 SiTite™ Mini-Unions for 0.8mm ID columns (P/N: [AG0-8825](#)) and Replacement Ferrules (P/N: [AG0-8824](#))

## ZB-Drug-1

### Faster Drugs of Abuse Testing

- Optimized phase for the separation of drugs of abuse
- Provides fast analysis with great peak shape
- Improves resolution of target analytes from matrix interferences
- Specially deactivated to improve quantitation for drug compounds

Upgrade to Zebron from traditional phases used for drugs of abuse:

#### Agilent®

- DB®-1ms
- DB-5ms
- DB-35

#### Restek®

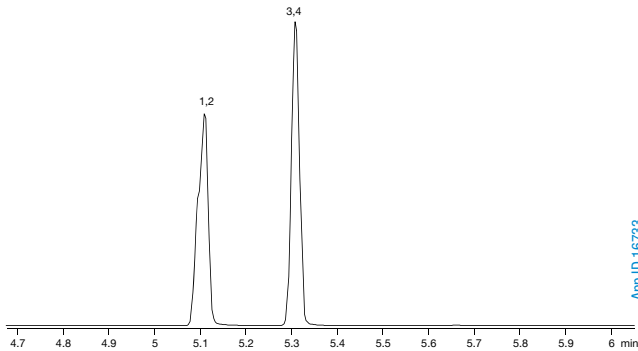
- Rxi®-1ms
- Rtx®-5
- Rtx-5ms
- Rtx-35ms

#### Supelco®

- SPB®-1

### Optimized Selectivity for Multiple Drug Classes

#### Traditional 5% Phenyl Phase

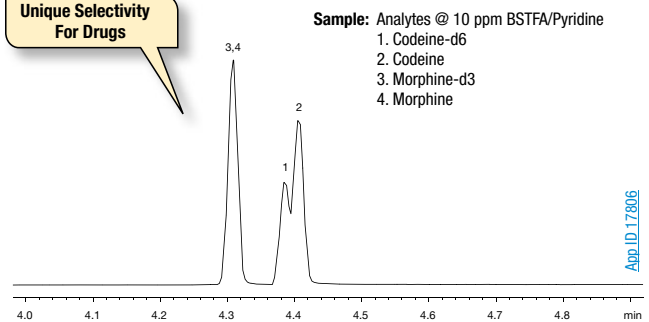


App ID: 16733

**Column:** As listed  
**Dimensions:** 10 meter x 0.18 mm x 0.18 µm  
**Injection:** Split 10:1 @ 240 °C, 1 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 140 °C to 320 °C @ 20 °C for 1 min  
**Detector:** MSD @ 230 °C

#### Zebron ZB-Drug-1

Unique Selectivity For Drugs

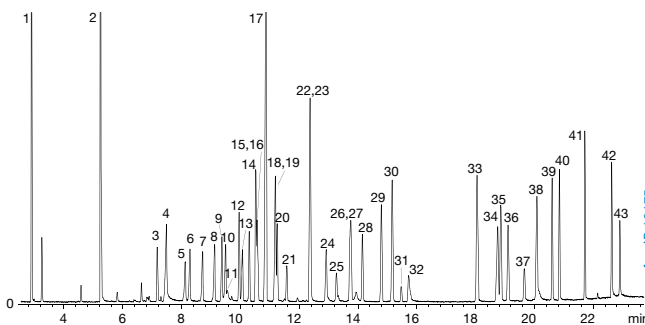


App ID: 17806

**Column:** As listed  
**Dimensions:** 10 meter x 0.18 mm x 0.18 µm  
**Part No.:** [ZCD-G023-08](#)  
**Injection:** Split 10:1 @ 280 °C, 1 µL  
**Carrier Gas:** Helium @ 55 cm/sec (constant flow)  
**Oven Program:** 180 °C to 340 °C @ 20 °C/min  
**Detector:** MSD @ 230 °C

**Sample:** Analytes @ 10 ppm BSTFA/Pyridine  
 1. Codeine-d6  
 2. Codeine  
 3. Morphine-d3  
 4. Morphine

#### Common Drug Screen by GC-MS



App ID: 18175

**Column:** Zebron ZB-Drug-1  
**Dimensions:** 10 meter x 0.18 mm x 0.18 µm  
**Part No.:** [ZCD-G023-08](#)  
**Injection:** Split 10:1 @ 260 °C, 1 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 50 °C to 150 °C @ 15 °C/min to 240 °C @ 7 °C/min to 320 °C @ 25 °C/min for 2 min  
**Detector:** MSD @ 320 °C; 45-450 amu

**Sample:** Analytes are 25 ppm in Methanol

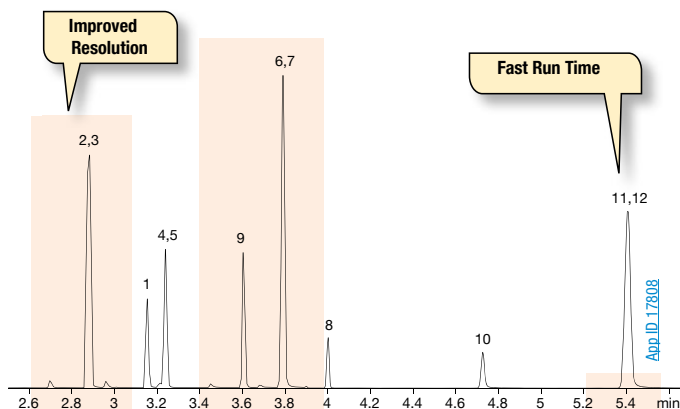
- |                   |                      |                    |
|-------------------|----------------------|--------------------|
| 1. Acetophenone   | 15. Meprobamate      | 29. Trimipramine   |
| 2. Nicotine       | 16. Diphenhydramine  | 30. Chlorcyclizine |
| 3. Benzocaine     | 17. Lidocaine        | 31. Cocaine        |
| 4. Ibuprofen      | 18. Hexobarbital     | 32. Desipramine    |
| 5. Allobarbitol   | 19. Doxylamine       | 33. Codeine        |
| 6. Aprobarbital   | 20. Glutethimide     | 34. Morphine       |
| 7. Butalbital     | 21. Caffeine         | 35. Diazepam       |
| 8. Amobarbital    | 22. Chlorpheniramine | 36. Hydrocodone    |
| 9. Phenacetin     | 23. Methapyrilene    | 37. 6-MAM          |
| 10. Pentobarbital | 24. Phenobarbital    | 38. Oxycodone      |
| 11. Acetaminophen | 25. Procaine         | 39. Heroin         |
| 12. Benzphetamine | 26. Methadone        | 40. Fentanyl       |
| 13. Secobarbital  | 27. Brompheniramine  | 41. Ibogaine       |
| 14. Phencyclidine | 28. Propoxyphene     | 42. Triazolam      |
|                   |                      | 43. LSD            |

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.

## ZB-Drug-1

### Faster Run Times and Improved Resolution

#### Zebron ZB-Drug-1

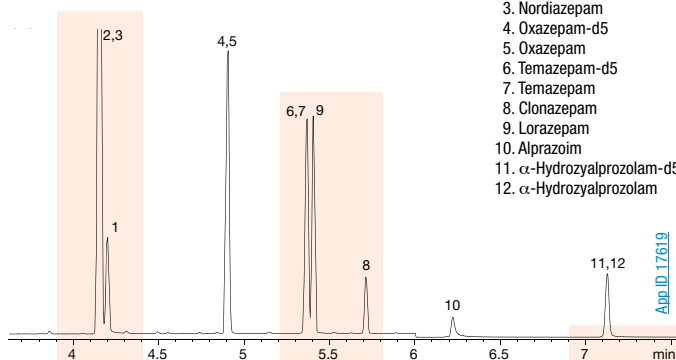


**Column:** Zebron ZB-Drug-1  
**Dimensions:** 10 meter x 0.18 mm x 0.18 µm  
**Part No.:** [7CD-G023-08](#)  
**Injection:** Split 10:1 @ 280 °C, 1 µL  
**Carrier Gas:** Helium @ 0.7 mL/min (constant flow)  
**Oven Program:** 200 °C to 210 °C @ 20 °C/min at 320 °C @ 30 °C/min for 1 min  
**Detector:** MSD @ 320 °C

#### Traditional Mid-Polar Phase

**Sample:**

1. Diazepam
2. Nordiazepam-d5
3. Nordiazepam
4. Oxazepam-d5
5. Oxazepam
6. Temazepam-d5
7. Temazepam
8. Clonazepam
9. Lorazepam
10. Alprazolam
11. α-Hydroxyalprazolam-d5
12. α-Hydroxyalprazolam



**Dimensions:** 10 meter x 0.18 mm x 0.18 µm  
**Injection:** Split 10:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 0.6 mL/min (constant flow)  
**Oven Program:** 180 °C to 340 °C @ 20 °C/min for 2 min  
**Detector:** MSD @ 320 °C

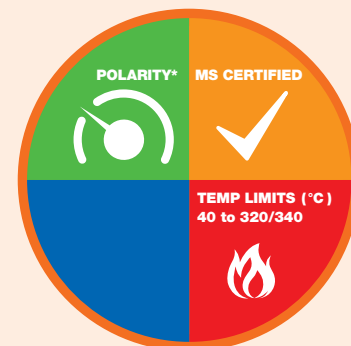
#### Ordering Information

##### Zebron ZB-Drug-1 GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>10-Meter</b> |        |                 |                             |
| 0.18            | 0.18   | 40 to 320/340   | <a href="#">7CD-G023-08</a> |
| <b>15-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | 40 to 320/340   | <a href="#">7EG-G023-11</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | 40 to 320/340   | <a href="#">7HG-G023-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G023-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



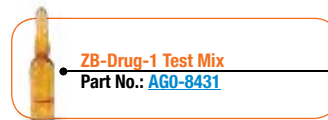
\*Similar polarity to ZB-MultiResidue™-2.

#### Phase Chemistry

- Proprietary

#### Recommended Applications

- Drug Screening
- 6-MAM
- Amphetamines
- Barbiturates
- Benzodiazepines
- PCP
- THC



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-BAC-1 and -2

### Optimized Pair for Blood Alcohol Testing

- Enhanced accuracy for post mortem samples
- Fast run time with baseline resolution of key components in just 2 minutes
- Enhanced resolution of ethanol and acetone peaks
- Achieve confirmation with two elution order changes when running columns in parallel
- Allows for the use of t-butanol or n-propanol as an internal standard

Upgrade to Zebron from these similar\* phases:

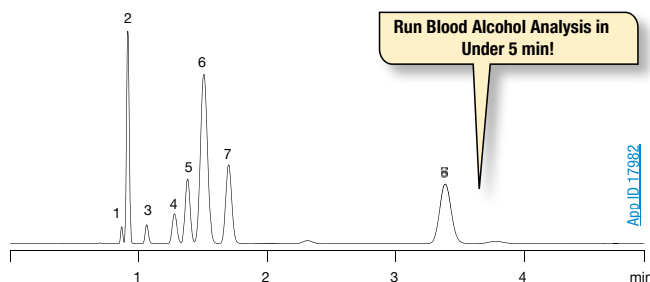
- |                 |                |
|-----------------|----------------|
| <b>Agilent®</b> | <b>Restek®</b> |
| • DB®-ALC1      | • Rtx®-BAC1    |
| • DB-ALC2       | • Rtx-BAC2     |

\*not exact equivalent, selectivity may differ

### Faster, More Sensitive Blood Alcohol Analysis

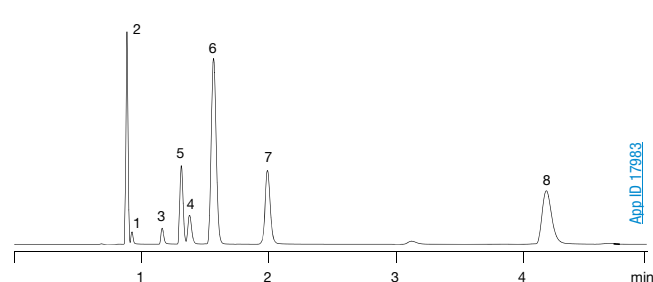
#### Zebron ZB-BAC-1

30 meter x 0.53 mm x 3.00 µm



#### Zebron ZB-BAC-2

30 meter x 0.53 mm x 2.00 µm



#### Conditions for both columns:

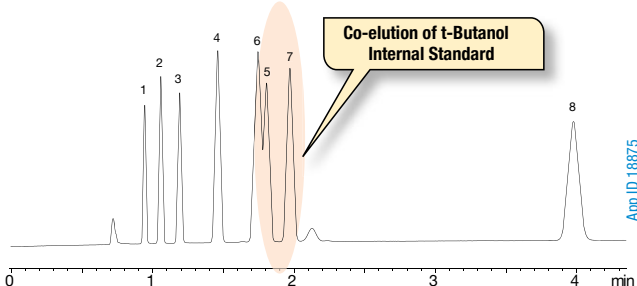
**Column:** As listed  
**Dimensions:** As listed  
**Part No.:** 7HK-G021-36 (ZB-BAC-1)  
 7HK-G022-32 (ZB-BAC-2)  
**Injection:** Split 0.8:1 @ 150 °C, 1 mL  
**Carrier Gas:** Helium @ 80 cm/sec (constant flow)  
**Oven Program:** 40 °C (Isothermal)  
**Detector:** FID @ 250 °C

**Sample:** Analytes 0.025 % and internal standards 0.100 % in water

1. Methanol
2. Acetaldehyde
3. Ethanol
4. Isopropanol
5. Acetone
6. t-Butanol (IS)
7. n-Propanol (IS)
8. 2-Butanol (IS)

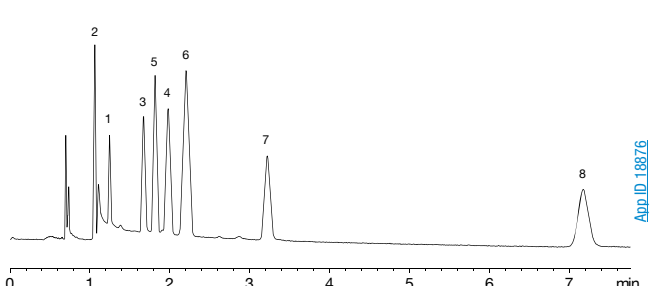
#### Restek Rtx-BAC1

30 meter x 0.53 mm x 3.00 µm



#### Restek Rtx-BAC2

30 meter x 0.53 mm x 2.00 µm



#### Conditions for both columns:

**Column:** As listed  
**Dimensions:** As listed  
**Injection:** Split 5:1 @ 150 °C, 1 mL  
**Carrier Gas:** Helium @ 80 cm/sec (constant flow)  
**Oven Program:** 40 °C (Isothermal)  
**Detector:** FID @ 220 °C

**Sample:** Analytes and internal standards 0.100 % in water

- |                 |                    |
|-----------------|--------------------|
| 1. Methanol     | 5. Acetone         |
| 2. Acetaldehyde | 6. t-Butanol (IS)  |
| 3. Ethanol      | 7. n-Propanol (IS) |
| 4. Isopropanol  | 8. 2-Butanol (IS)  |

Comparative separations may not be representative of all applications.



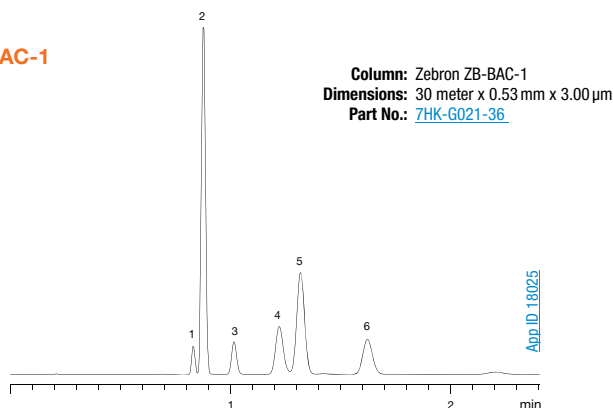
## guarantee

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.

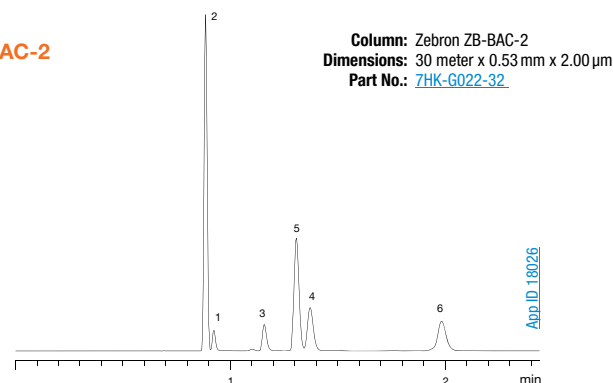
## ZB-BAC-1 and -2

### Run On Helium Or Hydrogen

#### BAC-1



#### BAC-2



#### Conditions for both columns:

- Injection:** Split 5:1 @ 150 °C, 1 mL
- Carrier Gas:** Hydrogen @ 80 cm/sec (constant flow)
- Oven Program:** 40 °C (Isothermal)
- Detector:** FID @ 250 °C
- Sample:** Analytes are 0.100% in water
  1. Methanol
  2. Acetaldehyde
  3. Ethanol
  4. Isopropanol
  5. Acetone
  6. n-Propanol

#### Ordering Information

| Zebron ZB-BAC-1 GC Columns |              |                 |                             |
|----------------------------|--------------|-----------------|-----------------------------|
| ID(mm)                     | df( $\mu$ m) | Temp. Limits °C | Part No.                    |
| 30-Meter                   |              |                 |                             |
| 0.32                       | 1.80         | -20 to 260/280  | <a href="#">7HM-G021-31</a> |
| 0.53                       | 3.00         | -20 to 260/280  | <a href="#">7HK-G021-36</a> |

| Zebron ZB-BAC-2 GC Columns |              |                 |                             |
|----------------------------|--------------|-----------------|-----------------------------|
| ID(mm)                     | df( $\mu$ m) | Temp. Limits °C | Part No.                    |
| 30-Meter                   |              |                 |                             |
| 0.32                       | 1.20         | -20 to 260/280  | <a href="#">7HM-G022-25</a> |
| 0.53                       | 2.00         | -20 to 260/280  | <a href="#">7HK-G022-32</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HM-G021-31-B](#) or [7HM-G022-25-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile

**POLARITY\***

**MS CERTIFIED**

**TEMP LIMITS (°C)**  
-20 to 260/280

\*Similar polarity to ZB-35.

---

**POLARITY\*\***

**MS CERTIFIED**

**TEMP LIMITS (°C)**  
-20 to 260/280

\*\*Similar polarity to ZB-624.

---

#### Phase Chemistry

- Proprietary

---

#### Recommended Applications

- Abused Inhalant Anesthetics
- Blood Alcohol Analysis

Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-1PLUS<sup>™</sup>

### MS Certified "1" Phase

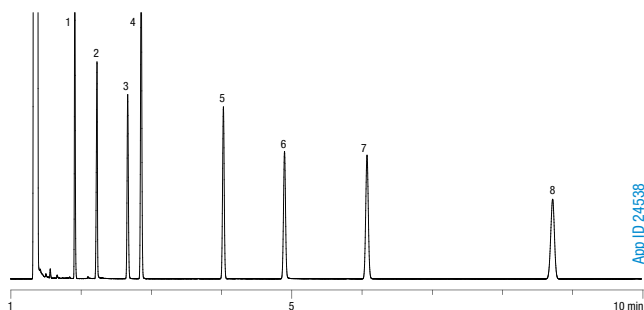
- Very low bleed (MS Certified) phase especially suited to high sensitivity GC-MS
- Extremely inert for active compounds such as drugs, pesticides, or acids and bases
- Improved signal-to-noise ratio for better sensitivity and mass spectral integrity
- Identical selectivity to 100% dimethylpolysiloxane phases

Upgrade to Zebron from any 100% dimethylpolysiloxane phase:

| Agilent <sup>®</sup>   | Restek <sup>®</sup>   | SGE <sup>®</sup>  | Supelco <sup>®</sup>   |
|--|---|---|--|
| <ul style="list-style-type: none"> <li>• DB<sup>®</sup>-1</li> <li>• DB-1ms</li> <li>• DB-1ms Ultra Inert</li> <li>• HP-1</li> <li>• HP-1ms</li> <li>• HP-1ms Ultra Inert</li> <li>• VF-1ms</li> <li>• CP-Sil 5 CB</li> <li>• Ultra 1</li> </ul> | <ul style="list-style-type: none"> <li>• Rtx<sup>®</sup>-1</li> <li>• Rtx-1ms</li> <li>• Rxi<sup>®</sup>-1ms</li> </ul> | <ul style="list-style-type: none"> <li>• BP1</li> <li>• SolGel-1ms<sup>™</sup></li> </ul> | <ul style="list-style-type: none"> <li>• SPB<sup>®</sup>-1</li> <li>• SE-30</li> <li>• MET-1</li> <li>• MDN-1</li> <li>• Equity<sup>®</sup>-1</li> </ul> |

### Lower Overall Column Activity

Activity is a key measure of column quality. ZB-1PLUS columns are aggressively tested to ensure full deactivation. Our QC test below demonstrates low tailing on ZB-1PLUS for even the most active compounds, like 2-ethylhexanoic acid.

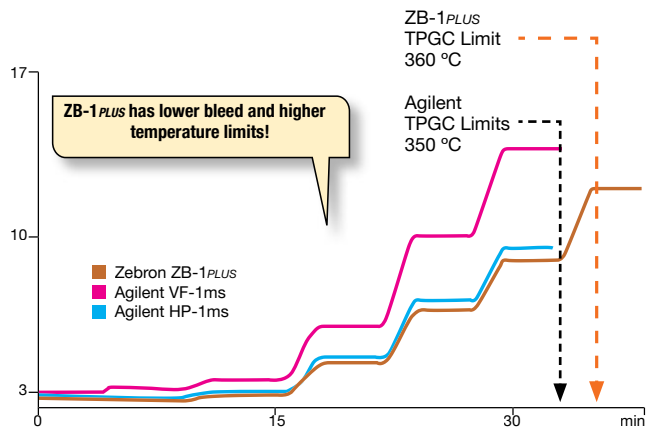


**Column:** Zebron ZB-1PLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Part No.:** ZHG-G031-11  
**Injection:** Split 100:1 @ 250 °C, 1.0 μL  
**Carrier Gas:** Hydrogen @ 1.18 mL/min (constant flow)  
**Oven Program:** 140 °C (Isothermal)  
**Detector:** FID @ 325 °C  
**Sample:**

1. Decane
2. 2-Ethylhexanoic Acid
3. 4-Chlorophenol
4. Naphthalene
5. Tridecane
6. 1-Undecanol
7. Dicyclohexylamine
8. Pentadecane

### Lower Column Bleed

We tested the ZB-1PLUS column bleed profile against other "MS" columns on the market – ZB-1PLUS shows the lowest bleed, even at temperatures up to 360 °C.



Test conditions were stopped at 350 °C for all competitor columns so as not to cause damage to the stationary phase by exceeding their maximum temperature limit.

#### Conditions for all columns:

**Columns:** As listed  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Injection:** Null Injection @ 250 °C  
**Carrier Gas:** Hydrogen @ 100 mL/min (constant flow)  
**Oven Program:** 240 °C for 9 min to 280 °C for 6.3 min to 320 °C for 6.4 min to 340 °C for 5.8 min to 350 °C for 5.5 min to 360 °C  
**Detector:** FID @ 320 °C

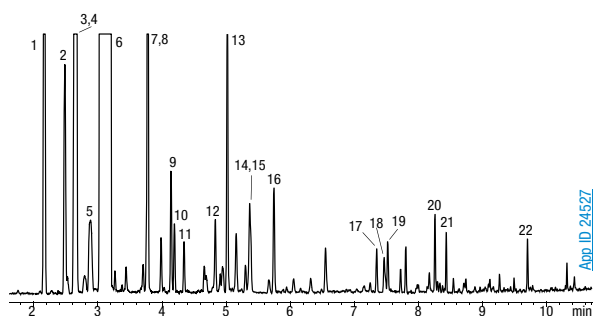


If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-1PLUS™

### Well-Suited for Food & Flavors

#### Cold Pressed Orange Oil by GC-MS



**Column:** Zebron ZB-1PLUS  
**Dimensions:** 10 meter x 0.10 mm x 0.10 µm  
**Part No.:** [7CB-G031-02](#)  
**Injection:** Split 120:1 @ 160 °C, 0.2 µL  
**Carrier Gas:** Helium @ 0.3 mL/min (constant flow)  
**Oven Program:** 60 °C to 130 °C @ 10 °C/min to 280 °C @ 30 °C/min for 3 min  
**Detector:** MSD

- Sample:** Sample was 10% in dichloromethane
- |                          |                |
|--------------------------|----------------|
| 1. α-Pinene              | 13. Decanal    |
| 2. β-Phellandrine        | 14. Carvone    |
| 3. β-Myrcene             | 15. Neral      |
| 4. Octanal               | 16. Geranial   |
| 5. 3-Carene              | 17. α-Cubebene |
| 6. Limonene              | 18. β-Cubebene |
| 7. Nonanal               | 19. Dodecanal  |
| 8. Linalool              | 20. Valencene  |
| 9. cis-Limonene oxide    | 21. Cadinene   |
| 10. trans-Limonene oxide | 22. Nootkatone |
| 11. Citronellal          |                |
| 12. α-Terpineol          |                |

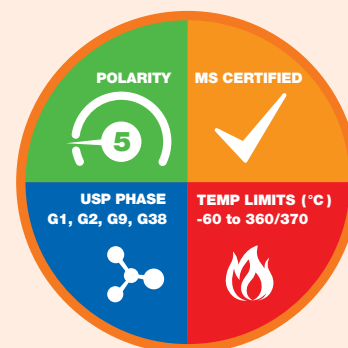
#### Ordering Information

##### Zebron ZB-1PLUS GC Columns

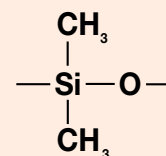
| ID (mm)         | df (µm) | Temp. Limits °C | Part No.                    |
|-----------------|---------|-----------------|-----------------------------|
| <b>15-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | -60 to 360/370  | <a href="#">7EG-G011-11</a> |
| 0.32            | 0.25    | -60 to 360/370  | <a href="#">7EM-G031-11</a> |
| <b>30-Meter</b> |         |                 |                             |
| 0.25            | 0.10    | -60 to 360/370  | <a href="#">7HG-G031-02</a> |
| 0.25            | 0.25    | -60 to 360/370  | <a href="#">7HG-G031-11</a> |
| 0.32            | 0.25    | -60 to 360/370  | <a href="#">7HM-G031-11</a> |
| <b>60-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | -60 to 360/370  | <a href="#">7KG-G031-11</a> |
| 0.25            | 1.00    | -60 to 360/370  | <a href="#">7KG-G031-22</a> |
| 0.32            | 0.25    | -60 to 360/370  | <a href="#">7KM-G031-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G031-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry



100 % Dimethylpolysiloxane

#### Recommended Applications

- Acids
- Amines
- Drugs
- EPA Methods (1668)
- Essential Oils
- Flavors & Fragrances
- Oxygenates and GROs
- PCBs
- Pesticides
- Solvent Impurities
- Sulfur Compounds (Light)



**ZB-1PLUS Test Mix**  
**Part No.:** [AG0-7805](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



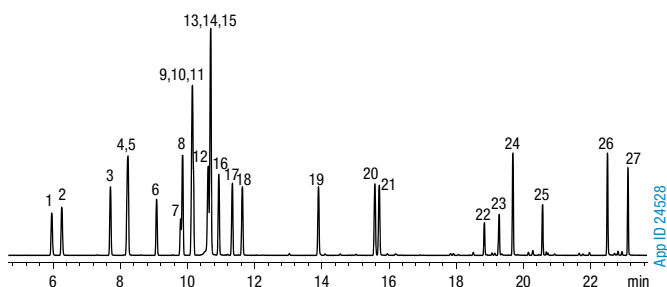
Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-5PLUS<sup>™</sup>

### Inert 5% Phenyl Selectivity

- Highly inert—improved peak shape for acidic/basic compounds, drugs of abuse, and pesticides
- Very low bleed (MS certified) levels provide maximum sensitivity
- Intense QC specifications ensure column-to-column performance
- ESC bonding results in phase stability and high temperature limits
- Traditional bonding chemistry provides the same selectivity as the ZB-5 columns

#### Phenols



**Column:** Zebron ZB-5PLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Part No.:** ZHG-G032-11  
**Injection:** Split 5:1 @ 240 °C, 1 μL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 60 °C to 140 °C @ 5 °C/min to 280 °C @ 10 °C/min  
**Detector:** MSD @ 230 °C, 45-450 amu

**Sample:**

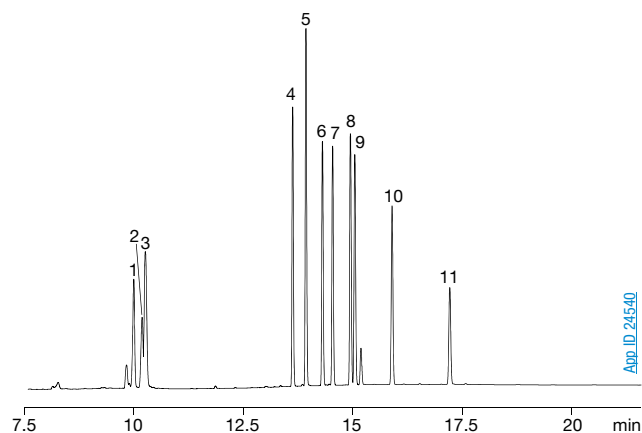
|                        |                                |
|------------------------|--------------------------------|
| 1. Phenol              | 16. 2,3-Dimethylphenol         |
| 2. 2-Chlorophenol      | 17. 3,4-Dimethylphenol         |
| 3. 2-Methylphenol      | 18. 2,6-Dichlorophenol         |
| 4. 4-Methylphenol      | 19. 4-Chloro-3-methylphenol    |
| 5. 3-Methylphenol      | 20. 2,4,6-Trichlorophenol      |
| 6. 2,6-Dimethylphenol  | 21. 2,4,5-Trichlorophenol      |
| 7. 2-Nitrophenol       | 22. 2,4-Dinitrophenol          |
| 8. 2-Ethylphenol       | 23. 4-Nitrophenol              |
| 9. 2,4-Dimethylphenol  | 24. 2,3,4,6-Tetrachlorophenol  |
| 10. 3,5-Dimethylphenol | 25. 4,6-Dinitro-2-methylphenol |
| 11. 2,5-Dimethylphenol | 26. Pentachlorophenol          |
| 12. 4-Ethylphenol      | 27. Dinoseb                    |
| 13. 3-Ethylphenol      |                                |
| 14. 2,4-Dichlorophenol |                                |
| 15. Benzoic Acid       |                                |

App ID: 24528

Upgrade to Zebron from any 5% phenyl / 95% dimethylpolysiloxane phase:

| Agilent <sup>®</sup> | Restek <sup>®</sup>     | SGE <sup>®</sup> | Supelco <sup>®</sup>     | OV <sup>®</sup> |
|----------------------|-------------------------|------------------|--------------------------|-----------------|
| • DB <sup>®</sup> -5 | • Rtx <sup>®</sup> -5   | • BP5            | • MDN-5S                 | • OV-5          |
| • HP-5               | • Rtx-5MS               | • BPX5           | • SPB <sup>®</sup> -5    |                 |
| • HP-5ms             | • Rtx-5Amine            |                  | • Equity <sup>®</sup> -5 |                 |
| • HP-5msi            | • Rxi <sup>®</sup> -5ms |                  |                          |                 |

#### Underivatized Antihistamines by GC-FID



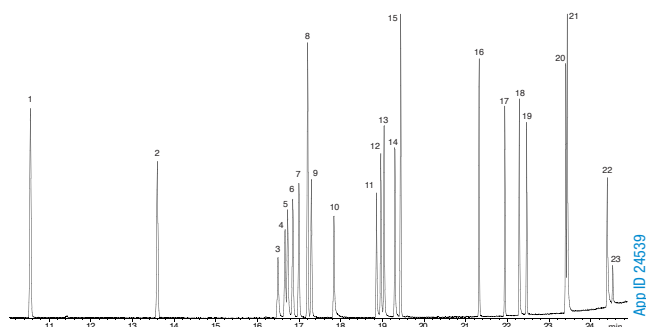
**Column:** Zebron ZB-5PLUS  
**Dimensions:** 30 meter x 0.25 mm x 1.0 μm  
**Part No.:** ZHG-G032-22  
**Injection:** Split 50:1 @ 305 °C, 1 μL  
**Carrier Gas:** Helium @ 1.3 mL/min (constant flow)  
**Oven Program:** 40 °C for 1 min to 240 °C @ 25 °C/min for 2 min to 305 °C @ 25 °C/min for 8 min  
**Detector:** FID @ 320 °C

**Sample:**

|                        |                     |
|------------------------|---------------------|
| 1. Phenylpropanolamine | 7. Phenyltoloxamine |
| 2. Ephedrine           | 8. Methapyrilene    |
| 3. Pseudoephedrine     | 9. Chlorpheniramine |
| 4. Pheniramine         | 10. Brompheniramine |
| 5. Diphenhydramine     | 11. Triprolidine    |
| 6. Doxylamine          |                     |

App ID: 24540

#### Endocrine Disruptors by GC-MS



**Column:** Zebron ZB-5PLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Part No.:** ZHG-G032-11  
**Injection:** Split 40:1 @ 250 °C, 1 μL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 100 °C to 180 °C @ 5 °C/min to 320 °C @ 15 °C/min  
**Detector:** MSD @ 180 °C, 45-450 amu

**Sample:** Analytes are 50 ppm in acetone

|                       |                       |                                |
|-----------------------|-----------------------|--------------------------------|
| 1. Dimethyl phthalate | 9. Terbutylazine      | 17. 4,4'-DDD                   |
| 2. Diethyl phthalate  | 10. Secbumetone       | 18. Di-n-hexyl phthalate       |
| 3. Atraton            | 11. Simetryn          | 19. 4,4'-DDT                   |
| 4. Simazine           | 12. Ametryn           | 20. Dicyclohexyl phthalate     |
| 5. Prometon           | 13. Prometryn         | 21. bis(2-Ethylhexyl)phthalate |
| 6. Atrazine           | 14. Terbutryn         | 22. Di-n-octyl phthalate       |
| 7. Propazine          | 15. Dibutyl phthalate | 23. Ethinyl estradiol          |
| 8. Dipropyl phthalate | 16. 4,4'-DDE          |                                |

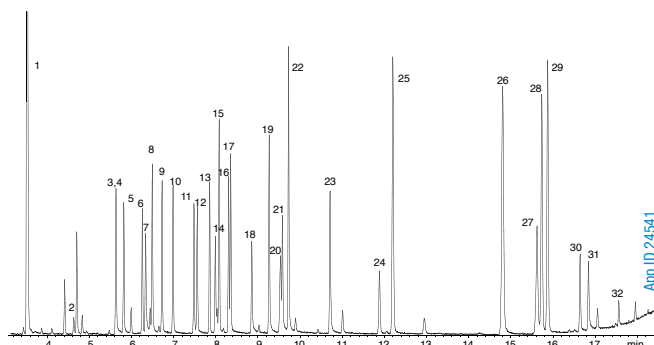
App ID: 24539

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.

## ZB-5PLUS™

### Good Results for Drugs

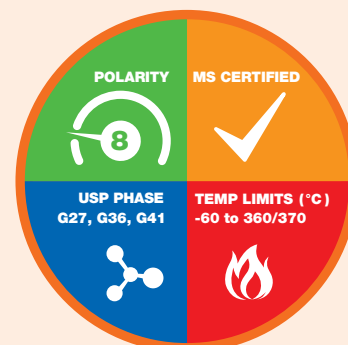
#### Drug Screening by GC-MS



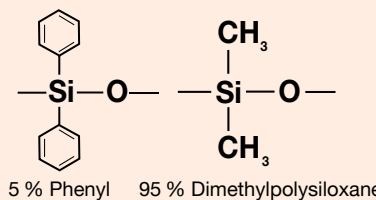
**Column:** Zebron ZB-5PLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G032-11](#)  
**Injection:** Split 15:1 @ 240 °C, 1 µL  
**Carrier Gas:** Helium @ 1.1 mL/min (constant flow)  
**Oven Program:** 140 °C to 240 °C @ 10 °C/min for 5 min to 320 °C @ 25 °C/min for 2.25 min  
**Detector:** MSD @ 230 °C, 45-450 amu

- Sample:** Analytes (underivatized) are 25 ppm in dichloromethane
- |                      |                               |
|----------------------|-------------------------------|
| 1. Nicotine          | 16. Hexobarbital              |
| 2. Methylecgonine    | 17. Dimenhydrinate            |
| 3. Ibuprofen         | 18. Doxylamine                |
| 4. Allobarbitol      | 19. Phenobarbital             |
| 5. Aprobital         | 20. 8-Chlorotheophylline      |
| 6. Butabarbital      | 21. Methapyrilene             |
| 7. Acetaminophen     | 22. Chlorpheniramine          |
| 8. Phenacetin        | 23. Brompheniramine           |
| 9. Amobarbital       | 24. Cocaine                   |
| 10. Pentobarbital    | 25. Chlorcyclizine            |
| 11. Secobarbital     | 26. Codeine                   |
| 12. Meprobamate      | 28. Diazepam                  |
| 13. Methyl benzilate | 29. Hydrocodone               |
| 14. Caffeine         | 30. 6-Monoacetylmorphine      |
| 15. Benzphetamine    | 31. Oxymorphone               |
|                      | 32. Diacetylmorphine (Heroin) |

#### Column Profile



#### Phase Chemistry



#### Recommended Applications

- Drugs
- EPA Methods
- FAMES
- Nitrosamines
- Pesticides
- Phenols

#### Ordering Information

##### Zebron ZB-5PLUS GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>15-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 360/370  | <a href="#">7EG-G032-11</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 360/370  | <a href="#">7HG-G032-11</a> |
| 0.25            | 0.50   | -60 to 360/370  | <a href="#">7HG-G032-17</a> |
| 0.25            | 1.00   | -60 to 360/370  | <a href="#">7HG-G032-22</a> |
| 0.32            | 0.25   | -60 to 360/370  | <a href="#">7HM-G032-11</a> |
| 0.32            | 0.50   | -60 to 360/370  | <a href="#">7HM-G032-17</a> |
| <b>60-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 360/370  | <a href="#">7KG-G032-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G032-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



For high temperature analysis, consider using a ZB-5HT, see p. 140



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-5MSPLUS™

### The Next Generation of Inertness

- The next generation of inertness for specialty chemical, forensic, toxicology, and food testing applications
- Specialized deactivation for versatile 5% phenyl-arylene selectivity with improved sensitivity
- Low bleed (MS Certified) and well-suited to high sensitivity GC-MS and GC-MS/MS work

Upgrade to Zebron from any 5% phenyl or 5% phenyl-arylene / 95% dimethylpolysiloxane phase:

#### Agilent®

- DB®-5ms
- DB-5ms Ultra Inert
- HP-5ms
- HP-5ms Ultra Inert
- VF-5ms

#### Restek®

- Rxi®-5Sil MS

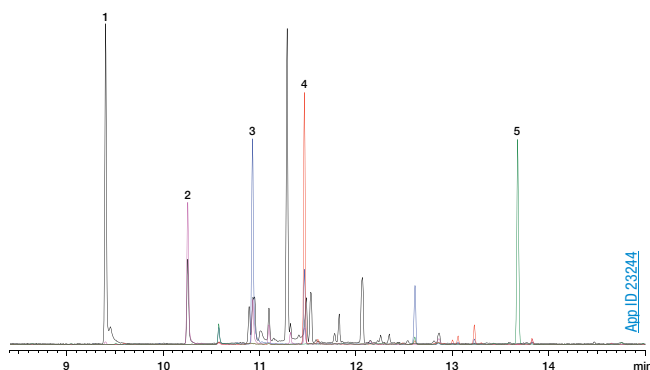
#### Supelco®

- SLB®-5ms

### Engineered for High Performance

Active sites on a GC column's surface can result in analyte adsorption and degradation, negatively affecting peak shape and response. To reduce potential surface activity, Zebron ZB-5MSPLUS is designed with a rigorous fused silica deactivation process that improves inertness for troublesome compounds. Instantly achieve higher responses for active compounds compared to your current 5ms phase column, without changing your selectivity.

#### Melamine in Dog Food by GC-MS



- Extraction Protocol:**
1. Combine 0.5 g of homogenized dog food with 10 mL of DEA/Water/Acetonitrile (1:4:5) in a 15 mL centrifuge tube
  2. Sonicate for 30 min
  3. Centrifuge at 5000 rpm for 10 min
  4. Transfer 100 µL of supernatant to an autosampler vial and evaporate to dryness using nitrogen gas
  5. Reconstitute with 100 µL of Acetonitrile/Pyridine (1:1) and then derivatize using 100 µL BSTFA with 1% TCMS at 70 °C for 45 min

**Column:** Zebron ZB-5MSPLUS

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

**Part No.:** [7HG-G030-11](#)

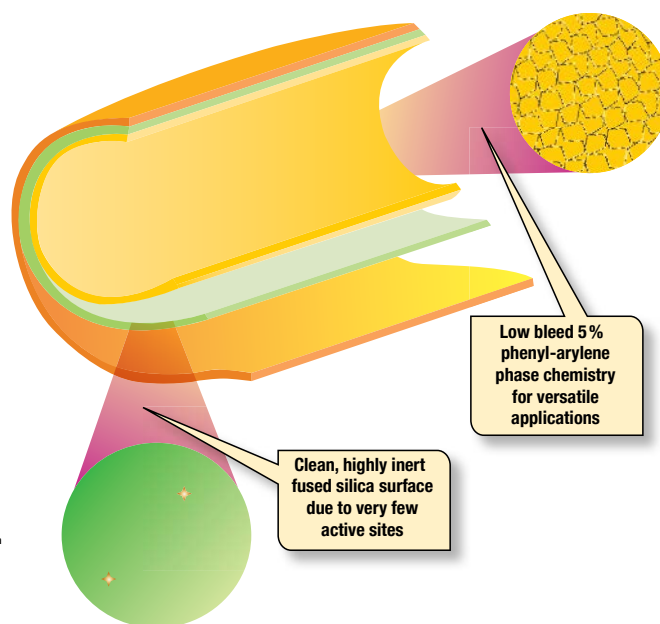
**Injection:** Splitless @ 280 °C, 1 µL

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

**Oven Program:** 75 °C for 1 min to 320 °C @ 15 °C/min hold for 4 min

**Detector:** MSD @ 320 °C

- Sample:**
1. Cyanuric acid
  2. Ammelide
  3. Ammeline
  4. Melamine
  5. Benzoguanamine

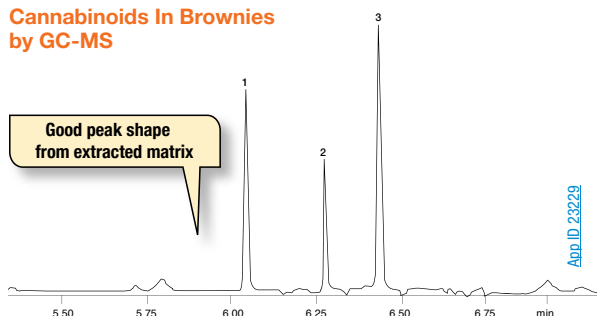


If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-5MSPLUS™

### Versatile Performance For Drugs and Chemicals

#### Cannabinoids In Brownies by GC-MS

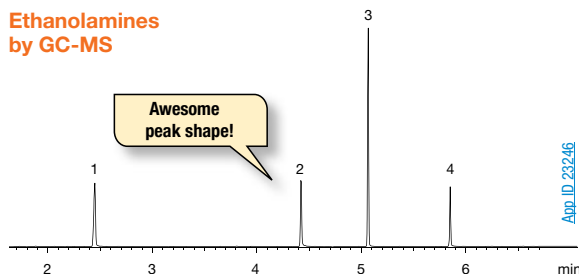


#### Extraction Protocol:

1. Combine 1 g of chocolate brownie with 10 mL of water in a 50 mL centrifuge tube
2. Shake using a mechanical shaker until dissolved
3. Add roQ™ QuEChERS EN15662 extraction salt packet (KSO-8909) and 10 mL of acetonitrile
4. Shake tube for 3 min using mechanical shaker
5. Centrifuge at 2700 rpm for 5 min
6. Transfer 1 mL of supernatant to an autosampler vial for GC-MS analysis

**Column:** Zebron ZB-5MSPLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 μm  
**Part No.:** 7HG-G030-11  
**Injection:** Splitless @ 250 °C, 1 μL  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 100 °C for 1 min to 320 °C @ 50 °C/min, hold for 2 min  
**Detector:** MSD @ 320 °C  
**Sample:** 1. Cannabidiol  
 2. Δ-9-Tetrahydrocannabinol  
 3. Cannabinol

#### Ethanolamines by GC-MS



**Column:** Zebron ZB-5MSPLUS  
**Dimensions:** 30 meter x 0.25 mm x 1.00 μm  
**Part No.:** 7HG-G030-22  
**Injection:** Split 200:1 @ 250 °C, 1 μL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 30 °C to 300 °C @ 40 °C/min  
**Detector:** MSD @ 320 °C  
**Sample:** 1. Monoethanolamine  
 2. Diethanolamine  
 3. Triethylene glycol monomethyl ether (IS)  
 4. Triethanolamine

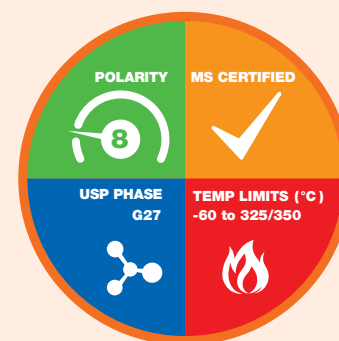
#### Ordering Information

##### Zebron ZB-5MSPLUS GC Columns

| ID(mm)  | df(μm) | Temp. Limits °C | Part No.                        |
|---|--------|-----------------|---------------------------------|
| <b>15-Meter</b>   |        |                 |                                 |
| 0.25  | 0.25   | -60 to 325/350  | <a href="#">7EG-G030-11</a>     |
| <b>20-Meter</b>   |        |                 |                                 |
| 0.18  | 0.18   | -60 to 325/350  | <a href="#">7FD-G030-08</a>     |
| 0.18  | 0.36   | -60 to 325/350  | <a href="#">7FD-G030-53</a>     |
| <b>30-Meter</b>   |        |                 |                                 |
| 0.25  | 0.25   | -60 to 325/350  | <a href="#">7HG-G030-11</a>     |
| 0.25  | 0.50   | -60 to 325/350  | <a href="#">7HG-G030-17</a>     |
| 0.25  | 1.00   | -60 to 325/350  | <a href="#">7HG-G030-22</a>     |
| 0.32  | 0.25   | -60 to 325/350  | <a href="#">7HM-G030-11</a>     |
| 0.32  | 1.00   | -60 to 325/350  | <a href="#">7HM-G030-22</a>     |
| <b>30-Meter with 5-Meter Guardian™ Integrated Guard</b> |        |                 |                                 |
| 0.25  | 0.25   | -60 to 325/350  | <a href="#">7HG-G030-11-GGA</a> |
| <b>30-Meter with 10-Meter Guardian Integrated Guard</b> |        |                 |                                 |
| 0.25  | 0.25   | -60 to 325/350  | <a href="#">7HG-G030-11-GGC</a> |
| 0.25  | 0.50   | -60 to 325/350  | <a href="#">7HG-G030-17-GGC</a> |
| <b>60-Meter</b>   |        |                 |                                 |
| 0.25  | 0.25   | -60 to 325/350  | <a href="#">7KG-G030-11</a>     |

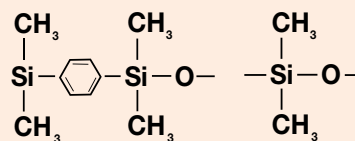
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G030-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry

5 % Phenyl-Arylene



#### Recommended Applications

- Acids
- Alkaloids
- Amines
- Drugs
- Essential Oils
- Flavors
- Halo-hydrocarbons
- Pesticides
- Phenols
- Residual Solvents
- Solvent Impurities



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

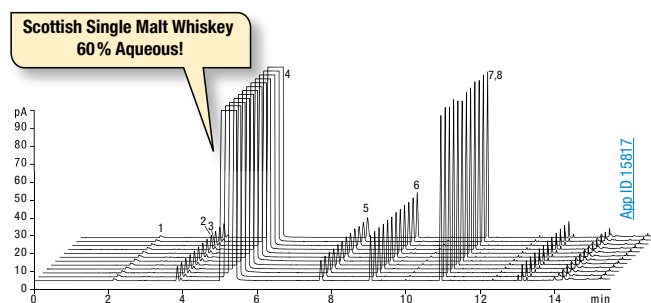
## ZB-WAXPLUS™

### Enhanced Aqueous Stability

- 100% aqueous stable, excellent for aqueous samples
- Extremely inert for acidic compounds
- Enhanced selectivity for low boiling solvents
- High retention of alcohols and chlorinated solvents
- Increased efficiency at 20°C

### Water Reproducibility of ZB-WAXPLUS

Historically, polyethylene glycol (PEG) phases have been unstable with aqueous samples such as beverages or glycols, resulting in poor reproducibility and decreased lifetime. ZB-WAXPLUS bonding procedure results in exceptional stability to repeated injections of aqueous matrices.



Upgrade to Zebron from any polyethylene glycol phase:

#### Agilent®

- DB®-WAX
- CAM
- HP-20M
- Carbowax 20M
- CP-Wax 52 CB

#### Restek®

- Stabilwax®

#### SGE®

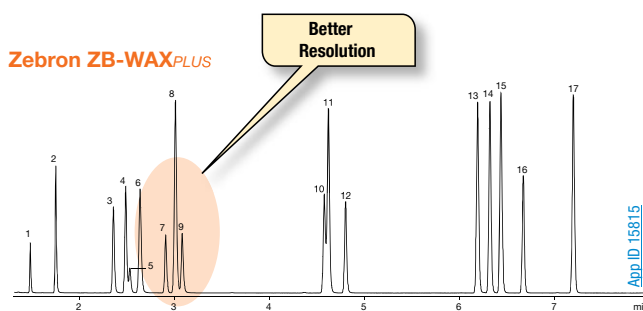
- BP20

#### Supelco®

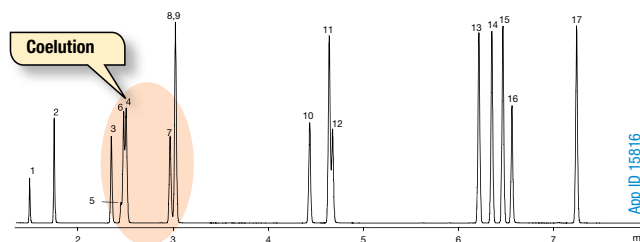
- SUPELCOWAX® 10

**Column:** Zebron ZB-WAXPLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** ZHG-G013-11  
**Injection:** Split 30:1 @ 140 °C, 0.2 µL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 35 °C for 5 min to 85 °C @ 10 °C/min to 200 °C @ 25 °C/min for 1 min  
**Detector:** FID @ 200 °C  
**Sample:** 1. Acetaldehyde  
 2. Ethyl Acetate  
 3. Methanol  
 4. Ethanol  
 5. Propanol  
 6. Isobutanol  
 7. 2-Methylbutanol  
 8. 3-Methylbutanol

### Improve Resolution



#### Restek Stabilwax



Conditions same for both columns:

**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Injection:** Split 100:1 @ 250 °C, 1 µL  
**Carrier Gas:** Hydrogen @ 1.0 mL/min (constant flow)  
**Oven Program:** 35 °C for 2.5 min to 85 °C @ 10 °C/min and hold until last peak elutes  
**Detector:** FID @ 225 °C

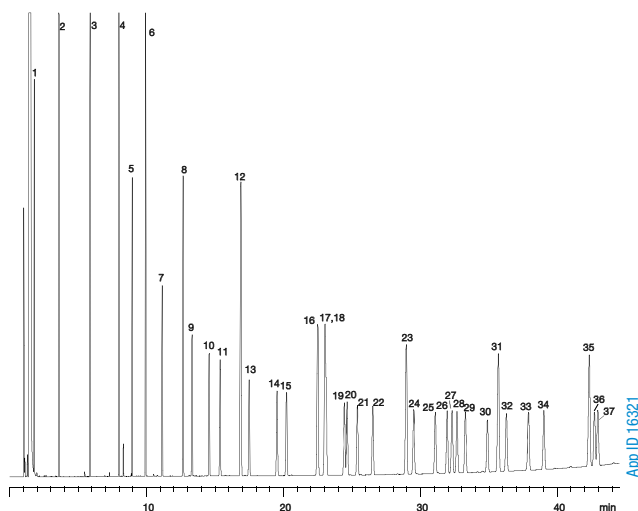
**Sample:** 1. Methyl Formate  
 2. Acetone  
 3. Ethyl Acetate  
 4. Methyl Ethyl Ketone  
 5. Methanol  
 6. 2-Methyl-2-propanol  
 7. Methylene Chloride  
 8. Benzene  
 9. Ethanol  
 10. 2-Butanol  
 11. Toluene  
 12. n-Propanol  
 13. Ethyl Benzene  
 14. p-Xylene  
 15. m-Xylene  
 16. 1-Butanol  
 17. o-Xylene

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.

## ZB-WAXPLUS<sup>™</sup>

### A Food Testing Must-Have

#### Food Industry FAMES



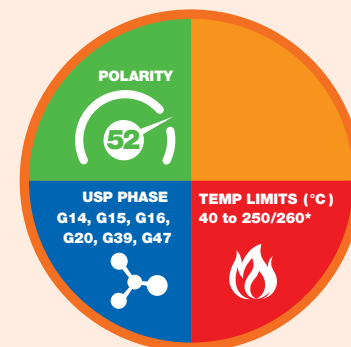
**Column:** Zebron ZB-WAXPLUS  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G013-11](#)  
**Injection:** Split 5:1 @ 220 °C, 1 µL  
**Carrier Gas:** Helium @ 3 mL/min (constant flow)  
**Oven Program:** 60 °C for 2 min to 150 °C @ 13 °C/min to 240 @ 2 °C/min  
**Detector:** FID @ 250 °C  
**Sample:** See the full compound list at [www.phenomenex.com/GC](http://www.phenomenex.com/GC)

#### Ordering Information

| Zebron ZB-WAXPLUS GC Columns |        |                 |                             |
|------------------------------|--------|-----------------|-----------------------------|
| ID(mm)                       | df(µm) | Temp. Limits °C | Part No.                    |
| <b>10-Meter</b>              |        |                 |                             |
| 0.10                         | 0.10   | 20 to 250/260   | <a href="#">7CB-G013-02</a> |
| <b>15-Meter</b>              |        |                 |                             |
| 0.25                         | 0.25   | 20 to 250/260   | <a href="#">7EG-G013-11</a> |
| 0.53                         | 1.00   | 20 to 230/240   | <a href="#">7EK-G013-22</a> |
| <b>20-Meter</b>              |        |                 |                             |
| 0.18                         | 0.18   | 20 to 250/260   | <a href="#">7FD-G013-08</a> |
| <b>30-Meter</b>              |        |                 |                             |
| 0.25                         | 0.25   | 20 to 250/260   | <a href="#">7HG-G013-11</a> |
| 0.25                         | 0.50   | 20 to 250/260   | <a href="#">7HG-G013-17</a> |
| 0.32                         | 0.25   | 20 to 250/260   | <a href="#">7HM-G013-11</a> |
| 0.32                         | 0.50   | 20 to 250/260   | <a href="#">7HM-G013-17</a> |
| 0.32                         | 1.00   | 20 to 230/240   | <a href="#">7HM-G013-22</a> |
| 0.53                         | 1.00   | 20 to 230/240   | <a href="#">7HK-G013-22</a> |
| <b>60-Meter</b>              |        |                 |                             |
| 0.25                         | 0.15   | 20 to 250/260   | <a href="#">7KG-G013-05</a> |
| 0.25                         | 0.25   | 20 to 250/260   | <a href="#">7KG-G013-11</a> |
| 0.25                         | 0.50   | 20 to 250/260   | <a href="#">7KG-G013-17</a> |
| 0.32                         | 0.25   | 20 to 250/260   | <a href="#">7KM-G013-11</a> |
| 0.32                         | 0.50   | 20 to 250/260   | <a href="#">7KM-G013-17</a> |
| 0.53                         | 1.00   | 20 to 230/240   | <a href="#">7KK-G013-22</a> |

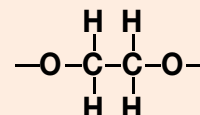
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G013-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



\*Thicker films (≥ 1.0 µm) are rated to 230/240 °C.

#### Phase Chemistry



100 % Polyethylene Glycol

#### Recommended Applications

- Alcohols
- Aldehydes
- Aromatics
- Essential Oils
- Flavors & Fragrances
- Free Fatty Acids
- Glycols
- OVIs
- Pharmaceuticals
- Solvents / Residual Solvents
- Styrene
- Xylene Isomers



**ZB-WAXPLUS Test Mix**  
**Part No.:** [AGO-7869](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime.  
 Add a Z-guard to your next Zebron GC order.

## ZB-1HT Inferno™

### Robust Results Up to 430 °C

- First non-metal columns stable to 430 °C
- Provides true boiling point separation for hydrocarbon distillation methods
- Longer lifetime with rugged high temperature, polyimide coated, fused silica tubing
- Low activity, provides good peak shape for acidic and basic samples
- Provides robust column performance for high temperature bake outs

Upgrade to Zebron from any 100% dimethylpolysiloxane phase:

#### Agilent®

- DB®-1
- DB-1ht
- HP-1
- CP-Sil 5 CB
- CP-SimDist

#### Restek®

- Rtx®-1
- Rxi®-1HT

#### SGE®

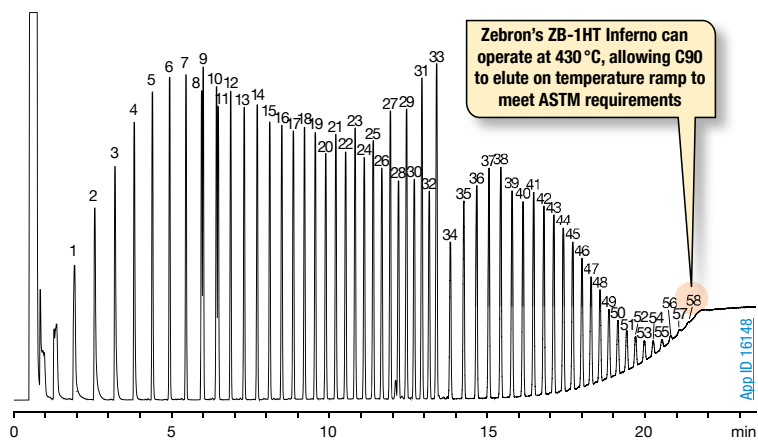
- BP1

#### Supelco®

- SPB®-1
- Petrocol® 2887

### Rugged, High-Temperature Performance

#### Great Separation of High Boiling Hydrocarbons (ASTM D6352)

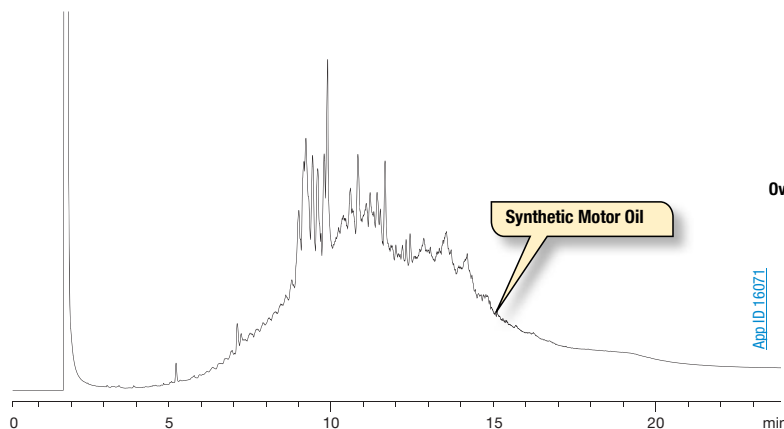


**Column:** Zebron ZB-1HT Inferno  
**Dimensions:** 5 meter x 0.53 mm x 0.10 µm  
**Part No.:** [7AK-G014-02](#)  
**Injection:** On-Column @ 43 °C, 0.1 µL  
**Carrier Gas:** Helium @ 4.4 mL/min (constant flow)  
**Oven Program:** 40 °C for 0.5 min to 430 °C @ 20 °C/min for 10 min  
**Detector:** FID @ 430 °C

| Sample | 1. C10      | 16. C23 | 31. C38 | 46. C66 |
|--------|-------------|---------|---------|---------|
|        | 2. C11      | 17. C24 | 32. C39 | 47. C68 |
|        | 3. C12      | 18. C25 | 33. C40 | 48. C70 |
|        | 4. C13      | 19. C26 | 34. C42 | 49. C72 |
|        | 5. C14      | 20. C27 | 35. C44 | 50. C74 |
|        | 6. C15      | 21. C28 | 36. C46 | 51. C76 |
|        | 7. C16      | 22. C29 | 37. C48 | 52. C78 |
|        | 8. C17      | 23. C30 | 38. C50 | 53. C80 |
|        | 9. Pristane | 24. C31 | 39. C52 | 54. C82 |
|        | 10. C18     | 25. C32 | 40. C54 | 55. C84 |
|        | 11. Phytane | 26. C33 | 41. C56 | 56. C86 |
|        | 12. C19     | 27. C34 | 42. C58 | 57. C88 |
|        | 13. C20     | 28. C35 | 43. C60 | 58. C90 |
|        | 14. C21     | 29. C36 | 44. C62 |         |
|        | 15. C22     | 30. C37 | 45. C64 |         |

Note: Sample was a combination of PolyWax® 655 and retention time markers C8-C40 in CS<sub>2</sub>/Chloroform

#### Bake Off Contaminants from Dirty Matrices



**Column:** Zebron ZB-1HT Inferno  
**Dimensions:** 30 meter x 0.25 mm x 0.10 µm  
**Part No.:** [7HG-G014-02](#)  
**Injection:** On-Column @ 153 °C, 1 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 150 °C to 400 °C at 14 °C/min for 6 min  
**Detector:** FID @ 400 °C  
**Sample:** Sample was 1% in dichloromethane Mobil® 1 10W-30 Fully Synthetic Motor Oil

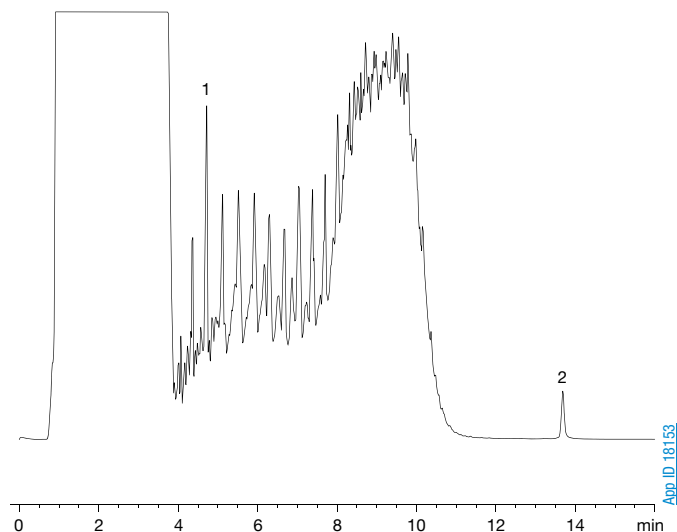


If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-1HT Inferno™

### Run Versatile Samples

#### Hydrocarbons from Water by GC-FID DIN EN ISO 9377-2 (DEV H53)



**Column:** Zebron ZB-1HT Inferno  
**Dimensions:** 15 meter x 0.32 mm x 0.25 µm  
**Part No.:** [ZEM-G014-11](#)  
**Injection:** Splitless @ 300 °C, 20 µL  
**Carrier Gas:** Helium @ 2.0 mL/min (constant flow)  
**Oven Program:** 50 °C for 2 min to 320 °C @ 30 °C/min for 5 min  
**Detector:** FID @ 330 °C  
**Sample:** 1. Decane (C10)  
 2. Tetracontane (C40)

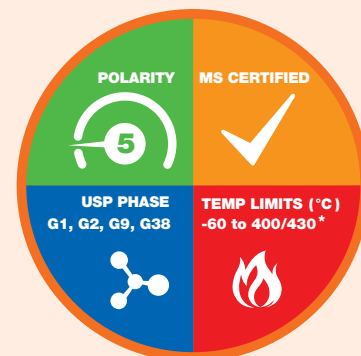
#### Ordering Information

##### Zebron ZB-1HT Inferno GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>5-Meter</b>  |        |                 |                             |
| 0.53            | 0.10   | -60 to 400/430  | <a href="#">7AK-G014-02</a> |
| <b>10-Meter</b> |        |                 |                             |
| 0.32            | 0.25   | -60 to 400/430  | <a href="#">7CM-G014-11</a> |
| <b>15-Meter</b> |        |                 |                             |
| 0.25            | 0.10   | -60 to 400/430  | <a href="#">7EG-G014-02</a> |
| 0.25            | 0.25   | -60 to 400/430  | <a href="#">7EG-G014-11</a> |
| 0.32            | 0.10   | -60 to 400/430  | <a href="#">7EM-G014-02</a> |
| 0.32            | 0.25   | -60 to 400/430  | <a href="#">7EM-G014-11</a> |
| 0.53            | 0.15   | -60 to 400      | <a href="#">7EK-G014-05</a> |
| <b>20-Meter</b> |        |                 |                             |
| 0.18            | 0.18   | -60 to 400/430  | <a href="#">7FD-G014-08</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.10   | -60 to 400/430  | <a href="#">7HG-G014-02</a> |
| 0.25            | 0.25   | -60 to 400/430  | <a href="#">7HG-G014-11</a> |
| 0.32            | 0.10   | -60 to 400/430  | <a href="#">7HM-G014-02</a> |
| 0.32            | 0.25   | -60 to 400/430  | <a href="#">7HM-G014-11</a> |
| 0.53            | 0.15   | -60 to 400      | <a href="#">7HK-G014-05</a> |

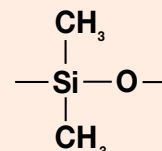
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G014-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



\*0.53 mm ID columns are rated to 400 °C.

#### Phase Chemistry



100 % Dimethylpolysiloxane

#### Recommended Applications

- Diesel Fuel
- High Boiling Petroleum Products
- High Molecular Weight Waxes
- Hydrocarbons
- Motor Oils
- Polymers/Plastics
- Simulated Distillation



**ZB-1HT Test Mix**  
 Part No.: [AGO-5155](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime.  
 Add a Z-guard to your next Zebron GC order.

## ZB-5HT Inferno™

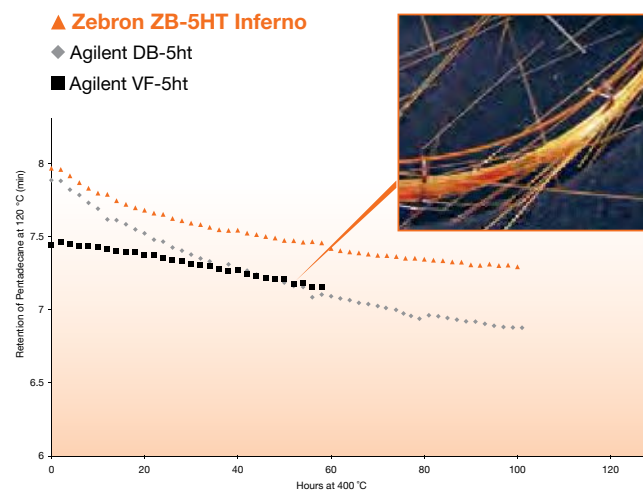
### Robust Results Up to 430 °C

- First non-metal columns stable to 430 °C
- Robust column for high temperature bake outs and analysis, such as biodiesel, long-chain hydrocarbons, polymers, and high molecular weight compounds
- Provides true boiling point separation for hydrocarbon distillation methods
- Longer lifetime with rugged high temperature, polyimide coated, fused silica tubing
- Low activity, provides good peak shape for acidic and basic samples

### Zebron Inferno Columns Win In The Lifetime Test

#### How does the lifetime test work?

All columns were held at 400 °C for 2 hours and then the oven was lowered to 120 °C for pentadecane analysis. The VF-5ht column broke just after 40 hours at 400 °C. The ZB-5HT had the same retention for pentadecane at 100 hours as the DB-5ht column at 40 hours — over 2X the lifetime!



Note that the VF-5ht column died around 40 hours at 400 °C whereas the Zebron ZB-5HT Inferno column maintained great retention of Pentadecane over 100 hours.

#### Conditions for all columns:

- Dimensions:** 30 meter x 0.25 mm x 0.10 µm
- Injection:** 1.0 µL of test mix [AGO-7578](#)
- Carrier Gas:** Helium @ 1.9 mL/min (constant flow)
- Oven Program:** 120 °C (Isothermal)
- Detector:** FID @ 400 °C
- Sample:** Pentadecane

Comparative separations may not be representative of all applications.

Upgrade to Zebron from any 5 % phenyl / 95 % dimethylpolysiloxane phase:

#### Agilent®

- DB®-5ht
- VF-5ht

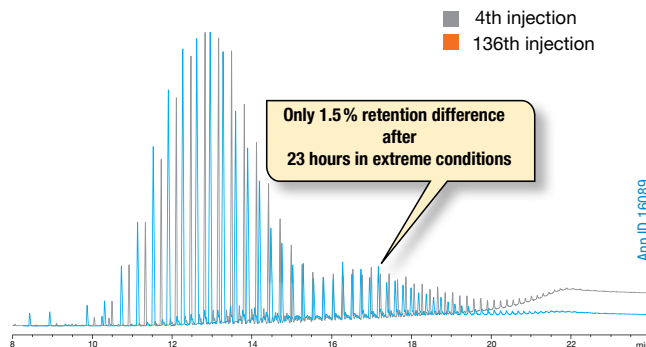
#### Restek®

- Rxi®-5HT
- Sbx®-5HT
- XTI®-5HT
- Rtx®-5HT

#### SGE®

- HT-5

### Paraffin Wax



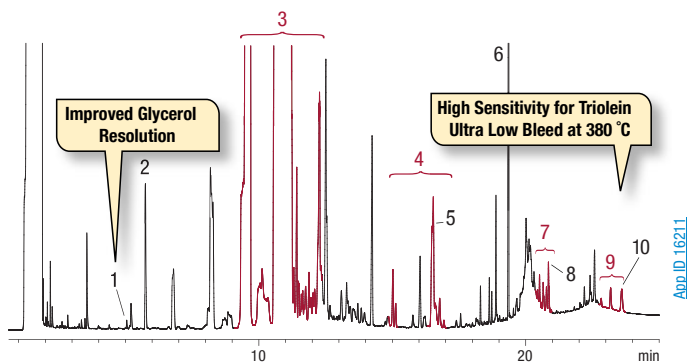
**Column:** Zebron ZB-5HT Inferno  
**Dimensions:** 15 meter x 0.32 mm x 0.10 µm  
**Part No.:** [7EM-G015-02](#)  
**Injection:** On Column @ 43 °C, 0.1 µL  
**Carrier Gas:** Helium @ 1.9 mL/min (constant flow)  
**Oven Program:** 40 °C for 2 min to 430 °C @ 20 °C for 10 min  
**Detector:** FID @ 430 °C  
**Sample:** Paraffin Wax

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.

## ZB-5HT Inferno™

### Well-Suited for Fuels Analysis

#### Free Total Glycerin in B100 Biodiesel by GC-FID



**Column:** Zebron ZB-5HT Inferno  
**Dimensions:** 15 meter x 0.32 mm x 0.10 µm + 2 meter x 0.53 mm Z-Guard™  
**Part No.:** [ZEM-G015-02](#)  
**Injection:** On-Column @ 53 °C, 1 µL  
**Carrier Gas:** Helium @ 3.0 mL/min (constant flow)  
**Oven Program:** 50 °C for 1 min to 180 °C @ 15 °C/min to 230 °C @ 7 °C/min to 380 °C @ 30 °C/min for 10 min  
**Detector:** FID @ 380 °C  
**Note:** A 2 m x 0.53 mm Guard Column was connected to the analytical column per ASTM method requirement  
**Sample:**

|                             |                      |
|-----------------------------|----------------------|
| 1. Glycerol                 | 6. Tricarpin (ISTD2) |
| 2. Butanetriol (ISTD1)      | 7. Diglycerides      |
| 3. Esters                   | 8. 1,3-Diolein       |
| 4. Monoglycerides           | 9. Triglycerides     |
| 5. 1-Monooleyl-rac-glycerol | 10. Triolein         |

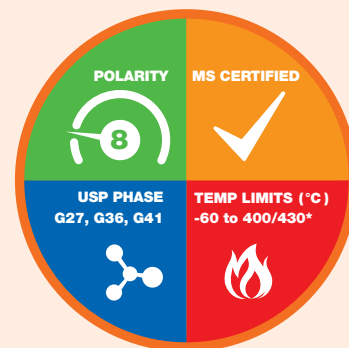
#### Ordering Information

##### Zebron ZB-5HT Inferno GC Columns

| ID(mm)  | df(µm) | Temp. Limits °C | Part No.                        |
|---|--------|-----------------|---------------------------------|
| <b>10-Meter with 2-Meter Spliced Guard (0.53 mm ID)</b> |        |                 |                                 |
| 0.32  | 0.10   | -60 to 400/430  | <a href="#">ZCM-G015-02-GST</a> |
| <b>15-Meter</b>   |        |                 |                                 |
| 0.25  | 0.10   | -60 to 400/430  | <a href="#">ZEG-G015-02</a>     |
| 0.25  | 0.25   | -60 to 400/430  | <a href="#">ZEG-G015-11</a>     |
| 0.32  | 0.10   | -60 to 400/430  | <a href="#">ZEM-G015-02</a>     |
| 0.32  | 0.25   | -60 to 400/430  | <a href="#">ZEM-G015-11</a>     |
| 0.53  | 0.15   | -60 to 400      | <a href="#">ZEK-G015-05</a>     |
| <b>15-Meter with 2-Meter Spliced Guard (0.53 mm ID)</b> |        |                 |                                 |
| 0.32  | 0.10   | -60 to 400/430  | <a href="#">ZEM-G015-02-GST</a> |
| <b>20-Meter</b>   |        |                 |                                 |
| 0.18  | 0.18   | -60 to 400/430  | <a href="#">ZFD-G015-08</a>     |
| <b>30-Meter</b>   |        |                 |                                 |
| 0.25  | 0.10   | -60 to 400/430  | <a href="#">ZHG-G015-02</a>     |
| 0.25  | 0.25   | -60 to 400/430  | <a href="#">ZHG-G015-11</a>     |
| 0.32  | 0.10   | -60 to 400/430  | <a href="#">ZHM-G015-02</a>     |
| 0.32  | 0.25   | -60 to 400/430  | <a href="#">ZHM-G015-11</a>     |
| 0.53  | 0.15   | -60 to 400      | <a href="#">ZHK-G015-05</a>     |
| <b>60-Meter</b>   |        |                 |                                 |
| 0.25  | 0.25   | -60 to 400/430  | <a href="#">ZKG-G015-11</a>     |

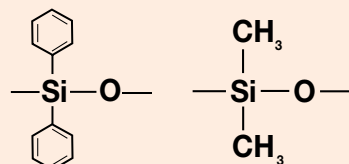
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [ZHG-G015-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



\*0.53 mm ID columns are rated to 400 °C.

#### Phase Chemistry



5 % Phenyl 95 % Dimethylpolysiloxane

#### Recommended Applications

- Diesel Fuels
- High Boiling Petroleum Products
- High Molecular Weight Waxes
- Hydrocarbons
- Motor Oils
- Polymers/Plastics
- Simulated Distillation
- Surfactants
- Triglycerides



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

## ZB-35HT Inferno™

### High Temperature Stability for Mid-Polarity

- First non-metal, 35% phenyl columns stable to 400 °C
- Longer lifetime with rugged high temperature, polyimide coated, fused silica tubing
- Robust column for high temperature analysis
- Great for high molecular weight compounds
- Eliminate carry-over with high temperature bake outs
- Low activity, provides good peak shape for acidic and basic samples

Upgrade to Zebron from any

35% phenyl / 65% dimethylpolysiloxane phase:

| Agilent®  | Restek®    | SGE®     | Supelco®  | OV®     |
|-----------|------------|----------|-----------|---------|
| • DB®-35  | • Rtx®-35  | • BPX35  | • MDN-35  | • OV-11 |
| • HP-35ms | • Rtx-35ms | • BPX608 | • SPB®-35 |         |
| • HP-35   |            |          | • SPB-608 |         |

### Lower Bleed Than Other Columns!

Conditions for all columns:

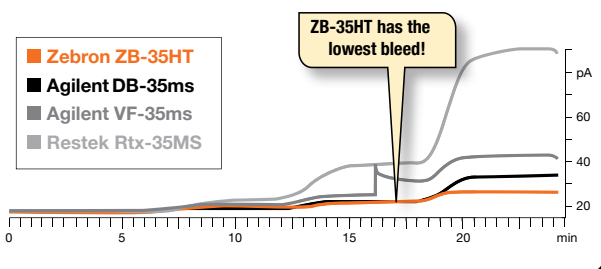
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm

**Injection:** Split 20:1 @ 200 °C, 1 µL

**Carrier Gas:** Helium @ 1.7 mL/min (constant flow)

**Oven Program:** 100 °C to 320 °C @ 30 °C/min for 5 min to 340 °C @ 20 °C/min for 5 min to 360 °C @ 20 °C/min for 5 min to 380 °C @ 20 °C/min for 5 min to 400 °C @ 20 °C/min for 5 min to 100 °C @ 30 °C/min for 8 min

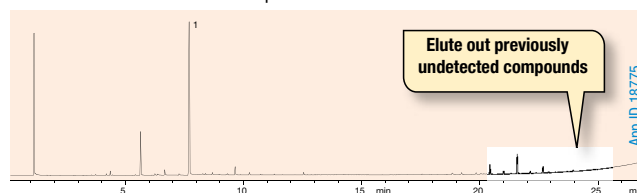
**Detector:** FID @ 405 °C



### See What You've Been Missing

#### A) ZB-35HT Inferno

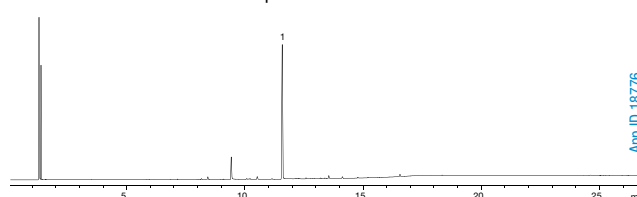
30 meter x 0.25 mm x 0.25 µm



VS.

#### B) Restek Rtx-35

30 meter x 0.25 mm x 1.00 µm



**Column:** As listed

**Dimensions:** As listed

**Part No.:** 7HG-G025-11 (ZB-35HT Inferno)

**Injection:** A) Split 50:1 @ 350 °C, 1 µL

B) Split 50:1 @ 300 °C, 1 µL

**Carrier Gas:** Helium @ 2.1 mL/min (constant flow)

**Oven Program:** A) 140 °C to 400 °C @ 10 °C/min

B) 140 °C to 300 °C @ 10 °C/min

**Detector:** A) FID @ 400 °C

B) FID @ 320 °C

**Sample:** 1. Hexadecylamine

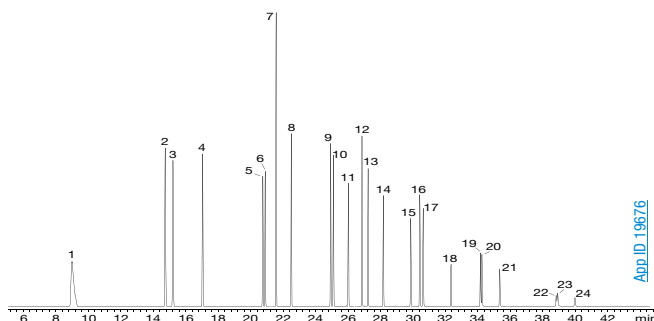
**Note:** Chromatogram is courtesy of Northeastern Chemical Company.

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.

## ZB-35HT Inferno™

### Well-Suited for Environmental Contaminants

#### PAHs and PCBs In A Single Run



**Column:** Zebron ZB-35 Inferno  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G025-11](#)  
**Injection:** Splitless @ 265 °C, 2 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 85 °C for 3 min to 320 °C @ 7 °C /min for 8 min  
**Detector:** MSD @ 280 °C  
**Sample:** Compounds are 5 ppm

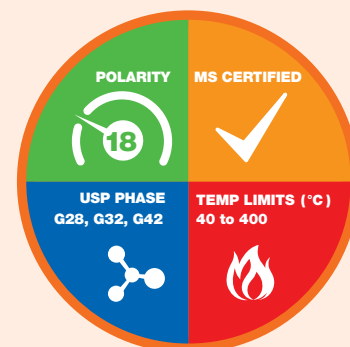
|                   |                       |                            |
|-------------------|-----------------------|----------------------------|
| 1. Naphthalene    | 9. PCB 101            | 17. Chrysene               |
| 2. Acenaphthylene | 10. Fluoranthene      | 18. PCB 194                |
| 3. Acenaphthene   | 11. Pyrene            | 19. Benzo[b]fluoranthene   |
| 4. Fluorene       | 12. PCB 118           | 20. Benzo[k]fluoranthene   |
| 5. Phenanthrene   | 13. PCB 153           | 21. Benzo[a]pyrene         |
| 6. Anthracene     | 14. PCB 138           | 22. Indeno[1,2,3-cd]pyrene |
| 7. PCB 28         | 15. PCB 180           | 23. Dibenzo[a,h]anthracene |
| 8. PCB 52         | 16. Benz[a]anthracene | 24. Benzo[g,h,i]perylene   |

#### Ordering Information

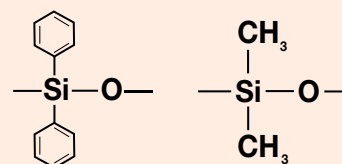
| Zebron ZB-35HT GC Columns |        |                 |                             |
|---------------------------|--------|-----------------|-----------------------------|
| ID(mm)                    | df(µm) | Temp. Limits °C | Part No.                    |
| <b>15-Meter</b>           |        |                 |                             |
| 0.25                      | 0.10   | 40 to 400       | <a href="#">7EG-G025-02</a> |
| 0.25                      | 0.25   | 40 to 400       | <a href="#">7EG-G025-11</a> |
| 0.32                      | 0.25   | 40 to 400       | <a href="#">7EM-G025-11</a> |
| <b>20-Meter</b>           |        |                 |                             |
| 0.18                      | 0.18   | 40 to 400       | <a href="#">7FD-G025-08</a> |
| <b>30-Meter</b>           |        |                 |                             |
| 0.25                      | 0.10   | 40 to 400       | <a href="#">7HG-G025-02</a> |
| 0.25                      | 0.25   | 40 to 400       | <a href="#">7HG-G025-11</a> |
| 0.32                      | 0.25   | 40 to 400       | <a href="#">7HM-G025-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G025-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry



35 % Phenyl    65 % Dimethylpolysiloxane

#### Recommended Applications

- Amines
- Chemicals
- Drugs
- EPA Methods (508, 608, 8081, 8141, 8151)
- PCBs / Aroclors
- Pesticides
- Pharmaceuticals
- Steroids



**ZB-35HT Test Mix**  
**Part No.:** [AGO-5156](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime.  
 Add a Z-guard to your next Zebron GC order.

## ZB-XLB-HT Inferno<sup>™</sup>

### High Temp Stability, Low Bleed

- Rugged, non-metal si-arylene GC column stable to 400 °C
- Robust column for high temperature bake outs and analysis, such as high molecular weight compounds
- Provides unique selectivity for conformational analyses
- Longer lifetime with high temperature, polyimide coated, fused silica tubing
- Low activity, provides good peak shape for acidic and basic samples
- Good tool for general screening to identify unknown samples

Upgrade to Zebron from these similar\* phases:

**Agilent<sup>®</sup>**

- DB<sup>®</sup>-XLB
- VF-XMS

**Restek<sup>®</sup>**

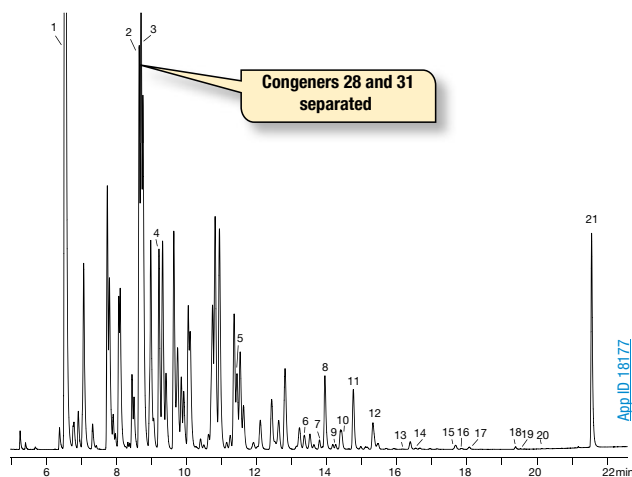
- DB<sup>®</sup>-XLB

**Supelco<sup>®</sup>**

- MDN-12

\*not exact equivalent, selectivity may differ

### Aroclor 1242: DIN Method 51527



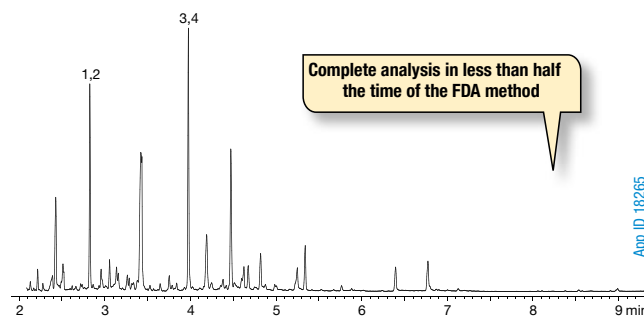
**Column:** Zebron ZB-XLB-HT Inferno  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G024-11](#)  
**Injection:** Split 2:1 @ 250 °C, 1 µL, pressure pulse @ 40 psi for first 0.25 min  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 50 °C for 0.5 min to 210 °C @ 40 °C/min for 3 min to 230 °C @ 30 °C/min for 5 min to 250 °C @ 30 °C/min for 5 min to 320 °C @ 40 °C/min for 2 min

**Detector:** ECD @ 350 °C

**Sample:** Total concentration of aroclors was 90 ppm in isooctane

|             |             |
|-------------|-------------|
| 1. TCMX     | 12. BZ# 138 |
| 2. BZ# 31   | 13. BZ# 126 |
| 3. BZ# 28   | 14. BZ# 167 |
| 4. BZ# 52   | 15. BZ# 156 |
| 5. BZ# 101  | 16. BZ# 180 |
| 6. BZ# 77   | 17. BZ# 157 |
| 7. BZ# 123  | 18. BZ# 170 |
| 8. BZ# 118  | 19. BZ# 169 |
| 9. BZ# 153  | 20. BZ# 189 |
| 10. BZ# 114 | 21. DCB     |
| 11. BZ# 105 |             |

### Melamine and Cyanuric Acid by GC-MS



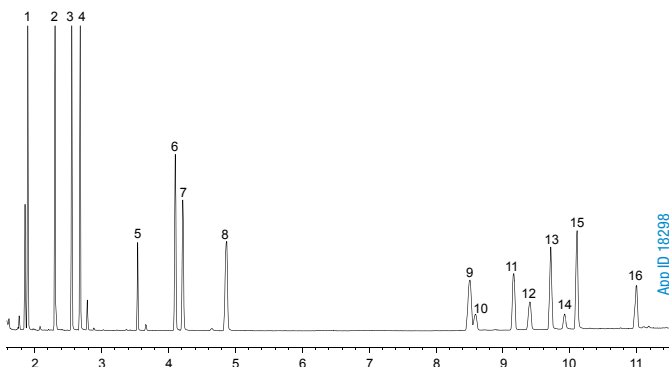
**Column:** Zebron ZB-XLB-HT Inferno  
**Dimensions:** 15 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7EG-G024-11](#)  
**Injection:** On-Column @ 103 °C, 1 µL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 100 °C for 0.5 min to 320 °C @ 25 °C/min  
**Detector:** MSD @ 325 °C  
**Sample:** Analytes are 200 ng / 100 µL in BSTFA / Pyridine (1:1)  
 1. Cyanuric Acid 13C3 (IS)  
 2. Cyanuric Acid  
 3. Melamine 13C3 15N3 (IS)  
 4. Melamine

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.

## ZB-XLB-HT Inferno<sup>™</sup>

### Good Results for Difficult Samples

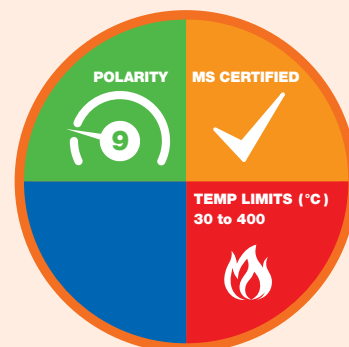
#### Explosives by GC-MS



**Column:** Zebron<sup>™</sup> ZB-XLB-HT Inferno  
**Dimensions:** 15 meter x 0.25 mm x 0.25 μm  
**Part No.:** [7EG-G024-11](#)  
**Injection:** On-Column @ 73 °C, 0.5 μL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 70 °C for 1 min to 140 °C @ 25 °C/min for 4 min to 280 °C @ 25 °C/min  
**Detector:** MSD @ 300 °C, 40-400 amu  
**Sample:** Analytes are 10 ppm in dichloromethane

|                                 |                                       |
|---------------------------------|---------------------------------------|
| 1. Nitrobenzene                 | 9. 2,4,6-Trinitrotoluene (2,4,6-TNT)  |
| 2. 2-Nitrotoluene               | 10. PETN                              |
| 3. 3-Nitrotoluene               | 11. 1,3,5-Trinitrobenzene (1,3,5-TNB) |
| 4. 4-Nitrotoluene               | 12. RDX                               |
| 5. Nitroglycerin                | 13. 4-Amino-2,6-dinitrotoluene        |
| 6. 2,6-Dinitrotoluene (2,6-DNT) | 14. 3,5-Nitroaniline                  |
| 7. 1,3-Dinitrobenzene (1,3-DNB) | 15. 2-Amino-4,6-dinitrotoluene        |
| 8. 2,4-Dinitrotoluene           | 16. Tetryl                            |

#### Column Profile



#### Phase Chemistry

- Proprietary

#### Recommended Applications

- Herbicides / Insecticides
- PCBs
- Pesticides
- Unknown Samples

#### Ordering Information

| Zebron ZB-XLB-HT Inferno GC Columns |        |                 |                             |
|-------------------------------------|--------|-----------------|-----------------------------|
| ID(mm)                              | df(μm) | Temp. Limits °C | Part No.                    |
| <b>15-Meter</b>                     |        |                 |                             |
| 0.25                                | 0.10   | 30 to 400       | <a href="#">7EG-G024-02</a> |
| 0.25                                | 0.25   | 30 to 400       | <a href="#">7EG-G024-11</a> |
| 0.32                                | 0.10   | 30 to 400       | <a href="#">7EM-G024-02</a> |
| <b>20-Meter</b>                     |        |                 |                             |
| 0.18                                | 0.18   | 30 to 400       | <a href="#">7FD-G024-08</a> |
| <b>30-Meter</b>                     |        |                 |                             |
| 0.25                                | 0.10   | 30 to 400       | <a href="#">7HG-G024-02</a> |
| 0.25                                | 0.25   | 30 to 400       | <a href="#">7HG-G024-11</a> |
| 0.32                                | 0.25   | 30 to 400       | <a href="#">7HM-G024-11</a> |
| <b>60-Meter</b>                     |        |                 |                             |
| 0.25                                | 0.25   | 30 to 400       | <a href="#">7KG-G024-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G024-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



**ZB-XLB-HT Test Mix**  
 Part No.: [AG0-7578](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-1

### Low Polarity for Versatile Applications

- Low polarity phase suited for true boiling point compounds
- Low bleed (MS Certified), low activity, and high efficiency
- Excellent resolving power of critical pairs in complex petrochemical samples
- Used for “fingerprinting” and routine quality control analyses

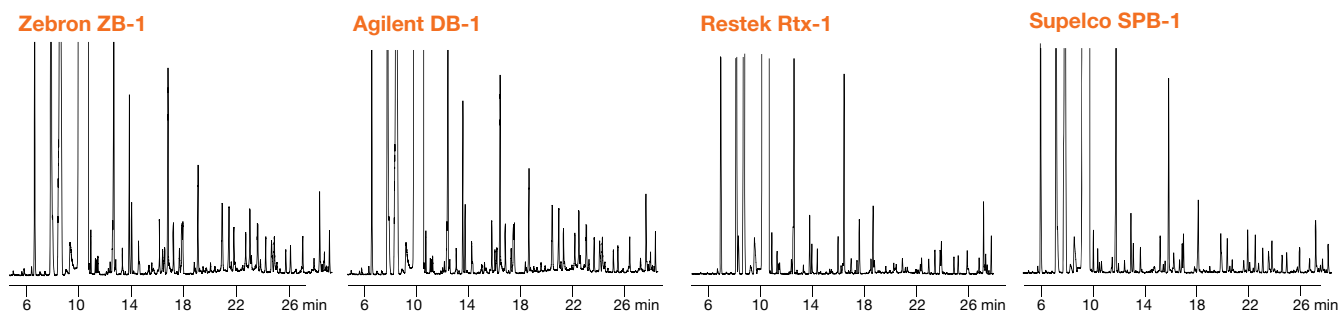
Upgrade to Zebron from any 100% dimethylpolysiloxane phase:

| Agilent®      | Restek®     | SGE®        | Supelco®       |
|---------------|-------------|-------------|----------------|
| • DB®-1       | • Rtx®-1    | • BP1       | • SPB®-1       |
| • DB-2887     | • Rtx-1PONA | • BP1-PONA  | • SPB-1 TG     |
| • DB-1 EVDX   | • Rtx-1 F&F | • BPX1-SimD | • SE-30        |
| • HP-1        |             |             | • MET-1        |
| • HP-101      |             |             | • SPB-1 Sulfur |
| • HP-PONA     |             |             | • SPB-HAP      |
| • Ultra 1     |             |             |                |
| • CP-Sil 5 CB |             |             |                |

### Guaranteed Equivalent Performance

Look no further for a guaranteed replacement for your current column! Put a workhorse head to head with your method and get virtually equivalent performance without altering your running conditions.

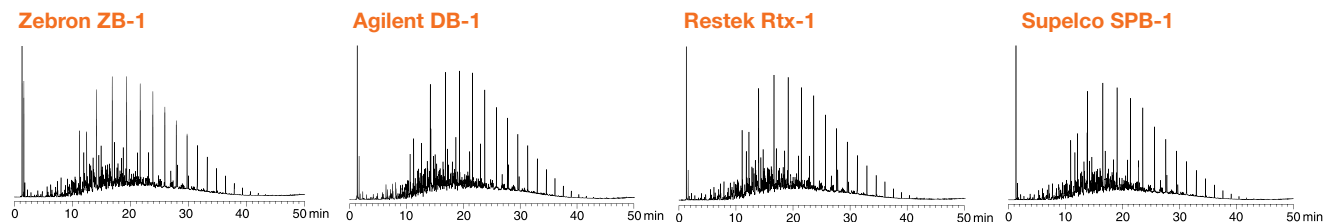
#### Orange Oil Profile by GC-MS



#### Conditions for all columns:

**Columns:** As listed  
**Dimensions:** 30 m x 0.25 mm x 0.25 µm  
**Injection:** Split 100:1 @ 150 °C, 1 µL  
**Carrier Gas:** Helium @ 36 cm/sec (constant flow)  
**Oven Program:** 60 °C for 3 min to 150 °C @ 4 °C/min to 225 °C @ 20 °C/min  
**Detector:** MSD @ 250 °C  
**Sample:** Sweet orange oil profile

#### Diesel Fuel Oil by GC-FID



#### Conditions for all columns:

**Columns:** As listed  
**Dimensions:** 30 m x 0.25 mm x 0.25 µm  
**Injection:** Split 100:1 @ 250 °C, 1 µL  
**Carrier Gas:** Hydrogen @ 41.7 cm/sec (constant flow)  
**Oven Program:** 40 °C for 2 min to 320 °C @ 6 °C/min, hold 5 min  
**Detector:** FID @ 325 °C  
**Sample:** Diesel fuel oil no. 2

Comparative separations may not be representative of all applications.





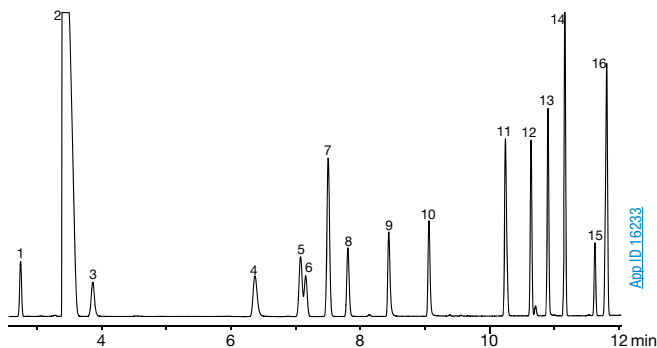
## guarantee

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.

## ZB-1

### Good Results Across Compound Classes

#### Industrial Chemicals by GC-FID



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

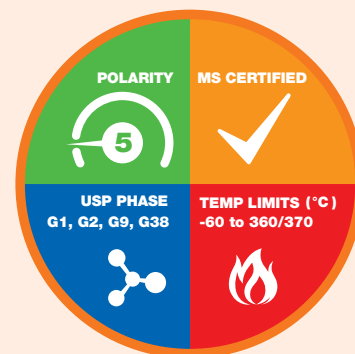
#### Ordering Information

##### Zebron ZB-1 GC Columns

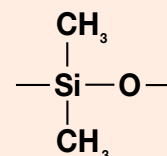
| ID(mm)           | df(µm) | Temp. Limits °C | Part No.                    |
|------------------|--------|-----------------|-----------------------------|
| <b>10-Meter</b>  |        |                 |                             |
| 0.53             | 2.65   | -60 to 340/360  | <a href="#">7CK-G001-35</a> |
| <b>15-Meter</b>  |        |                 |                             |
| 0.25             | 0.10   | -60 to 360/370  | <a href="#">7EG-G001-02</a> |
| 0.25             | 0.25   | -60 to 360/370  | <a href="#">7EG-G001-11</a> |
| 0.25             | 1.00   | -60 to 340/360  | <a href="#">7EG-G001-22</a> |
| 0.32             | 0.25   | -60 to 360/370  | <a href="#">7EM-G001-11</a> |
| 0.32             | 1.00   | -60 to 340/360  | <a href="#">7EM-G001-22</a> |
| 0.53             | 0.15   | -60 to 360/370  | <a href="#">7EK-G001-05</a> |
| 0.53             | 0.50   | -60 to 360/370  | <a href="#">7EK-G001-17</a> |
| 0.53             | 1.50   | -60 to 340/360  | <a href="#">7EK-G001-28</a> |
| <b>30-Meter</b>  |        |                 |                             |
| 0.25             | 0.10   | -60 to 360/370  | <a href="#">7HG-G001-02</a> |
| 0.25             | 0.25   | -60 to 360/370  | <a href="#">7HG-G001-11</a> |
| 0.25             | 0.50   | -60 to 360/370  | <a href="#">7HG-G001-17</a> |
| 0.25             | 1.00   | -60 to 340/360  | <a href="#">7HG-G001-22</a> |
| 0.32             | 0.25   | -60 to 360/370  | <a href="#">7HM-G001-11</a> |
| 0.32             | 0.50   | -60 to 360/370  | <a href="#">7HM-G001-17</a> |
| 0.32             | 1.00   | -60 to 340/360  | <a href="#">7HM-G001-22</a> |
| 0.32             | 3.00   | -60 to 340/360  | <a href="#">7HM-G001-36</a> |
| 0.32             | 5.00   | -60 to 340/360  | <a href="#">7HM-G001-39</a> |
| 0.53             | 0.50   | -60 to 360/370  | <a href="#">7HK-G001-17</a> |
| 0.53             | 1.50   | -60 to 340/360  | <a href="#">7HK-G001-28</a> |
| 0.53             | 3.00   | -60 to 340/360  | <a href="#">7HK-G001-36</a> |
| 0.53             | 5.00   | -60 to 340/360  | <a href="#">7HK-G001-39</a> |
| <b>50-Meter</b>  |        |                 |                             |
| 0.25             | 0.50   | -60 to 360/370  | <a href="#">7JG-G001-17</a> |
| <b>60-Meter</b>  |        |                 |                             |
| 0.25             | 0.25   | -60 to 360/370  | <a href="#">7KG-G001-11</a> |
| 0.25             | 1.00   | -60 to 340/360  | <a href="#">7KG-G001-22</a> |
| 0.32             | 0.25   | -60 to 360/370  | <a href="#">7KM-G001-11</a> |
| 0.32             | 1.00   | -60 to 340/360  | <a href="#">7KM-G001-22</a> |
| 0.32             | 3.00   | -60 to 340/360  | <a href="#">7KM-G001-36</a> |
| 0.53             | 1.50   | -60 to 340/360  | <a href="#">7KK-G001-28</a> |
| <b>100-Meter</b> |        |                 |                             |
| 0.25             | 0.50   | -60 to 360/370  | <a href="#">7MG-G001-17</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G001-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



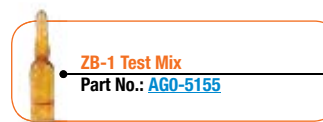
#### Phase Chemistry



100 % Dimethylpolysiloxane

#### Recommended Applications

- Ethanol
- Hydrocarbons
- Mercaptans
- MTBE
- Natural Gas Odorants
- Oxygenates and GROs
- Solvent Impurities
- Sulfur Compounds (Light)



Engineered Self Crosslinking™ (ESC) polymer technology. Zebron GC Columns MS Certification, see p. 427



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-5

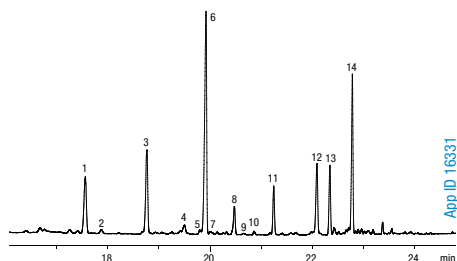
### Low Polarity For A Wide Application Range

- Rugged, versatile low polarity column for general lab purpose
- Resilient to dirty samples—long column life
- Low bleed (MS Certified) especially suited to high sensitivity work using GC-MS
- Extremely inert for active compounds such as drugs or pesticides
- Great column for unknown samples

Upgrade to Zebron from any 5% phenyl / 95% dimethylpolysiloxane phase:

| Agilent®  | Restek®  | SGE®  | Supelco®   | OV®  |
|---|--|---|--|--|
| <ul style="list-style-type: none"> <li>• DB®-5</li> <li>• HP-5</li> <li>• HP-PAS-5</li> <li>• CP-Sil 8 CB</li> <li>• Ultra 2</li> </ul> | <ul style="list-style-type: none"> <li>• Rtx®-5</li> </ul> | <ul style="list-style-type: none"> <li>• BP5</li> <li>• BPX5</li> </ul> | <ul style="list-style-type: none"> <li>• MDN-5</li> <li>• SPB®-5</li> <li>• PTE-5</li> <li>• SE-54</li> <li>• PTA-5</li> <li>• Equity®-5</li> <li>• Sac-5</li> </ul> | <ul style="list-style-type: none"> <li>• OV-5</li> </ul> |

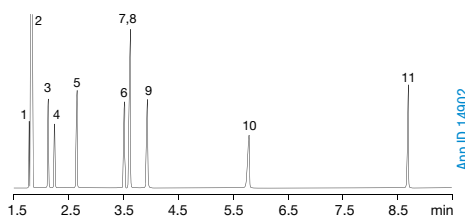
### Vitamin E and Sterols by GC-FID



**Column:** Zebron ZB-5  
**Dimensions:** 30 meter x 0.25 mm x 0.10 µm  
**Part No.:** [7HG-G002-02](#)  
**Injection:** Splitless @ 220 °C, 1 µL  
**Carrier Gas:** Helium @ 1.8 mL/min (constant flow)  
**Oven Program:** 110 °C for 0.2 min to 140 °C @ 30 °C/min to 230 °C @ 10 °C/min for 6 min to 340 °C @ 10 °C/min for 15.8 min  
**Detector:** FID @ 340 °C  
**Sample:**

|                         |                     |
|-------------------------|---------------------|
| 1. Squalene             | 8. γ-Tocomoenol     |
| 2. FFA C24:0            | 9. Stigma-3,5-diene |
| 3. δ-Tocopherol         | 10. Cholesterol     |
| 4. δ-Tocomoenol         | 11. α-Tocopherol    |
| 5. Campesta-3,5-diene   | 12. Campesterol     |
| 6. γ-Tocopherol         | 13. Stigmasterol    |
| 7. Stigma-3,5,22-triene | 14. β-Sitosterol    |

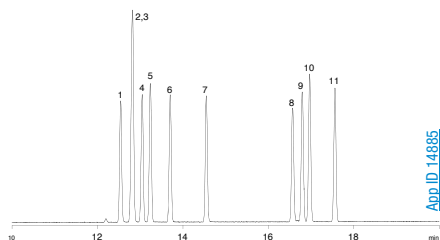
### BTEX by GC-FID



**Column:** Zebron ZB-5  
**Dimensions:** 30 meter x 0.32 mm x 0.25 µm  
**Part No.:** [7HM-G002-11](#)  
**Injection:** Split 20:1 @ 225 °C, 0.25 µL  
**Carrier Gas:** Helium @ 2 mL/min (constant flow)  
**Oven Program:** 60 °C to 75 °C @ 15 °C/min to 90 °C @ 3 °C/min to 190 °C @ 25 °C/min  
**Detector:** FID @ 300 °C  
**Sample:**

|                                 |              |
|---------------------------------|--------------|
| 1. Pentane                      | 8. p-Xylene  |
| 2. Methylene Chloride (solvent) | 9. o-Xylene  |
| 3. Benzene                      | 10. Decane   |
| 4. Heptane                      | 11. Dodecane |
| 5. Toluene                      |              |
| 6. Ethylbenzene                 |              |
| 7. m-Xylene                     |              |

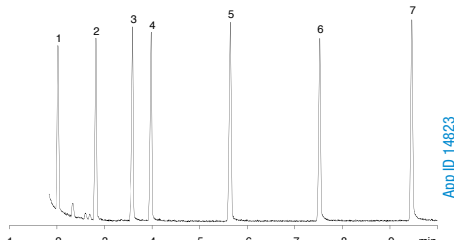
### Triazine Herbicides by GC-MS



**Column:** Zebron ZB-5  
**Dimensions:** 30 meter x 0.32 mm x 0.50 µm  
**Part No.:** [7HM-G002-17](#)  
**Injection:** Split 20:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 150 °C to 250 °C @ 4 °C/min for 5 min  
**Detector:** MSD @ 240 °C  
**Sample:**

|                  |                |
|------------------|----------------|
| 1. Atraton       | 7. Secbumetone |
| 2. Simazine      | 8. Simetryn    |
| 3. Prometon      | 9. Ametryn     |
| 4. Atrazine      | 10. Prometryn  |
| 5. Propazine     | 11. Terbutryn  |
| 6. Terbutylazine |                |

### Organic Acids by GC-MS



**Column:** Zebron ZB-5  
**Dimensions:** 30 meter x 0.32 mm x 1.0 µm  
**Part No.:** [7HM-G002-22](#)  
**Injection:** Split 20:1 @ 225 °C, 0.2 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 60 °C to 200 °C @ 8 °C/min for 5 min  
**Detector:** MSD @ 180 °C  
**Sample:**

|                    |                   |
|--------------------|-------------------|
| 1. Acetic acid     | 5. n-Valeric acid |
| 2. Propionic acid  | 6. Caproic acid   |
| 3. Isobutyric acid | 7. Heptanoic acid |
| 4. n-Butyric acid  |                   |

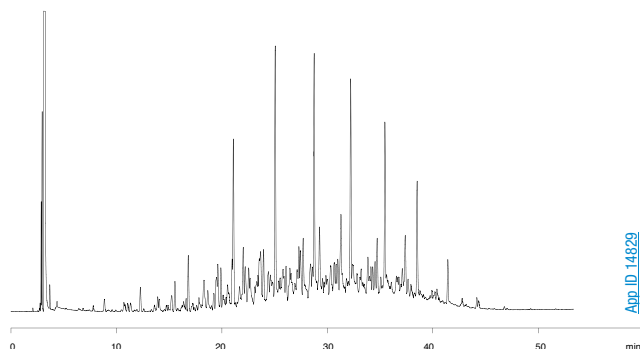


## guarantee

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.

## ZB-5

### Kerosene by GC-FID



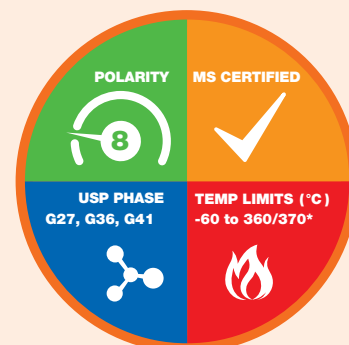
**Column:** Zebron ZB-5  
**Dimensions:** 30 meter x 0.53 mm x 1.50 µm  
**Part No.:** [7HK-G002-28](#)  
**Injection:** Split 30:1 @ 275 °C, 1 µL  
**Carrier Gas:** Helium @ 4.1 mL/min  
**Oven Program:** 40 °C for 5 min to 300 °C @ 4 °C/min for 5 min  
**Detector:** FID @ 300 °C  
**Sample:** Kerosene

### Ordering Information

| Zebron ZB-5 GC Columns |         |                 |                             |
|------------------------|---------|-----------------|-----------------------------|
| ID (mm)                | df (µm) | Temp. Limits °C | Part No.                    |
| <b>15-Meter</b>        |         |                 |                             |
| 0.25                   | 0.10    | -60 to 360/370  | <a href="#">7EG-G002-02</a> |
| 0.25                   | 0.25    | -60 to 360/370  | <a href="#">7EG-G002-11</a> |
| 0.25                   | 0.50    | -60 to 360/370  | <a href="#">7EG-G002-17</a> |
| 0.25                   | 1.00    | -60 to 340/360  | <a href="#">7EG-G002-22</a> |
| 0.32                   | 0.10    | -60 to 360/370  | <a href="#">7EM-G002-02</a> |
| 0.32                   | 0.25    | -60 to 360/370  | <a href="#">7EM-G002-11</a> |
| 0.32                   | 1.00    | -60 to 340/360  | <a href="#">7EM-G002-22</a> |
| 0.53                   | 0.50    | -60 to 360/370  | <a href="#">7EK-G002-17</a> |
| 0.53                   | 1.50    | -60 to 340/360  | <a href="#">7EK-G002-28</a> |
| 0.53                   | 3.00    | -60 to 340/360  | <a href="#">7EK-G002-36</a> |
| <b>20-Meter</b>        |         |                 |                             |
| 0.18                   | 0.18    | -60 to 360/370  | <a href="#">7FD-G002-08</a> |
| <b>30-Meter</b>        |         |                 |                             |
| 0.25                   | 0.10    | -60 to 360/370  | <a href="#">7HG-G002-02</a> |
| 0.25                   | 0.25    | -60 to 360/370  | <a href="#">7HG-G002-11</a> |
| 0.25                   | 0.50    | -60 to 360/370  | <a href="#">7HG-G002-17</a> |
| 0.25                   | 1.00    | -60 to 340/360  | <a href="#">7HG-G002-22</a> |
| 0.32                   | 0.25    | -60 to 360/370  | <a href="#">7HM-G002-11</a> |
| 0.32                   | 0.50    | -60 to 360/370  | <a href="#">7HM-G002-17</a> |
| 0.32                   | 1.00    | -60 to 340/360  | <a href="#">7HM-G002-22</a> |
| 0.53                   | 0.50    | -60 to 360/370  | <a href="#">7HK-G002-17</a> |
| 0.53                   | 1.50    | -60 to 340/360  | <a href="#">7HK-G002-28</a> |
| 0.53                   | 3.00    | -60 to 340/360  | <a href="#">7HK-G002-36</a> |
| 0.53                   | 5.00    | -60 to 340/360  | <a href="#">7HK-G002-39</a> |
| <b>60-Meter</b>        |         |                 |                             |
| 0.25                   | 0.10    | -60 to 360/370  | <a href="#">7KG-G002-02</a> |
| 0.25                   | 0.25    | -60 to 360/370  | <a href="#">7KG-G002-11</a> |
| 0.25                   | 0.50    | -60 to 360/370  | <a href="#">7KG-G002-17</a> |
| 0.25                   | 1.00    | -60 to 340/360  | <a href="#">7KG-G002-22</a> |
| 0.32                   | 0.25    | -60 to 360/370  | <a href="#">7KM-G002-11</a> |
| 0.32                   | 1.00    | -60 to 340/360  | <a href="#">7KM-G002-22</a> |
| 0.53                   | 1.50    | -60 to 340/360  | <a href="#">7KK-G002-28</a> |

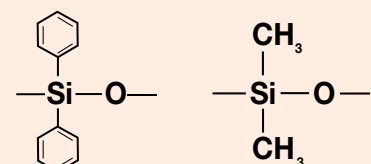
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G002-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

### Column Profile



\*Thicker films (≥ 1.0 µm) are rated to 340/360 °C.

### Phase Chemistry



5 % Phenyl 95 % Dimethylpolysiloxane

### Recommended Applications

- Alkaloids
- Dioxins
- Drugs
- Essential Oils
- Flavors
- FAMES
- Halo-Hydrocarbons
- Herbicides
- PCBs / Aroclors
- Pesticides
- Phenols
- Residual Solvents



**ZB-5 Test Mix**  
 Part No.: [AGO-5155](#)



For ultra low bleed, consider using a ZB-5ms, see p. 150  
 For high temperature analysis, consider using a ZB-5HT, see p. 140



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

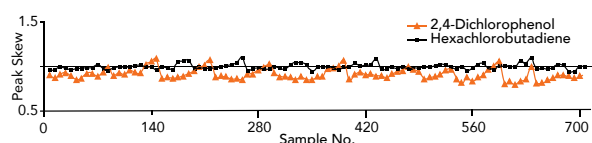
## ZB-5ms

### Robust Results, Versatile Performance

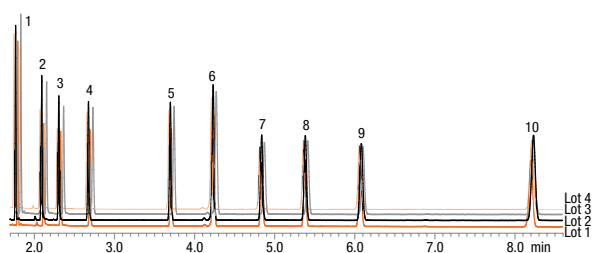
- Popular rugged column for general purpose use
- Fully conditioned within 35 minutes
- High response for acids and bases
- Enhanced resolution of polyaromatic hydrocarbons (PAHs) and other multi-ring aromatic compounds

### Long Lifetime

Consistent response after more than 700 samples at pH 2!



### Reproducible Results



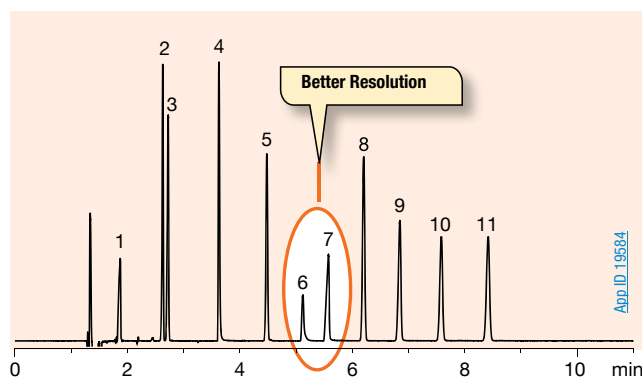
**Column:** Zebron ZB-5ms  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** 7HG-G010-11  
**Injection:** Split 1:100 @ 250 °C, 1.4 µL  
**Carrier Gas:** Hydrogen @ 140 °C, 40 cm/sec  
**Oven Program:** 140 °C (Isothermal)  
**Detector:** FID @ 325 °C  
**Sample:**  
 1. Decane  
 2. 2-Ethylhexanoic Acid  
 3. 1,6-Hexanediol  
 4. 4-Chlorophenol  
 5. Tridecane  
 6. 1-Methylnaphthalene  
 7. 1-Undecanol  
 8. Tetradecane  
 9. Dicyclohexylamine  
 10. Pentadecane

Upgrade to Zebron from any 5% phenyl-arylene / 95% dimethylpolysiloxane phase:

- |  |  |  |
|--|--|--|
| <b>Agilent®</b>  | <b>Restek®</b>   | <b>Supelco®</b>  |
| <ul style="list-style-type: none"> <li>• DB®-5ms</li> <li>• DB-5.625</li> <li>• DB-5ms EVDX</li> <li>• CP-Sil 8 CB MS</li> <li>• VF-5ms</li> </ul> | <ul style="list-style-type: none"> <li>• Rtx®-5Sil MS</li> <li>• Rxi®-5Sil MS</li> </ul> | <ul style="list-style-type: none"> <li>• SLB®-5ms</li> </ul> |

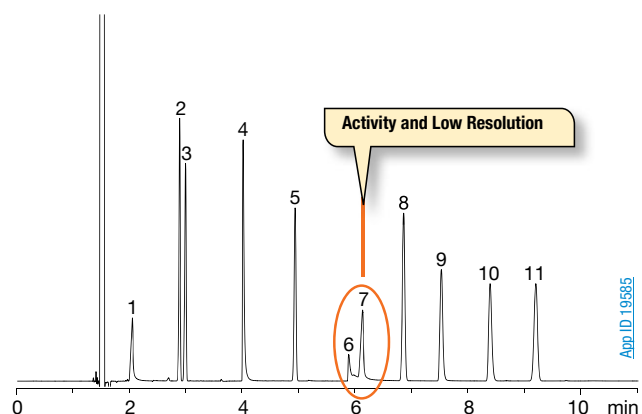
### Better Separations & Peak Shapes

#### Zebron ZB-5ms



VS.

#### Restek Rxi-5ms



#### Conditions for both columns:

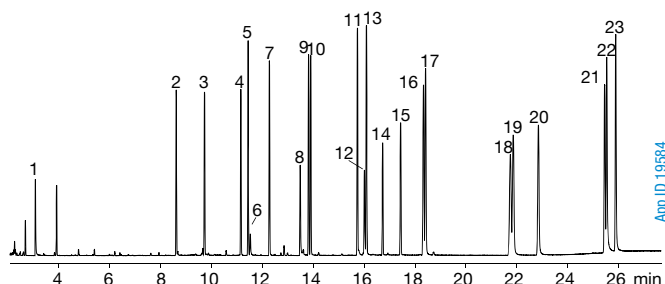
**Columns:** As listed  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Injection:** On-Column @ 68 °C, 0.1 µL  
**Carrier Gas:** Helium @ 40 cm/sec (constant flow)  
**Oven Program:** 65 °C (Isothermal)  
**Detector:** FID @ 320 °C  
**Note:** Sample dissolved at 100 ppm in Acetone  
**Sample:**  
 1. 1-Propionic acid  
 2. 1-Octene  
 3. n-Octane  
 4. 4-Methylpyrimidine  
 5. n-Nonane  
 6. Trimethyl phosphate  
 7. 1,2-Pentanediol  
 8. N-propylbenzene  
 9. 1-Heptanol  
 10. 3-Octanone  
 11. n-Decane

Comparative separations may not be representative of all applications.

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.

## ZB-5ms

### Less Tailing, Improved Resolution



**Column:** Zebron ZB-5ms  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G010-11](#)  
**Injection:** On-column @ 43 °C, 0.1 µL  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 40 °C for 2 min to 260 °C @ 15 °C/min for 5 min to 320 °C @ 15 °C/min for 2 min  
**Detector:** MSD @ 340 °C, 45 - 450 amu  
**Note:** Sample dissolved at 10 ppm in Methylene chloride  
**Sample:**

|                        |                  |                            |
|------------------------|------------------|----------------------------|
| 1. Pyridine            | 9. Phenanthrene  | 17. Benz[a]anthracene      |
| 2. Naphthalene         | 10. Anthracene   | 18. Benzo[b]fluoranthene   |
| 3. 2-Methylnaphthalene | 11. Fluoranthene | 19. Benzo[k]fluoranthene   |
| 4. Acenaphthylene      | 12. Benzidine    | 20. Benzo[a]pyrene         |
| 5. Acenaphthene        | 13. Pyrene       | 21. Indeno[1,2,3-cd]pyrene |
| 6. 2,4-Dinitrophenol   | 14. Endrin       | 22. Dibenzo[a,h]anthracene |
| 7. Fluorene            | 15. DDT          | 23. Benzo[g,h,i]perylene   |
| 8. Pentachlorophenol   | 16. Chrysene     |                            |

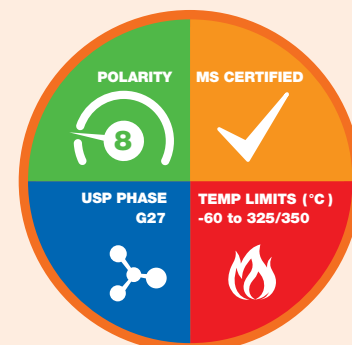
#### Ordering Information

##### Zebron ZB-5ms GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>10-Meter</b> |        |                 |                             |
| 0.10            | 0.10   | -60 to 325/350  | <a href="#">7CB-G010-02</a> |
| 0.18            | 0.18   | -60 to 325/350  | <a href="#">7CD-G010-08</a> |
| <b>12-Meter</b> |        |                 |                             |
| 0.20            | 0.33   | -60 to 325/350  | <a href="#">7DE-G010-14</a> |
| <b>15-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 325/350  | <a href="#">7EG-G010-11</a> |
| <b>20-Meter</b> |        |                 |                             |
| 0.18            | 0.18   | -60 to 325/350  | <a href="#">7FD-G010-08</a> |
| 0.18            | 0.32   | -60 to 325/350  | <a href="#">7FD-G010-51</a> |
| 0.18            | 0.36   | -60 to 325/350  | <a href="#">7FD-G010-53</a> |
| <b>25-Meter</b> |        |                 |                             |
| 0.20            | 0.33   | -60 to 325/350  | <a href="#">7GE-G010-14</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | -60 to 325/350  | <a href="#">7HG-G010-11</a> |
| 0.25            | 0.50   | -60 to 325/350  | <a href="#">7HG-G010-17</a> |
| 0.25            | 1.00   | -60 to 325/350  | <a href="#">7HG-G010-22</a> |
| 0.32            | 0.25   | -60 to 325/350  | <a href="#">7HM-G010-11</a> |
| 0.32            | 0.50   | -60 to 325/350  | <a href="#">7HM-G010-17</a> |
| 0.32            | 1.00   | -60 to 325/350  | <a href="#">7HM-G010-22</a> |
| <b>60-Meter</b> |        |                 |                             |
| 0.25            | 0.10   | -60 to 325/350  | <a href="#">7KG-G010-02</a> |
| 0.25            | 0.25   | -60 to 325/350  | <a href="#">7KG-G010-11</a> |
| 0.32            | 0.25   | -60 to 325/350  | <a href="#">7KM-G010-11</a> |

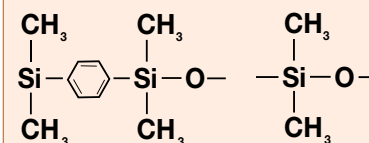
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G010-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry

5 % Phenyl-Arylene



95 % Dimethylpolysiloxane

#### Recommended Applications

- Acids
- Alkaloids
- Amines
- Dioxins
- Drugs
- Essential Oils
- Flavors
- FAMES
- Halo-hydrocarbons
- Herbicides
- PCBs/Aroclors
- Pesticides
- Phenols
- Residual Solvents
- Solvent Impurities



**ZB-5ms Test Mix**  
**Part No.:** [AG0-7578](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

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.

## ZB-23

### For Omega-3 Fatty Acids and Fish Oil Testing

- Traditional separation of cis/trans FAMES

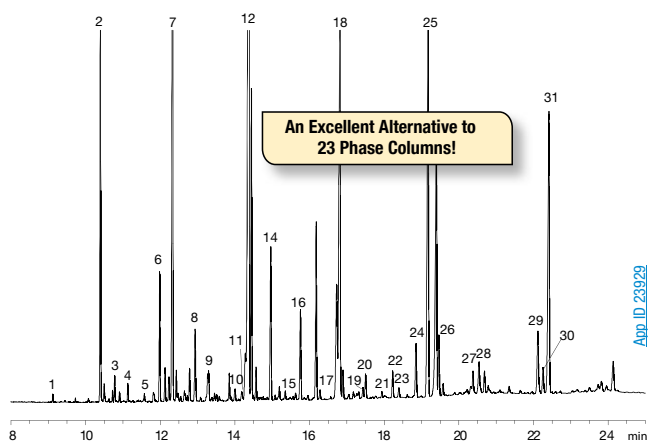
Alternative to any  
Cyanopropyl Polysiloxane phase:

**Agilent®**  
• DB®-23

**Restek®**  
• Rtx®-2330

**Supelco®**  
• SP®-2330

### Unsaturated Fatty Acids from Marine Oil



An Excellent Alternative to  
23 Phase Columns!

App ID: Z3929

**Column:** Zebron ZB-23

**Dimensions:** 60 meter x 0.25 mm x 0.15 µm

**Part No.:** [7KG-G039-05](#)

**Injection:** Split 50:1 @ 250 °C, 1 µL

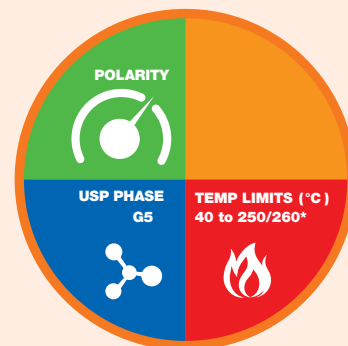
**Carrier Gas:** Helium @ 33cm/s @ 50 °C (constant flow)

**Oven Program:** 50 °C for 1 min to 175 °C @ 25 °C/min to 230 °C @ 4 °C/min for 5 min

**Detector:** FID @ 280 °C

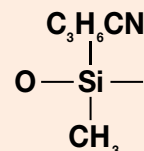
|                |                      |                               |
|----------------|----------------------|-------------------------------|
| <b>Sample:</b> | 1. C12:0             | 16. C18:3 cis 9,12,15         |
|                | 2. C14:0             | 17. C20:0                     |
|                | 3. C14:1 cis 9       | 18. C20:1 cis 11              |
|                | 4. C15:0             | 19. C21:0                     |
|                | 5. C15:1 cis 10      | 20. C20:2 cis 11,14           |
|                | 6. C16:0             | 21. C20:3 cis 8,11,14         |
|                | 7. C16:1 cis 9       | 22. C20:4 cis 5,8,11,14       |
|                | 8. C17:0             | 23. C20:3 cis 11,14,17        |
|                | 9. C17:1 cis 10      | 24. C22:0                     |
|                | 10. C18:0            | 25. C20:5 cis 5,8,11,14,17    |
|                | 11. C18:1 trans 9    | 26. C22:1 cis 13              |
|                | 12. C18:1 cis 9      | 27. C23:0                     |
|                | 13. C18:2 trans 9,12 | 28. C22:2 cis 13,16           |
|                | 14. C18:2 cis 9,12   | 29. C24:0                     |
|                | 15. C18:3 cis 6,9,12 | 30. C24:1 cis 15              |
|                |                      | 31. C22:6 cis 4,7,10,13,16,19 |

#### Column Profile



\* 0.53 mm ID columns are rated to 230/240 °C

#### Phase Chemistry



50 % Cyanopropyl 50 % Methylpolysiloxane

#### Recommended Applications

- Omega-3 Fatty Acids

#### Ordering Information

##### Zebron ZB-23 GC Columns

| ID(mm)          | df(µm) | Temp. Limits °C | Part No.                    |
|-----------------|--------|-----------------|-----------------------------|
| <b>15-Meter</b> |        |                 |                             |
| 0.25            | 0.25   | 40 to 250/260   | <a href="#">7EG-G039-11</a> |
| 0.53            | 0.50   | 40 to 230/240   | <a href="#">7EK-G039-17</a> |
| <b>20-Meter</b> |        |                 |                             |
| 0.18            | 0.20   | 40 to 250/260   | <a href="#">7FD-G039-10</a> |
| <b>30-Meter</b> |        |                 |                             |
| 0.25            | 0.15   | 40 to 250/260   | <a href="#">7HG-G039-05</a> |
| 0.25            | 0.25   | 40 to 250/260   | <a href="#">7HG-G039-11</a> |
| 0.32            | 0.25   | 40 to 250/260   | <a href="#">7HM-G039-11</a> |
| 0.53            | 0.50   | 40 to 230/240   | <a href="#">7HK-G039-17</a> |
| <b>60-Meter</b> |        |                 |                             |
| 0.25            | 0.15   | 40 to 250/260   | <a href="#">7KG-G039-05</a> |
| 0.25            | 0.25   | 40 to 250/260   | <a href="#">7KG-G039-11</a> |
| 0.32            | 0.25   | 40 to 250/260   | <a href="#">7KM-G039-11</a> |

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.

## ZB-88

### For Olive Oil and Hydrogenated Oil Analysis

- Traditional separation of cis/trans FAMES
- Excellent performance for AOAC 996.06 and AOCS Ce 1j-07 methods

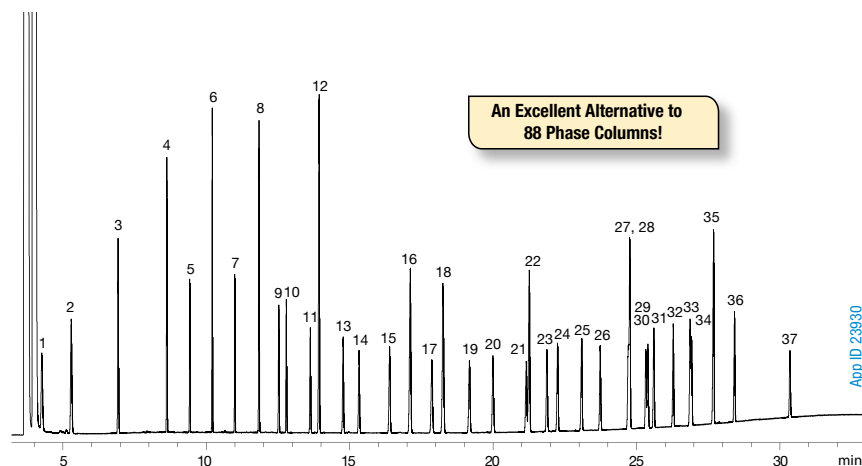
Upgrade to Zebron from any Biscyanopropyl Polysiloxane phase:

**Agilent<sup>®</sup>**  
 • CP-Sil 88  
 • HP-88

**Restek<sup>®</sup>**  
 • Rt<sup>®</sup>-2560

**Supelco<sup>®</sup>**  
 • SP<sup>®</sup>-2560

### 37 FAME Mix



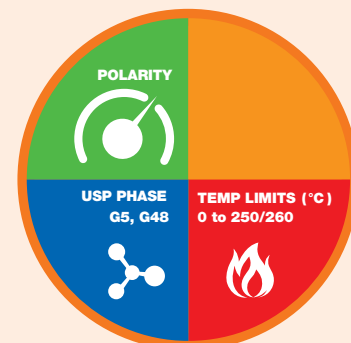
An Excellent Alternative to 88 Phase Columns!

App. ID: 23930

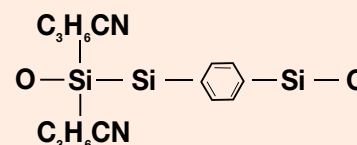
**Column:** Zebron ZB-88  
**Dimensions:** 100 meter x 0.25 mm x 0.20 µm  
**Part No.:** [ZMG-G037-10](#)  
**Injection:** Split 50:1 @ 250 °C, 1 µL  
**Carrier Gas:** Hydrogen @ 2 mL/min (constant flow)  
**Oven Program:** 120 °C for 1 min to 175 °C @ 10 °C/min for 10 min to 210 °C @ 5 °C/min for 5 min to 230 °C @ 5 °C/min for 5 min  
**Detector:** FID @ 280 °C

|                |                      |                               |
|----------------|----------------------|-------------------------------|
| <b>Sample:</b> | 1. C4:0              | 20. C18:2 cis 9,12            |
|                | 2. C6:0              | 21. C18:3 cis 6,9,12          |
|                | 3. C8:0              | 22. C20:0                     |
|                | 4. C10:0             | 23. C18:3 cis 9,12,15         |
|                | 5. C11:0             | 24. C20:1 cis 11              |
|                | 6. C12:0             | 25. C21:0                     |
|                | 7. C13:0             | 26. C20:2 cis 11,14           |
|                | 8. C14:0             | 27. C22:0                     |
|                | 9. C14:1 cis 9       | 28. C20:3 cis 8,11,14         |
|                | 10. C15:0            | 29. C20:3 cis 11,14,17        |
|                | 11. C15:1 cis 10     | 30. C22:1 cis 13              |
|                | 12. C16:0            | 31. C20:4 cis 5,8,11,14       |
|                | 13. C16:1 cis 9      | 32. C23:0                     |
|                | 14. C17:0            | 33. C22:2 cis 13,16           |
|                | 15. C17:1 cis 10     | 34. C20:5 cis 5,8,11,14,17    |
|                | 16. C18:0            | 35. C24:0                     |
|                | 17. C18:1 trans 9    | 36. C24:1 cis 15              |
|                | 18. C18:1 cis 9      | 37. C22:6 cis 4,7,10,13,16,19 |
|                | 19. C18:2 trans 9,12 |                               |

### Column Profile



### Phase Chemistry



88 % Cyanopropyl      12 % Arylpolsiloxane

### Recommended Applications

- cis/trans FAMES

### Ordering Information

#### Zebron ZB-88 GC Columns

| ID (mm)          | df (µm) | Temp. Limits °C | Part No.                    |
|------------------|---------|-----------------|-----------------------------|
| <b>30-Meter</b>  |         |                 |                             |
| 0.25             | 0.20    | 0 to 250/260    | <a href="#">7HG-G037-10</a> |
| <b>60-Meter</b>  |         |                 |                             |
| 0.25             | 0.20    | 0 to 250/260    | <a href="#">7KG-G037-10</a> |
| <b>100-Meter</b> |         |                 |                             |
| 0.25             | 0.20    | 0 to 250/260    | <a href="#">7MG-G037-10</a> |

## ZB-35

### Intermediate Polarity for GC-MS

- Intermediate polarity column with temperature limits up to 360 °C allows high molecular weight analysis
- Excellent inertness to minimize analyte adsorption, improve efficiency, and reproducibility
- More rugged (longer column life) than other polar phases
- Excellent for trace analysis with bleed-sensitive detectors (MS, FID, ECD, NPD)

Upgrade to Zebron from any

35% phenyl / 65% dimethylpolysiloxane phase:

**Agilent®**

- DB®-35
- DB-35ms
- HP-35
- HP-35ms

**Restek®**

- Rtx®-35
- Rtx-35ms

**SGE®**

- BPX35
- BPX608

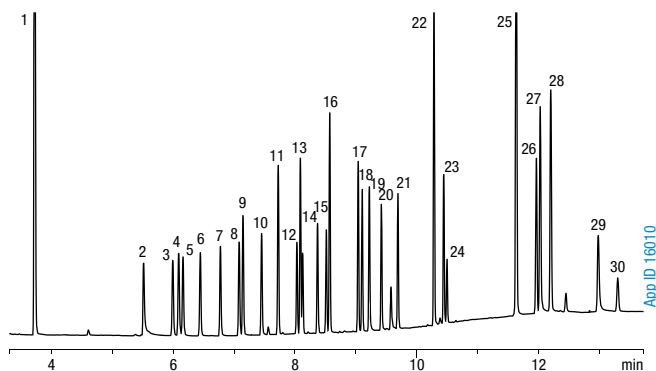
**Supelco®**

- MDN-35
- SPB®-35
- SPB-608

**OV®**

- OV-11

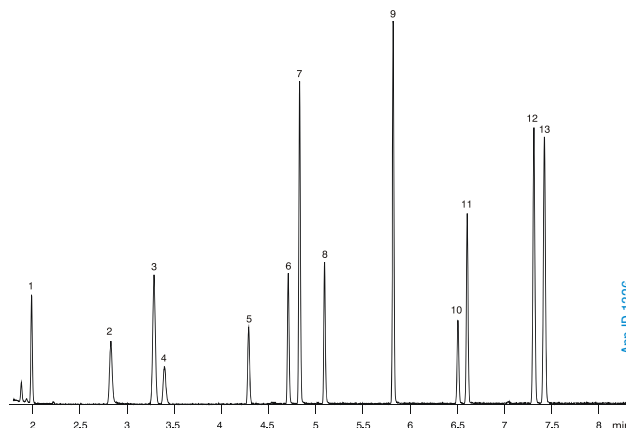
### Common Drug Screen by GC-FID



**Column:** Zebron ZB-35  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G003-11](#)  
**Injection:** Split 10:1 @ 225 °C, 1.5 µL  
**Carrier Gas:** Helium @ 1.4 mL/min (constant flow)  
**Oven Program:** 120 °C to 180 °C @ 25 °C/min to 200 °C @ 6 °C/min to 300 °C @ 20 °C/min for 3 min  
**Detector:** FID @ 300 °C  
**Sample:** All analytes are 25 ppm except nicotine at 100 ppm

|                  |                      |                      |
|------------------|----------------------|----------------------|
| 1. Nicotine      | 11. Benzphetamine    | 21. Bromopheniramine |
| 2. Ibuprofen     | 12. Meprobamate      | 22. Chlorcyclizine   |
| 3. Allobarbitol  | 13. Dimenhydrinate   | 23. Cocaine          |
| 4. Acetaminophen | 14. Hexobarbital     | 24. Benactyzine      |
| 5. Aprobarbital  | 15. Doxylamine       | 25. Codeine          |
| 6. Butalbital    | 16. Caffeine         | 26. Diazepam         |
| 7. Amobarbital   | 17. Chlorpheniramine | 27. Morphine         |
| 8. Pentobarbital | 18. Methapyrilene    | 28. Hydrocodone      |
| 9. Phenacetin    | 19. Phenobarbital    | 29. Oxymorphone      |
| 10. Secobarbital | 20. Procaine         | 30. Heroin           |

### Solvents and Halogenated Hydrocarbons by GC-MS



**Column:** Zebron ZB-35  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G003-11](#)  
**Injection:** Split 50:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 1.12 mL/min (constant flow)  
**Oven Program:** 32 to 125 °C @ 12 °C/min (hold 1 min)  
**Detector:** MSD @ 250 °C  
**Sample:**

1. trans-1,2-Dichloroethylene
2. 1,1,1-Trichloroethane
3. Benzene
4. 1,2-Dichloroethane
5. Bromodichloromethane
6. cis-1,3-Dichloropropene
7. Toluene
8. trans-1,3-Dichloropropene
9. Ethylbenzene
10. Bromoform
11. 1,1,2,2-Tetrachloroethane
12. 1,3-Dichlorobenzene
13. 1,4-Dichlorobenzene

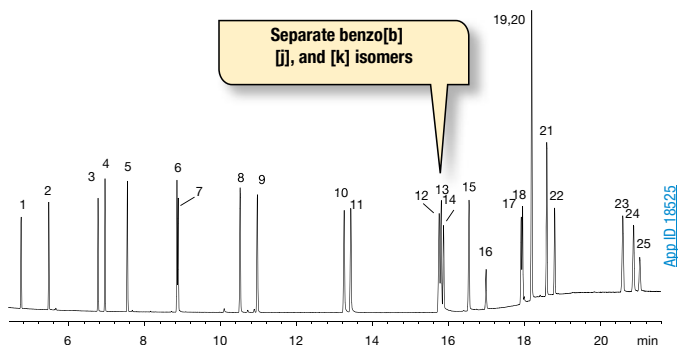


If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-35

### Perform Difficult Separations

#### PAHs in Water by GC-MS



**Column:** Zebron ZB-35  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** 7HG-G003-11  
**Injection:** On-Column @ 83 °C, 1 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 80 °C for 0.66 min to 250 °C @ 20 °C/min to 360 °C @ 8 °C/min for 6 min  
**Detector:** MSD @ 360 °C, 45-450 amu  
**Sample:** Analytes are 10 ppm in dichloromethane

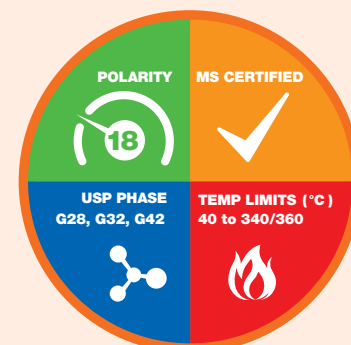
|                        |                            |                               |
|------------------------|----------------------------|-------------------------------|
| 1. Naphthalene         | 11. Chrysene               | 21. Benzo[g,h,i]perylene      |
| 2. 2-Methylnaphthalene | 12. Benzo[b]fluoranthene   | 22. 7H-Dibenzo[c,g] carbazole |
| 3. Acenaphthylene      | 13. Benzo[k]fluoranthene   | 23. Dibenzo[a,e]pyrene        |
| 4. Acenaphthene        | 14. Benzo[j]fluoranthene   | 24. Dibenzo[a,i]pyrene        |
| 5. Fluorene            | 15. Benzo[a]pyrene         | 25. Dibenzo[a,h]pyrene        |
| 6. Phenanthrene        | 16. 3-Methylcholanthrene   |                               |
| 7. Anthracene          | 17. Dibenz[a,h]acridine    |                               |
| 8. Fluoranthene        | 18. Dibenz[a,j]acridine    |                               |
| 9. Pyrene              | 19. Indeno[1,2,3-cd]pyrene |                               |
| 10. Benz[a]anthracene  | 20. Dibenz[a,h]anthracene  |                               |

#### Ordering Information

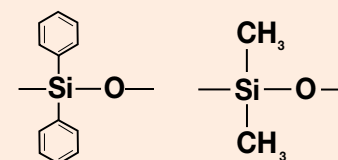
| Zebron ZB-35 GC Columns |        |                 |                             |
|-------------------------|--------|-----------------|-----------------------------|
| ID(mm)                  | df(µm) | Temp. Limits °C | Part No.                    |
| <b>10-Meter</b>         |        |                 |                             |
| 0.10                    | 0.10   | 40 to 340/360   | <a href="#">7CB-G003-02</a> |
| <b>15-Meter</b>         |        |                 |                             |
| 0.25                    | 0.25   | 40 to 340/360   | <a href="#">7EG-G003-11</a> |
| 0.25                    | 0.50   | 40 to 340/360   | <a href="#">7EG-G003-17</a> |
| 0.53                    | 1.00   | 40 to 340/360   | <a href="#">7EK-G003-22</a> |
| <b>30-Meter</b>         |        |                 |                             |
| 0.25                    | 0.25   | 40 to 340/360   | <a href="#">7HG-G003-11</a> |
| 0.25                    | 0.50   | 40 to 340/360   | <a href="#">7HG-G003-17</a> |
| 0.32                    | 0.25   | 40 to 340/360   | <a href="#">7HM-G003-11</a> |
| 0.32                    | 0.50   | 40 to 340/360   | <a href="#">7HM-G003-17</a> |
| 0.53                    | 0.50   | 40 to 340/360   | <a href="#">7HK-G003-17</a> |
| 0.53                    | 1.00   | 40 to 340/360   | <a href="#">7HK-G003-22</a> |
| <b>60-Meter</b>         |        |                 |                             |
| 0.25                    | 0.25   | 40 to 340/360   | <a href="#">7KG-G003-11</a> |
| 0.32                    | 0.25   | 40 to 340/360   | <a href="#">7KM-G003-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G003-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry



35 % Phenyl    65 % Dimethylpolysiloxane

#### Recommended Applications

- Amines
- Drugs
- EPA Methods (508, 608, 8081, 8141, 8151)
- PCBs / Aroclors
- Pesticides
- Pharmaceuticals



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-50

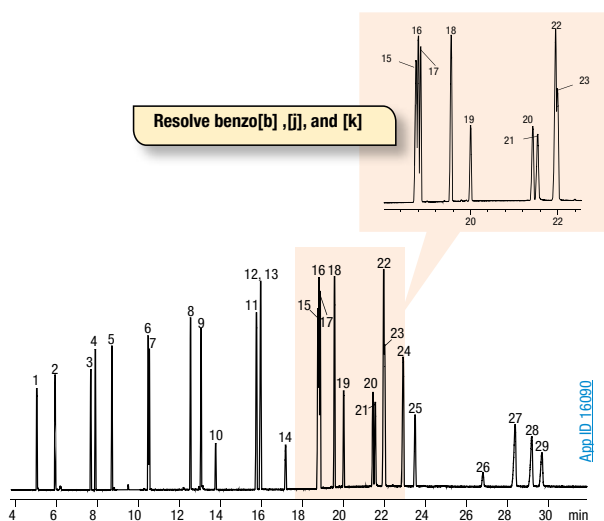
### Robust Results, Rugged Performance

- High polarity column with temperature limits up to 340 °C allows high temperature bake out to remove contaminants
- Excellent inertness to minimize analyte adsorption, improve efficiency, and reproducibility
- More rugged (longer column life) than other polar phases
- Excellent for trace analysis with bleed-sensitive detectors
- Great for drug screening and environmental compounds

Upgrade to Zebron from any 50% phenyl / 50% dimethylpolysiloxane phase:

| Agilent®   | Restek®   | SGE®  | Supelco®  |
|--|---|---|---|
| <ul style="list-style-type: none"> <li>• DB®-17</li> <li>• DB-17ht</li> <li>• DB-17ms</li> <li>• DB-17 EVDX</li> </ul> | <ul style="list-style-type: none"> <li>• Rtx®-50</li> </ul> | <ul style="list-style-type: none"> <li>• BPX50</li> </ul> | <ul style="list-style-type: none"> <li>• SP®-2250</li> <li>• SPB®-17</li> <li>• SPB-50</li> </ul> |

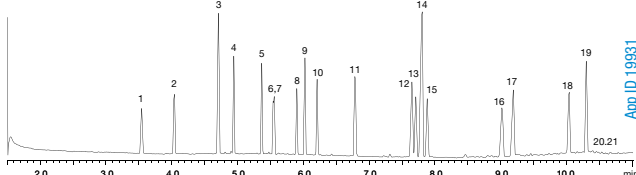
### PAHs Including European Analytes



**Column:** Zebron ZB-50  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** ZHG-G004-11  
**Injection:** Pulsed Splitless for 0.5 min @ 320 °C, 1 µL  
**Carrier Gas:** Helium @ 1.2 mL/min (constant flow)  
**Oven Program:** 80 °C to 265 °C @ 15 °C/min to 290 °C @ 5 °C/min to 330 °C @ 20 °C/min for 15 min  
**Detector:** MSD @ 330 °C; 45-450 amu  
**Sample:**

|                           |                              |
|---------------------------|------------------------------|
| 1. Naphthalene            | 16. Benzo[k]fluoranthene     |
| 2. 2-Methylnaphthalene    | 17. Benzo[j]fluoranthene     |
| 3. Acenaphthalene         | 18. Benzo[a]pyrene           |
| 4. Acenaphthene           | 19. 3-Methylcholanthrene     |
| 5. Fluorene               | 20. Dibenz[a,h]acridine      |
| 6. Phenanthrene           | 21. Dibenz[a,j]acridine      |
| 7. Anthracene             | 22. Dibenz[a,h]anthracene    |
| 8. Fluoranthene           | 23. Indeno[1,2,3-cd]pyrene   |
| 9. Pyrene                 | 24. Benzo[g,h,i]perylene     |
| 10. Benzo[c]fluorene      | 25. 7H-Dibenzo[c,g]carbazole |
| 11. Benz[a]anthracene     | 26. Dibenzo[a,j]pyrene       |
| 12. Chrysene              | 27. Dibenzo[a,e]pyrene       |
| 13. Cyclopenta[c,d]pyrene | 28. Dibenzo[a,i]pyrene       |
| 14. 5-Methylchrysene      | 29. Dibenzo[a,h]pyrene       |
| 15. Benzo[b]fluoranthene  |                              |

### Phthalates by GC-MS



**Column:** Zebron ZB-50  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** ZHG-G004-11  
**Injection:** Split 10:1 @ 260 °C, 1 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 135 °C to 275 °C @ 25 °C/min for 3.5 min to 340 °C @ 35 °C/min for 1 min  
**Detector:** MSD @ 320 °C; 45-500 amu  
**Sample:** Analytes are 100 µg/mL

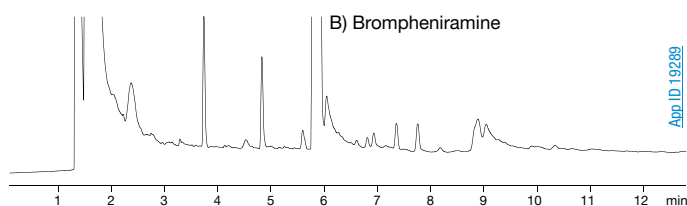
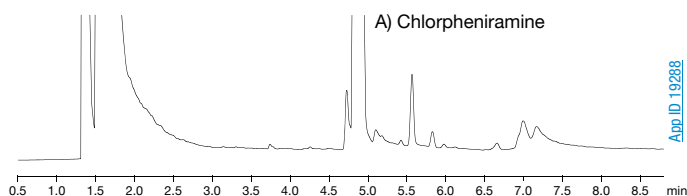
|                                     |                                 |
|-------------------------------------|---------------------------------|
| 1. Dimethyl phthalate               | 12. Di(ethylhexyl) phthalate    |
| 2. Diethyl phthalate                | 13. Butylbenzyl phthalate       |
| 3. Diallyl phthalate                | 14. Diheptyl phthalate          |
| 4. Dipropyl phthalate               | 15. bis(2-Butoxyethyl)phthalate |
| 5. Dibutyl phthalate                | 16. Dicyclohexyl phthalate      |
| 6. Diisobutyl phthalate             | 17. Di-n-octyl phthalate        |
| 7. Dihexyl phthalate                | 18. Diphenylhexyl phthalate     |
| 8. bis(2-Methoxyethyl)phthalate     | 19. Dinonyl phthalate           |
| 9. Dipentyl phthalate               | 20. Diisononyl phthalate        |
| 10. bis(2-Ethoxyethyl)phthalate     | 21. Diisodecyl phthalate        |
| 11. bis(4-Methyl-2-pentyl)phthalate |                                 |

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.

## ZB-50

### Mid-Polarity for Drugs

#### Antihistamines by GC-FID



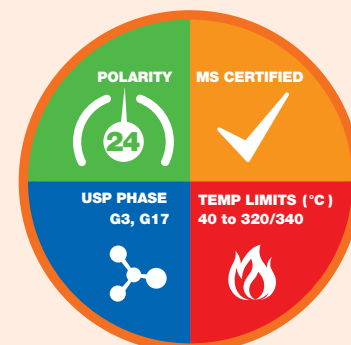
**Column:** Zebron ZB-50  
**Dimensions:** 30 meter x 0.32 mm x 0.50 µm  
**Part No.:** [7HM-G004-17](#)  
**Injection:** Split 20:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 40 cm/sec (constant flow)  
**Oven Program:** A) 190 °C to 260 °C @ 25 °C/min for 6 min  
 B) 190 °C to 260 °C @ 25 °C/min for 10 min  
**Detector:** FID @ 270 °C  
**Sample:** As listed

#### Ordering Information

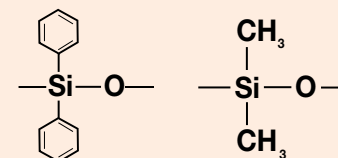
| Zebron ZB-50 GC Columns |         |                 |                             |
|-------------------------|---------|-----------------|-----------------------------|
| ID (mm)                 | df (µm) | Temp. Limits °C | Part No.                    |
| <b>10-Meter</b>         |         |                 |                             |
| 0.10                    | 0.10    | 40 to 320/340   | <a href="#">7CB-G004-02</a> |
| 0.53                    | 2.00    | 40 to 320/340   | <a href="#">7CK-G004-32</a> |
| <b>15-Meter</b>         |         |                 |                             |
| 0.25                    | 0.15    | 40 to 320/340   | <a href="#">7EG-G004-05</a> |
| 0.25                    | 0.25    | 40 to 320/340   | <a href="#">7EG-G004-11</a> |
| 0.32                    | 0.25    | 40 to 320/340   | <a href="#">7EM-G004-11</a> |
| 0.32                    | 0.50    | 40 to 320/340   | <a href="#">7EM-G004-17</a> |
| 0.53                    | 1.00    | 40 to 320/340   | <a href="#">7EK-G004-22</a> |
| <b>30-Meter</b>         |         |                 |                             |
| 0.25                    | 0.25    | 40 to 320/340   | <a href="#">7HG-G004-11</a> |
| 0.25                    | 0.50    | 40 to 320/340   | <a href="#">7HG-G004-17</a> |
| 0.32                    | 0.25    | 40 to 320/340   | <a href="#">7HM-G004-11</a> |
| 0.32                    | 0.50    | 40 to 320/340   | <a href="#">7HM-G004-17</a> |
| 0.53                    | 1.00    | 40 to 320/340   | <a href="#">7HK-G004-22</a> |
| <b>60-Meter</b>         |         |                 |                             |
| 0.25                    | 0.25    | 40 to 320/340   | <a href="#">7KG-G004-11</a> |
| 0.25                    | 0.50    | 40 to 320/340   | <a href="#">7KG-G004-17</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G004-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry



50 % Phenyl    50 % Dimethylpolysiloxane

#### Recommended Applications

- Antidepressants
- Cholesterols
- Drugs of Abuse
- EPA Methods (508, 608, 8081, 8141, 8151)
- Glycols
- Herbicides
- Pesticides
- Steroids
- Triglycerides



**ZB-50 Test Mix**  
 Part No.: [AG0-5157](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-624

### Robust Results for VOCs and Residual Solvents

- Widely used phase to separate volatile organic flavor and fragrance additives and residual solvents in industrial or pharmaceutical products (OVIs)
- Popular choice for residual solvent testing
- Excellent for US EPA Methods 501.3, 502.2, 503.1, 524.2, 601, 602, 624, 8010, 8015, 8020, 8021, 8240, 8260
- Specifically designed for the separation of volatile organic compounds (VOCs)
- Increased temperature limit speeds run times and re-equilibration

Upgrade to Zebron from any

6 % cyanopropylphenyl / 94 % dimethylpolysiloxane phase:

**Agilent®**

- DB®-624
- DB-1301
- DB-VRX
- HP-VOC
- CP-1301
- CP-Select 624 CB

**Restek®**

- Rtx®-624
- Rtx-1301
- Rtx-VMS

**SGE®**

- BPX624

**Supelco®**

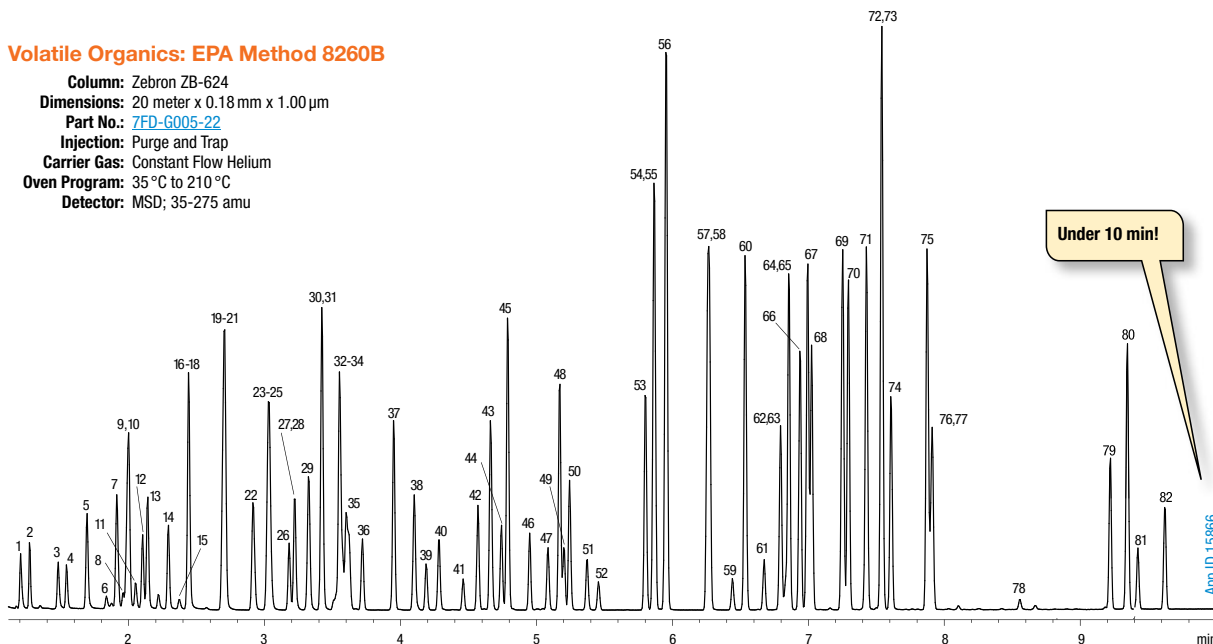
- SPB®-624
- SPB-1301

**OV®**

- OV-624

### Volatile Organics: EPA Method 8260B

Column: Zebron ZB-624  
 Dimensions: 20 meter x 0.18 mm x 1.00 µm  
 Part No.: 7FD-G005-22  
 Injection: Purge and Trap  
 Carrier Gas: Constant Flow Helium  
 Oven Program: 35 °C to 210 °C  
 Detector: MSD; 35-275 amu



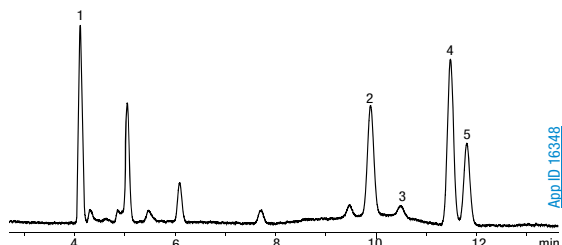
| Peak No. | Sample Analyte           | Peak No. | Sample Analyte           | Peak No. | Sample Analyte               | Peak No. | Sample Analyte               |
|----------|--------------------------|----------|--------------------------|----------|------------------------------|----------|------------------------------|
| 1.       | Chloromethane            | 22.      | Ethyl-t-butyl ether      | 43.      | Methyl isobutyl ketone       | 64.      | 1, 2, 3-Trichloropropane     |
| 2.       | Vinyl chloride           | 23.      | 2, 2-Dichloropropane     | 44.      | Toluene-d8                   | 65.      | n-Propylbenzene              |
| 3.       | Bromomethane             | 24.      | cis-1, 2-Dichloroethene  | 45.      | Toluene                      | 66.      | 2-Chlorotoluene              |
| 4.       | Chloroethane             | 25.      | 2-Butanone               | 46.      | trans-1, 3-Dichloropropene   | 67.      | 1, 3, 5-Trimethylbenzene     |
| 5.       | Trichlorofluoromethane   | 26.      | Bromochloromethane       | 47.      | 1, 1, 2-Trichloroethane      | 68.      | 4-Chlorotoluene              |
| 6.       | Ethanol                  | 27.      | Chloroform               | 48.      | Tetrachloroethene            | 69.      | tert-Butylbenzene            |
| 7.       | Dichlorotrifluoroethane  | 28.      | Tetrahydrofuran          | 49.      | 1, 3-Dichloropropane         | 70.      | 1, 2, 4-Trimethylbenzene     |
| 8.       | Acrolein                 | 29.      | 1, 1, 1-Trichloroethane  | 50.      | 2-Hexanone                   | 71.      | sec-Butylbenzene             |
| 9.       | Trichlorotrifluoroethane | 30.      | 1, 1-Dichloropropene     | 51.      | Dibromochloromethane         | 72.      | 1, 3-Dichlorobenzene         |
| 10.      | 1, 1-Dichloroethene      | 31.      | Carbon tetrachloride     | 52.      | Ethylene dibromide           | 73.      | 4-Isopropyltoluene           |
| 11.      | Acetone                  | 32.      | 1, 2-Dichloroethane-d4   | 53.      | Chlorobenzene                | 74.      | 1, 4-Dichlorobenzene         |
| 12.      | Methyl iodide            | 33.      | Benzene                  | 54.      | 1, 1, 1, 2-Tetrachloroethane | 75.      | n-Butylbenzene               |
| 13.      | Carbon disulfide         | 34.      | 1, 2-Dichloroethane      | 55.      | Ethylbenzene                 | 76.      | 1, 2-Dichlorobenzene-d4      |
| 14.      | Methylene chloride       | 35.      | t-Amyl methyl ether      | 56.      | m, p-Xylene                  | 77.      | 1, 2-Dichlorobenzene         |
| 15.      | t-Butanol                | 36.      | Fluorobenzene            | 57.      | o-Xylene                     | 78.      | 1, 2-Dibromo-3-chloropropane |
| 16.      | trans-1,2-Dichloroethane | 37.      | Trichloroethene          | 58.      | Styrene                      | 79.      | 1, 2, 4-Trichlorobenzene     |
| 17.      | Methyl-t-butyl ether     | 38.      | 1, 2-Dichloropropane     | 59.      | Bromoform                    | 80.      | Hexachlorobutadiene          |
| 18.      | Acrylonitrile            | 39.      | Dibromomethane           | 60.      | Isopropylbenzene             | 81.      | Naphthalene                  |
| 19.      | 1, 1-Dichloroethane      | 40.      | Bromodichloromethane     | 61.      | 4-Bromofluorobenzene         | 82.      | 1, 2, 3-Trichlorobenzene     |
| 20.      | Vinyl Acetate            | 41.      | 2-Chloroethylvinyl ether | 62.      | 1, 1, 2, 2-Tetrachloroethane |          |                              |
| 21.      | Diisopropyl ether        | 42.      | cis-1, 3-Dichloropropene | 63.      | Bromobenzene                 |          |                              |

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.

## ZB-624

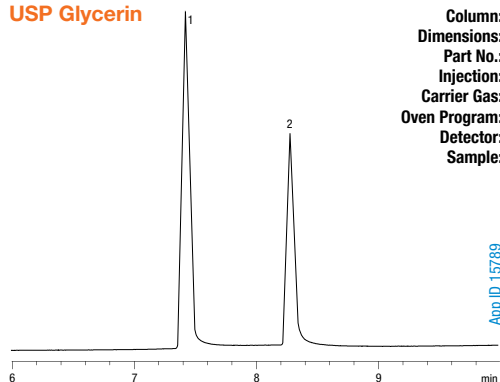
### Good Performance for Pharmaceuticals

#### USP <467> Residual Solvents Procedure A – Class 1



**Column:** Zebron ZB-624  
**Dimensions:** 30 meter x 0.32 mm x 1.80 µm  
**Part No.:** [7HM-G005-31](#)  
**Injection:** Split 5:1 @ 140 °C, 1 mL  
**Carrier Gas:** Helium @ 35 cm/sec (constant flow)  
**Oven Program:** 40 °C for 20 min to 240 °C @ 10 °C/min for 20 min  
**Detector:** FID @ 250 °C  
**Sample:** 1. 1,1-Dichloroethene  
 2. 1,1,1-Trichloroethane  
 3. Carbon tetrachloride  
 4. Benzene  
 5. 1,2-Dichloroethane

#### USP Glycerin



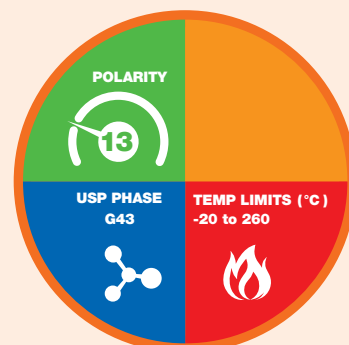
**Column:** Zebron ZB-624  
**Dimensions:** 30 meter x 0.53 mm x 3.00 µm  
**Part No.:** [7HK-G005-36](#)  
**Injection:** Split 10:1 @ 220 °C, 0.5 µL  
**Carrier Gas:** Helium @ 4.5 mL/min (constant flow)  
**Oven Program:** 100 °C to 220 °C @ 7.5 °C/min for 4 min  
**Detector:** FID @ 250 °C  
**Sample:** 1. Diethylene Glycol  
 2. Glycerin

#### Ordering Information

| Zebron ZB-624 GC Columns |        |                 |                             |
|--------------------------|--------|-----------------|-----------------------------|
| ID(mm)                   | df(µm) | Temp. Limits °C | Part No.                    |
| <b>20-Meter</b>          |        |                 |                             |
| 0.18                     | 1.00   | -20 to 260      | <a href="#">7FD-G005-22</a> |
| <b>30-Meter</b>          |        |                 |                             |
| 0.25                     | 1.40   | -20 to 260      | <a href="#">7HG-G005-27</a> |
| 0.32                     | 1.80   | -20 to 260      | <a href="#">7HM-G005-31</a> |
| 0.53                     | 3.00   | -20 to 260      | <a href="#">7HK-G005-36</a> |
| <b>60-Meter</b>          |        |                 |                             |
| 0.25                     | 1.40   | -20 to 260      | <a href="#">7KG-G005-27</a> |
| 0.32                     | 1.80   | -20 to 260      | <a href="#">7KM-G005-31</a> |
| 0.53                     | 3.00   | -20 to 260      | <a href="#">7KK-G005-36</a> |
| <b>75-Meter</b>          |        |                 |                             |
| 0.53                     | 3.00   | -20 to 260      | <a href="#">7LK-G005-36</a> |
| <b>105-Meter</b>         |        |                 |                             |
| 0.53                     | 3.00   | -20 to 260      | <a href="#">7NK-G005-36</a> |

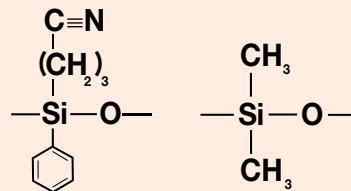
Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G005-27-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry

6 % Cyanopropylphenyl



94 % Dimethylpolysiloxane

#### Recommended Applications

- Pharmaceuticals
- Residual Solvents
- Volatile Organic Compounds (VOCs)
- EPA Methods (501.3, 502.2, 503.1, 524.2, 601, 602, 624, 8010, 8015, 8020, 8021, 8240, 8260)



**ZB-624 Test Mix**  
 Part No.: [AG0-5159](#)



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-1701

### Alternate Selectivity for Mid-Polarity Analyses

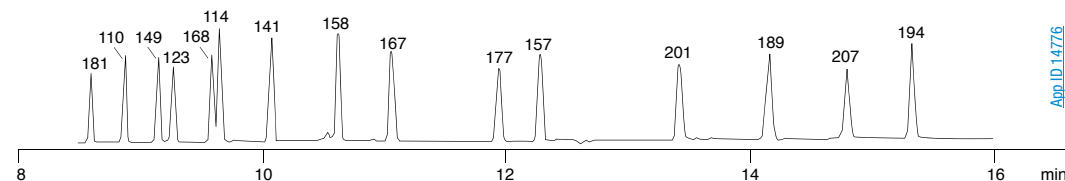
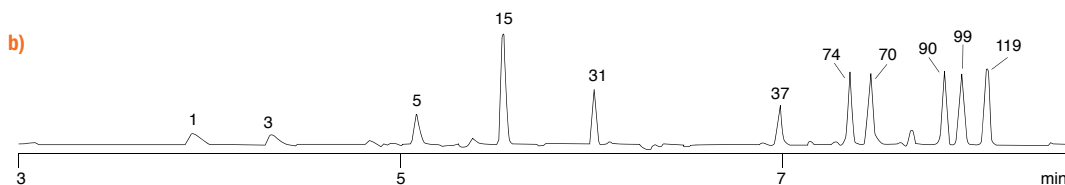
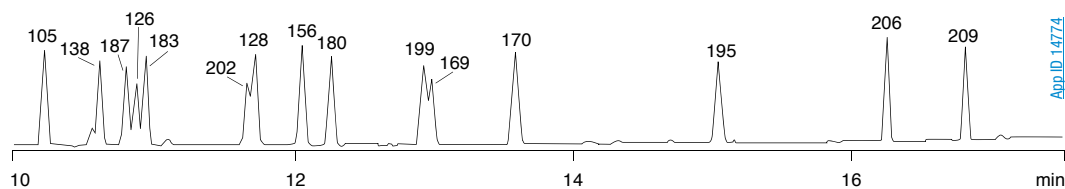
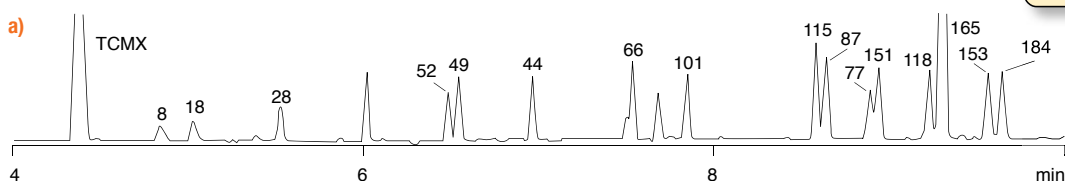
- Fast run and re-equilibration times for enhanced sample throughput and productivity
- Provides alternate selectivity to phenyl phases with similar polarity

Upgrade to Zebtron from any 14% cyanopropylphenyl / 86% dimethylpolysiloxane phase:

| Agilent®       | Restek®     | SGE®   | Supelco®       | OV®       |
|----------------|-------------|--------|----------------|-----------|
| • DB®-1701     | • Rtx®-1701 | • BP10 | • SPB®-1701    | • OV-1701 |
| • CP-Sil 19 CB | • Rtx-VMS   |        | • Equity®-1701 |           |

### Polychlorinated Biphenyl (PCB) Congeners by GC-ECD

Resolve PCB congeners when used in a dual-column setup with ZB-50! Learn more at [www.phenomenex.com/PCBs](http://www.phenomenex.com/PCBs)



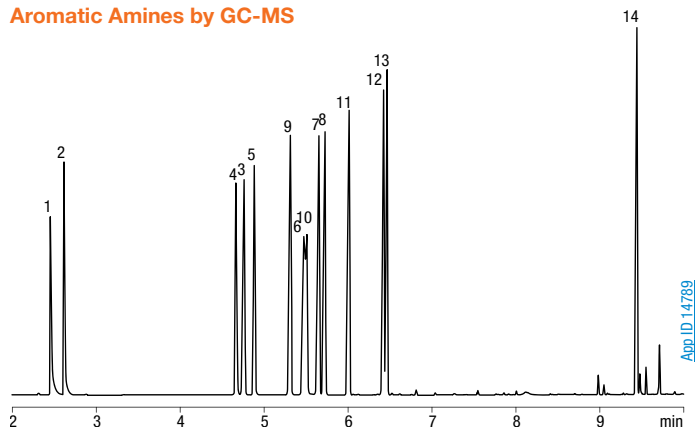
**Column:** ZebtronZB-1701  
**Dimensions:** 30 meter x 0.32 mm x 0.25 µm  
**Part No.:** [ZHM-G006-11](#)  
**Injection:** Splitless (hold 0.75 min) @ 225 °C, 1 µL  
**Carrier Gas:** Helium @ 2.5 mL/min (constant flow)  
**Oven Program:** 130 °C to 230 °C @ 20 °C/min to 270 °C @ 4 °C/min to 300 °C @ 20 °C/min, hold 1 min  
**Detector:** ECD @ 325 °C

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.

## ZB-1701

### Good Peak Shape for Active Analytes

#### Aromatic Amines by GC-MS



- Column:** ZebronZB-1701  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G006-11](#)  
**Injection:** Split 15:1 @ 220 °C, 1 µL  
**Carrier Gas:** Helium @ 1.0 mL/min (constant flow)  
**Oven Program:** 60 °C for 1 min to 110 °C @ 30 °C/min to 135 °C @ 9 °C/min to 260 °C @ 30 °C/min for 2 min  
**Detector:** MSD @ 180 °C  
**Sample:** Analytes are at 1.58 mg/mL each
1. Piperidine
  2. 2-Methylpiperidine
  3. Aniline
  4. Benzylamine
  5. α-Phenylethylamine
  6. N-Methylaniline
  7. m-Toluidine
  8. o-Toluidine
  9. N,N-Dimethylaniline
  10. β-Phenylethylamine
  11. N-Ethylaniline
  12. 2,4-Dimethylaniline
  13. N,N-Diethylaniline
  14. Dibenzylamine

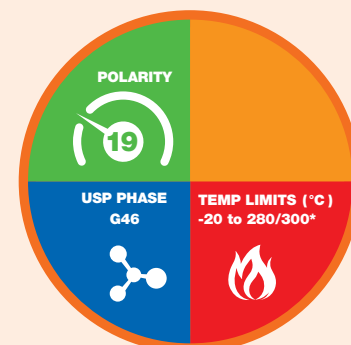
#### Ordering Information

##### ZebronZB-1701 GC Columns

| ID (mm)         | df (µm) | Temp. Limits °C | Part No.                    |
|-----------------|---------|-----------------|-----------------------------|
| <b>15-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | -20 to 280/300  | <a href="#">7EG-G006-11</a> |
| 0.32            | 0.25    | -20 to 280/300  | <a href="#">7EM-G006-11</a> |
| <b>30-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | -20 to 280/300  | <a href="#">7HG-G006-11</a> |
| 0.25            | 1.00    | -20 to 260/280  | <a href="#">7HG-G006-22</a> |
| 0.32            | 0.25    | -20 to 280/300  | <a href="#">7HM-G006-11</a> |
| 0.32            | 1.00    | -20 to 260/280  | <a href="#">7HM-G006-22</a> |
| 0.53            | 1.00    | -20 to 260/280  | <a href="#">7HK-G006-22</a> |
| <b>60-Meter</b> |         |                 |                             |
| 0.25            | 0.25    | -20 to 280/300  | <a href="#">7KG-G006-11</a> |
| 0.32            | 0.25    | -20 to 280/300  | <a href="#">7KM-G006-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G006-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

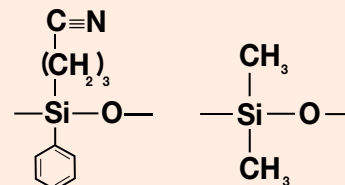
#### Column Profile



\*Thicker films (≥ 1.0 µm) are rated to 260/280 °C.

#### Phase Chemistry

14 % Cyanopropylphenyl



86 % Dimethylpolysiloxane

#### Recommended Applications

- Alcohols
- Amines
- Aromatic Hydrocarbons
- Drugs
- Esters
- PAHs
- PCBs
- Pharmaceutical Intermediates
- Phenols
- Solvents
- Steroids
- TMS Sugars
- Tranquillizers



**ZB-1701 Test Mix**  
 Part No.: [AGO-5156](#)



For enhanced response to Endrin and DDT, consider using ZB-1701P, See p. 162

Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-1701P

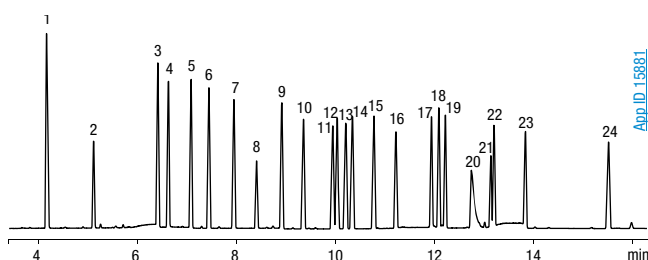
### Enhanced Response for DDT and Endrin

- Specially tested to ensure response of DDT, Endrin, Endrin Aldehyde, and Endrin Ketone
- Fast run and re-equilibration times for enhanced sample throughput and productivity
- Guaranteed column for pesticide analysis

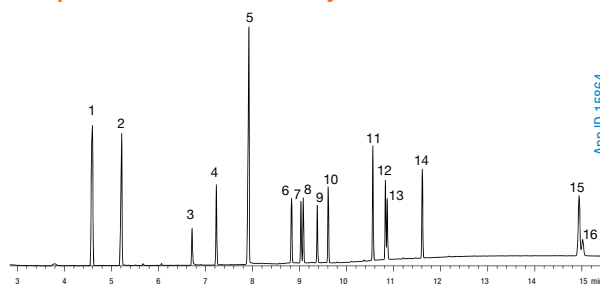
Upgrade to Zebron from any  
14% cyanopropylphenyl / 86% dimethylpolysiloxane phase:

| Agilent®       | Restek®     | SGE®   | Supelco®       | OV®       |
|----------------|-------------|--------|----------------|-----------|
| • DB®-1701     | • Rtx®-1701 | • BP10 | • SPB®-1701    | • OV-1701 |
| • DB-1701P     | • Rtx-VMS   |        | • Equity®-1701 |           |
| • CP-Sil 19 CB |             |        |                |           |

### Chlorinated Pesticides by GC-ECD: EPA Method 8081



### European Red List Pesticides by GC-MS



**Column:** ZebronZB-1701P  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G012-11](#)  
**Injection:** Splitless @ 240 °C, 1 µL  
**Carrier Gas:** Helium @ 1.6 mL/min (constant flow)  
**Oven Program:** 100 °C to 200 °C @ 25 °C/min to 240 °C @ 6 °C/min to 265 °C @ 20 °C/min for 5 min  
**Detector:** ECD @ 300 °C  
**Sample:** All compounds are 20 ppm

1. 1-Bromo-2-Nitrobenzene (IS)
2. Tetrachloro-m-xylene (Surr)
3. α-BHC
4. Pentachloronitrobenzene (IS)
5. γ-BHC (Lindane)
6. Heptachlor
7. Aldrin
8. β-BHC
9. δ-BHC
10. Heptachlor Epoxide
11. Endosulfan I
12. γ-Chlordane
13. α-Chlordane
14. DDE
15. Dieldrin
16. Endrin
17. DDD
18. Endosulfan II
19. DDT
20. Endrin Aldehyde
21. Methoxychlor
22. Endosulfan Sulfate
23. Endrin Ketone
24. Decachlorobiphenyl (Surr)

**Column:** ZebronZB-1701P  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G012-11](#)  
**Injection:** Splitless (hold 0.5 min) @ 220 °C, 1 µL  
**Carrier Gas:** Helium @ 0.8 mL/min (constant flow)  
**Oven Program:** 100 °C to 220 °C @ 20 °C/min for 1 min to 280 °C @ 15 °C/min  
**Detector:** MSD; 40-450 amu  
**Sample:**

1. Dichlorvos
2. Methamidophos
3. Acephate
4. Demeton-S-methyl
5. Omethoate
6. Dimethoate
7. Tolclofos-methyl
8. Pirimiphos methyl
9. Chlorpyrifos (Dursban)
10. Malathion
11. Prothiophos
12. Profenofos
13. Methidathion
14. Ethion
15. Pyrazophos
16. Azinphos-methyl

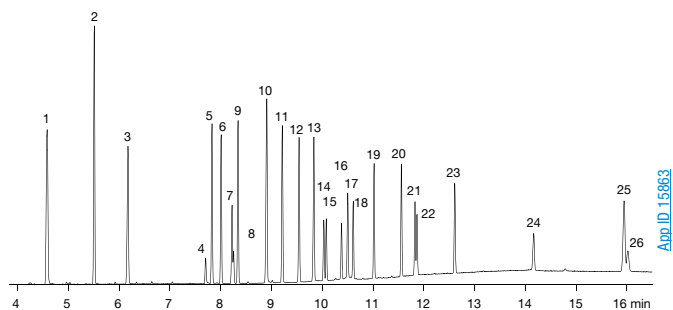


If Zebron columns do not provide you with equivalent or better separations as compared to any other GC column of the same phase and comparable dimensions, return the column with comparative data within 45 days for a FULL REFUND.

## ZB-1701P

### Resolve Key Pesticides

#### Organophosphate Pesticides by GC-MS



**Column:** ZebronZB-1701P  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G012-11](#)  
**Injection:** Splitless (hold 0.5 min) @ 220 °C, 1 µL  
**Carrier Gas:** Helium @ 0.8 mL/min (constant flow)  
**Oven Program:** 80 °C to 220 °C @ 20 °C/min for 1 min to 280 °C @ 15 °C/min for 4.5 min  
**Detector:** MSD; 40-450 amu

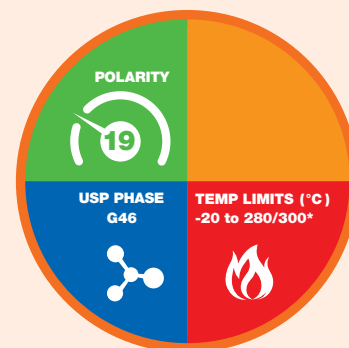
- Sample:**
- 0,0,0-Triethyl phosphorothioate
  - Dichlorvos
  - Methamidophos
  - Acephate
  - Thionazin
  - Di-allate (isomer)
  - Demeton-S-methyl
  - Di-allate
  - Phorate
  - Omethoate
  - Disulfoton
  - Pronamide
  - Dimethoate
  - Tolclofos-methyl
  - Pirimiphos methyl
  - Chlorpyrifos (Dursban)
  - Methyl parathion
  - Malathion
  - Parathion
  - Prothiophos
  - Profenofos
  - Methodathion
  - Ethion
  - Famphur
  - Pyrazophos
  - Azinphos-methyl

#### Ordering Information

| ZebronZB-1701P GC Columns |        |                 |                             |
|---------------------------|--------|-----------------|-----------------------------|
| ID(mm)                    | df(µm) | Temp. Limits °C | Part No.                    |
| <b>30-Meter</b>           |        |                 |                             |
| 0.25                      | 0.25   | -20 to 280/300  | <a href="#">7HG-G012-11</a> |
| 0.32                      | 0.25   | -20 to 280/300  | <a href="#">7HM-G012-11</a> |
| 0.53                      | 1.00   | -20 to 260/280  | <a href="#">7HK-G012-22</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G012-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

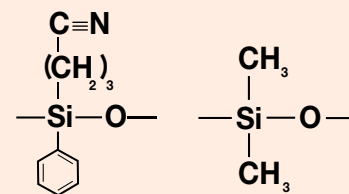
#### Column Profile



\*Thicker films (≥ 1.0 µm) are rated to 260/280 °C.

#### Phase Chemistry

14 % Cyanopropylphenyl



86 % Dimethylpolysiloxane

#### Recommended Applications

- Nitrogen Containing Pesticides
- Organochlorine Pesticides
- Organophosphorous Pesticides
- PCBs / Aroclors



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-WAX

### PEG Versatility for Solvents, Acids, and Amines

- High polarity column with low bleed (MS certified) for improved results
- Highly stable, long lifetime
- Low activity for amines
- Bonded, solvent rinsible
- Excellent chromatography of polar complex mixtures
- Widely used for profiling and “fingerprinting”

Upgrade to Zebron from any polyethylene glycol phase:

#### Agilent®

- DB®-WAXetr
- HP-INNOWax
- CP-Wax 57 CB

#### Restek®

- Rtx®-WAX
- Fawemwax
- Stabilwax®-DB

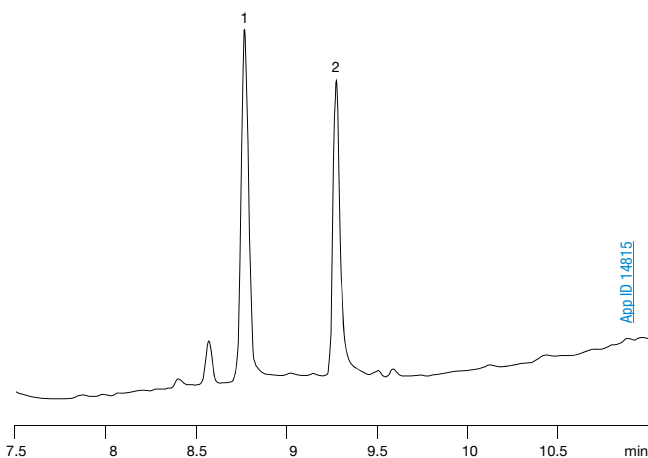
#### SGE®

- SolGel-WAX™

#### Supelco®

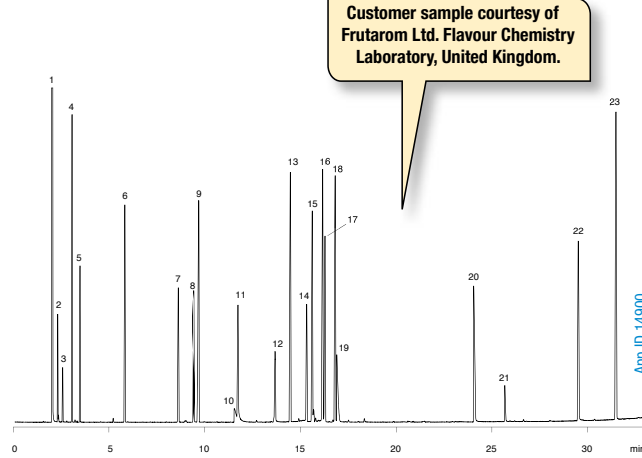
- Met-Wax
- Omegawax

### Ethylene and Propylene Glycol in Water by GC-FID



**Column:** Zebron ZB-WAX  
**Dimensions:** 30 meter x 0.53 mm x 1.0 µm  
**Part No.:** 7HK-G007-22  
**Injection:** Splitless (hold 0.5 min) @ 225 °C, 1 µL  
**Carrier Gas:** Helium @ 6.6 mL/min (constant flow)  
**Oven Program:** 80 °C for 1 min to 200 °C @ 8 °C/min for 5 min  
**Detector:** FID @ 325 °C  
**Sample:** 1. Propylene glycol  
 2. Ethylene glycol

### Flavors Analysis by GC-MS



**Column:** Zebron ZB-WAX  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** 7HG-G007-11  
**Injection:** Split 100:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 50 °C to 250 °C @ 6 °C/min for 3 min  
**Detector:** MSD @ 275 °C

**Sample:**

|                         |                     |
|-------------------------|---------------------|
| 1. Acetone              | 13. Ethyl decanoate |
| 2. Ethyl acetate        | 14. Neral           |
| 3. Ethanol              | 15. α-Terpineol     |
| 4. Decane               | 16. Neryl Acetate   |
| 5. Ethyl butyrate       | 17. Geranial        |
| 6. Limonene             | 18. Decanol         |
| 7. 2,3-Dimethylpyrazine | 19. Valeric acid    |
| 8. (Z)-3-Hexenol        | 20. Nonanoic acid   |
| 9. Tetradecane          | 21. Decanoic acid   |
| 10. Acetic acid         | 22. Vanillin        |
| 11. Decanal             | 23. Anthracene      |
| 12. Propylene glycol    |                     |



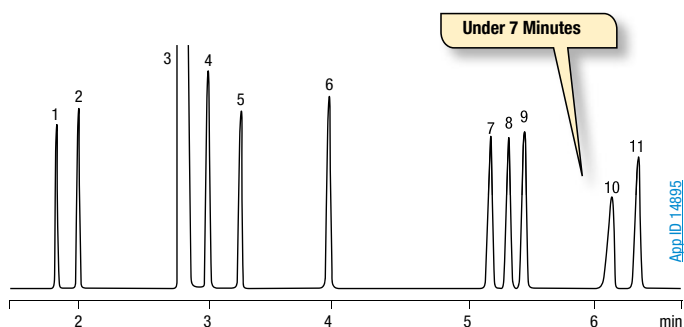
## guarantee

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.

## ZB-WAX

### Performs for Industrial Chemicals

#### BTEX by GC-FID



**Column:** Zebron ZB-WAX  
**Dimensions:** 30 meter x 0.32 mm x 0.50 µm  
**Part No.:** [ZHM-G007-17](#)  
**Injection:** Split 20:1 @ 250 °C, 0.2 µL  
**Carrier Gas:** Helium @ 2 mL/min (constant flow)  
**Oven Program:** 60 °C to 75 °C @ 15 °C/min to 90 °C @ 3 °C/min (hold 3 min)  
**Detector:** FID @ 300 °C

**Sample:**

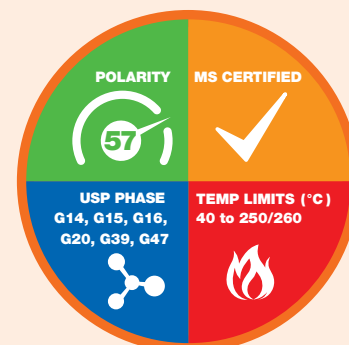
|                                 |                 |
|---------------------------------|-----------------|
| 1. Pentane                      | 7. Ethylbenzene |
| 2. Heptane                      | 8. p-Xylene     |
| 3. Solvent (methylene chloride) | 9. m-Xylene     |
| 4. Benzene                      | 10. Dodecane    |
| 5. Decane                       | 11. o-Xylene    |
| 6. Toluene                      |                 |

#### Ordering Information

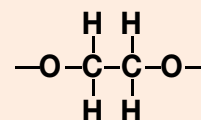
| Zebron ZB-WAX GC Columns |         |                 |                             |
|--------------------------|---------|-----------------|-----------------------------|
| ID (mm)                  | df (µm) | Temp. Limits °C | Part No.                    |
| <b>10-Meter</b>          |         |                 |                             |
| 0.10                     | 0.10    | 40 to 250/260   | <a href="#">ZCB-G007-02</a> |
| <b>15-Meter</b>          |         |                 |                             |
| 0.25                     | 0.25    | 40 to 250/260   | <a href="#">ZEG-G007-11</a> |
| 0.32                     | 0.25    | 40 to 250/260   | <a href="#">ZEM-G007-11</a> |
| 0.32                     | 0.50    | 40 to 250/260   | <a href="#">ZEM-G007-17</a> |
| 0.53                     | 1.00    | 40 to 250/260   | <a href="#">ZEK-G007-22</a> |
| <b>20-Meter</b>          |         |                 |                             |
| 0.18                     | 0.18    | 40 to 250/260   | <a href="#">ZFD-G007-08</a> |
| <b>30-Meter</b>          |         |                 |                             |
| 0.25                     | 0.15    | 40 to 250/260   | <a href="#">ZHG-G007-05</a> |
| 0.25                     | 0.25    | 40 to 250/260   | <a href="#">ZHG-G007-11</a> |
| 0.25                     | 0.50    | 40 to 250/260   | <a href="#">ZHG-G007-17</a> |
| 0.25                     | 1.00    | 40 to 250/260   | <a href="#">ZHG-G007-22</a> |
| 0.32                     | 0.15    | 40 to 250/260   | <a href="#">ZHM-G007-05</a> |
| 0.32                     | 0.25    | 40 to 250/260   | <a href="#">ZHM-G007-11</a> |
| 0.32                     | 0.50    | 40 to 250/260   | <a href="#">ZHM-G007-17</a> |
| 0.53                     | 0.50    | 40 to 250/260   | <a href="#">ZHK-G007-17</a> |
| 0.53                     | 1.00    | 40 to 250/260   | <a href="#">ZHK-G007-22</a> |
| <b>60-Meter</b>          |         |                 |                             |
| 0.25                     | 0.15    | 40 to 250/260   | <a href="#">ZKG-G007-05</a> |
| 0.25                     | 0.25    | 40 to 250/260   | <a href="#">ZKG-G007-11</a> |
| 0.25                     | 0.50    | 40 to 250/260   | <a href="#">ZKG-G007-17</a> |
| 0.32                     | 0.25    | 40 to 250/260   | <a href="#">ZKM-G007-11</a> |
| 0.32                     | 0.50    | 40 to 250/260   | <a href="#">ZKM-G007-17</a> |
| 0.53                     | 1.00    | 40 to 250/260   | <a href="#">ZKK-G007-22</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [ZHG-G007-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



#### Phase Chemistry



100 % Polyethylene Glycol

#### Recommended Applications

- Alcohols
- Aldehydes
- Aromatics
- Basic Compounds
- Essential Oils
- Flavors & Fragrances
- Glycols
- Pharmaceuticals
- Solvents
- Styrene
- Xylene Isomers



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

## ZB-FFAP

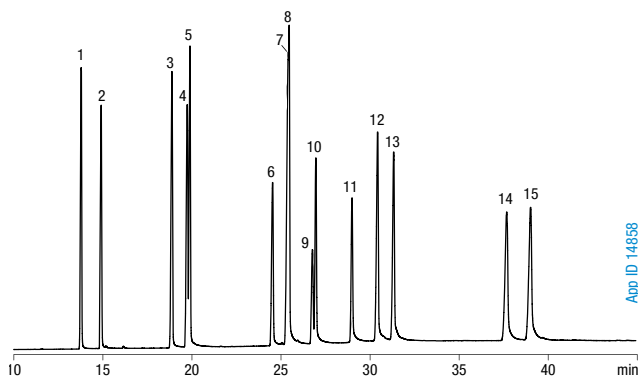
### Improve Resolution for Free Fatty Acids

- High polarity column; excellent thermal and chemical stability
- Provides better peak shape for underivatized acids
- Especially suited for organic acids, free fatty acids, and alcohols
- Bonded, solvent rinsable FFAP phase

Upgrade to Zebron from any nitroterephthalic acid modified polyethylene glycol phase:

| Agilent®   | Restek®   | SGE®   | Supelco®   | OV®  |
|--|---|--|--|--|
| <ul style="list-style-type: none"> <li>• DB®-FFAP</li> <li>• HP-FFAP</li> <li>• CP-Wax 58 FFAP CB</li> <li>• CP-FFAP CB</li> </ul> | <ul style="list-style-type: none"> <li>• Stabilwax®-DA</li> </ul> | <ul style="list-style-type: none"> <li>• BP21</li> </ul> | <ul style="list-style-type: none"> <li>• Nukol</li> <li>• SPB®-1000</li> </ul> | <ul style="list-style-type: none"> <li>• OV-351</li> </ul> |

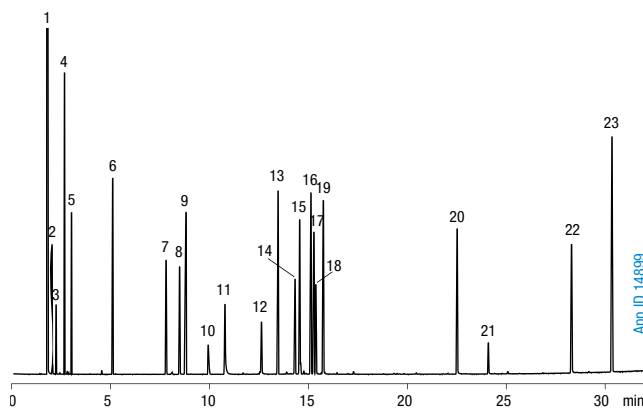
### Unsaturated Free Fatty Acids by GC-FID



**Column:** Zebron ZB-FFAP  
**Dimensions:** 60 meter x 0.25 mm x 0.25 µm  
**Part No.:** 7KG-G009-11  
**Injection:** Split 40:1 @ 220 °C, 0.2 µL  
**Carrier Gas:** Helium @ 2.4 mL/min (constant flow)  
**Oven Program:** 200 °C to 260 °C @ 2 °C/min for 30 min  
**Detector:** FID @ 250 °C  
**Sample:**

1. Myristic Acid (C14:0)
2. Myristoleic Acid (C14:1c)
3. Palmitic Acid (C16:0)
4. Palmitoleic Acid (C16:1t)
5. Palmitoleic Acid (C16:1c)
6. Stearic Acid (C18:0)
7. Elaidic Acid (C18:1t)
8. Oleic Acid (C18:1c)
9. Linoleic Acid (C18:2c)
10. Linoleic Acid (C18:2c)
11. Linolenic Acid (C18:3c)
12. Arachidic Acid (C20:0)
13. Gondoic Acid (C20:1c)
14. Behenic Acid (C22:0)
15. Erucic Acid (C22:1c)

### Flavors Analysis by GC-MS



**Column:** Zebron ZB-FFAP  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** 7HG-G009-11  
**Injection:** Split 100:1 @ 250 °C, 1 µL  
**Carrier Gas:** Helium @ 1 mL/min (constant flow)  
**Oven Program:** 50 °C to 250 °C @ 6 °C/min for 3 min  
**Detector:** MSD @ 270 °C  
**Sample:**

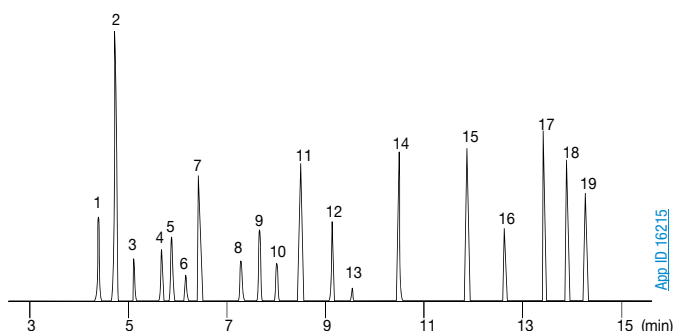
|                         |                     |
|-------------------------|---------------------|
| 1. Acetone              | 13. Ethyl Decanoate |
| 2. Ethyl Acetate        | 14. Neral           |
| 3. Ethanol              | 15. α-Terpineol     |
| 4. Decane               | 16. Neryl Acetate   |
| 5. Ethyl Butyrate       | 17. Geranial        |
| 6. Limonene             | 18. Valeric Acid    |
| 7. 2,3-Dimethylpyrazine | 19. Decanol         |
| 8. (z)-3-Hexenol        | 20. Nonanoic Acid   |
| 9. Tetradecane          | 21. Decanoic Acid   |
| 10. Acetic Acid         | 22. Vanillin        |
| 11. Decanal             | 23. Anthracene      |
| 12. Propylene Glycol    |                     |

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.

## ZB-FFAP

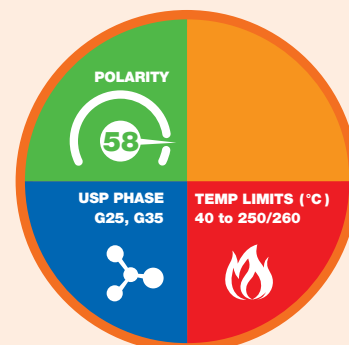
### Good Resolution for Common Solvents

#### Solvents by GC-FID

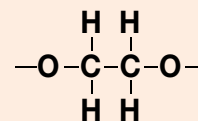


- Column:** Zebron ZB-FFAP  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G009-11](#)  
**Injection:** Split 11.8:1 @ 225 °C, 1 µL  
**Carrier Gas:** Helium @ 3.4 mL/min (constant flow)  
**Oven Program:** 60 °C for 8 min to 150 °C @ 15 °C/min for 4 min  
**Detector:** FID @ 250 °C  
**Sample:** Analytes are 100 µg/mL
- |                         |                            |
|-------------------------|----------------------------|
| 1. n-Hexane             | 10. Perchloroethylene      |
| 2. Carbon disulfide     | 11. Toluene                |
| 3. Acetone              | 12. n-Butyl acetate        |
| 4. Ethyl acetate        | 13. Undecane               |
| 5. Methyl ethyl ketone  | 14. Ethylbenzene           |
| 6. Dichloromethane      | 15. o-Xylene               |
| 7. Benzene              | 16. PGMEAC                 |
| 8. Trichloroethylene    | 17. Styrene                |
| 9. Methylisobutylketone | 18. 1,2,4-Trimethylbenzene |
|                         | 19. Cyclohexane            |

#### Column Profile



#### Phase Chemistry



100 % Nitroterephthalic Modified Polyethylene Glycol

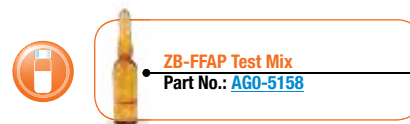
#### Recommended Applications

- Acrylates
- Alcohols
- Aldehydes
- Free Fatty Acids
- Ketones
- Organic Acids
- Phenols
- Volatile Free Acids

#### Ordering Information

| Zebron ZB-FFAP GC Columns |        |                 |                             |
|---------------------------|--------|-----------------|-----------------------------|
| ID(mm)                    | df(µm) | Temp. Limits °C | Part No.                    |
| <b>15-Meter</b>           |        |                 |                             |
| 0.25                      | 0.25   | 40 to 250/260   | <a href="#">7EG-G009-11</a> |
| 0.32                      | 0.25   | 40 to 250/260   | <a href="#">7EM-G009-11</a> |
| 0.32                      | 0.50   | 40 to 250/260   | <a href="#">7EM-G009-17</a> |
| 0.53                      | 1.00   | 40 to 250/260   | <a href="#">7EK-G009-22</a> |
| <b>30-Meter</b>           |        |                 |                             |
| 0.25                      | 0.25   | 40 to 250/260   | <a href="#">7HG-G009-11</a> |
| 0.32                      | 0.25   | 40 to 250/260   | <a href="#">7HM-G009-11</a> |
| 0.32                      | 0.50   | 40 to 250/260   | <a href="#">7HM-G009-17</a> |
| 0.32                      | 1.00   | 40 to 250/260   | <a href="#">7HM-G009-22</a> |
| 0.53                      | 1.00   | 40 to 250/260   | <a href="#">7HK-G009-22</a> |
| <b>50-Meter</b>           |        |                 |                             |
| 0.32                      | 0.50   | 40 to 250/260   | <a href="#">7JM-G009-17</a> |
| <b>60-Meter</b>           |        |                 |                             |
| 0.25                      | 0.25   | 40 to 250/260   | <a href="#">7KG-G009-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G009-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

Extend column lifetime. Add a Z-guard to your next Zebron GC order.

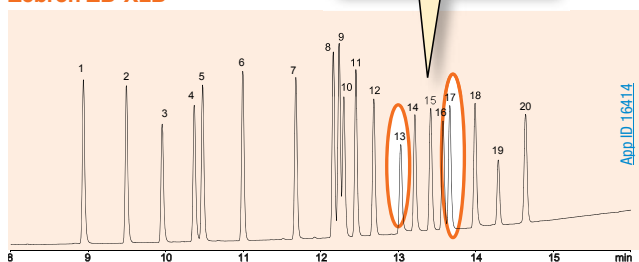
## ZB-XLB

### Extra Low Bleed

- Unique, low polarity si-arylene column
- Engineered specifically for use with bleed sensitive detectors such as MS
- Provides alternate selectivity to standard 5-type phases
- Often used for confirmation of pesticides, PCBs, or other environmental samples
- Good tool for sample screening to identify unknown contaminants

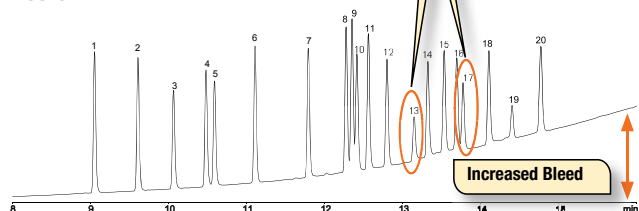
### Better Performance for Chlorinated Pesticides EPA Method 8081A

Zebron ZB-XLB



VS.

Restek Rxi-XLB



#### Conditions for both columns:

- Columns: As listed  
 Dimensions: 30 meter x 0.25 mm x 0.25 µm  
 Injection: Split 111:1 @ 250 °C, 1.5 µL  
 Carrier Gas: Helium @ 0.9 mL/min (constant flow)  
 Oven Program: 110 °C to 320 °C @ 15 °C/min and hold until last peak elutes  
 Detector: ECD @ 350 °C
- |                |                       |                        |
|----------------|-----------------------|------------------------|
| <b>Sample:</b> | 1. α-BHC              | 11. 4,4'-DDE           |
|                | 2. γ-BHC              | 12. Dieldrin           |
|                | 3. β-BHC              | 13. Endrin             |
|                | 4. δ-BHC              | 14. 4,4'-DDD           |
|                | 5. Heptachlor         | 15. Endosulfan II      |
|                | 6. Aldrin             | 16. Endrin aldehyde    |
|                | 7. Heptachlor epoxide | 17. 4,4'-DDT           |
|                | 8. γ-Chlordane        | 18. Endosulfan sulfate |
|                | 9. α-Chlordane        | 19. Methoxychlor       |
|                | 10. Endosulfan I      | 20. Endrin ketone      |

Comparative separations may not be representative of all applications.

Upgrade to Zebron from these similar\* phases:

**Agilent®**

- DB®-XLB
- VF-XMS

**Restek®**

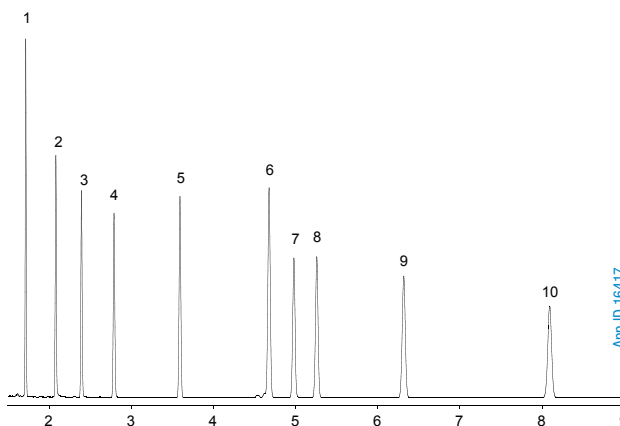
- Rtx®-XLB
- Rxi®-5Sil MS

**Supelco®**

- MDN-12

\*not exact equivalent, selectivity may differ

### Industrial Chemicals by GC-FID



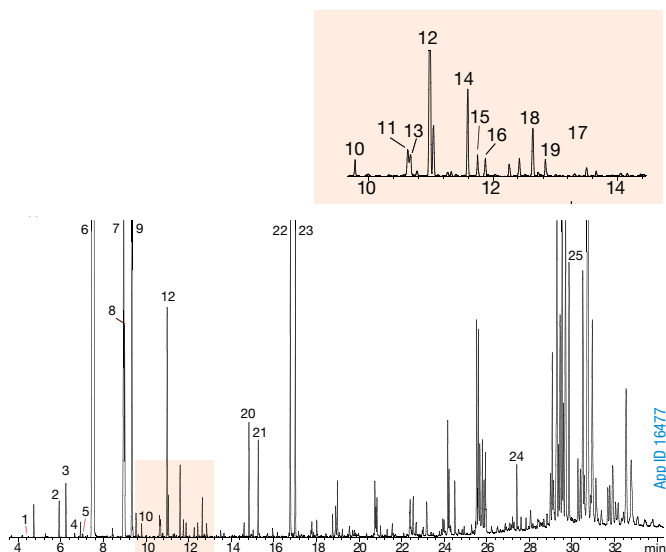
- Column: Zebron ZB-XLB  
 Dimensions: 30 meter x 0.25 mm x 0.25 µm  
 Part No.: [7HG-G019-11](#)  
 Injection: Split 83:1 @ 250 °C, 1 µL  
 Carrier Gas: Hydrogen @ 1.2 mL/min (constant flow)  
 Oven Program: 140 °C (Isothermal)  
 Detector: FID @ 325 °C  
 Sample:
1. Decane
  2. 2-Ethylhexanoic acid
  3. 1,6-Hexanediol
  4. 4-Chlorophenol
  5. Tridecane
  6. 1-Methylnaphthalene
  7. 1-Undecanol
  8. Tetradecane
  9. Dicyclohexylamine
  10. Pentadecane

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.

## ZB-XLB

### Good Sensitivity for Essential Oils

#### Rose Oil Determination by GC-MS



**Column:** Zebron ZB-XLB  
**Dimensions:** 30 meter x 0.25 mm x 0.25 µm  
**Part No.:** [7HG-G019-11](#)  
**Injection:** On-Column @ 43 °C, 0.1 µL  
**Carrier Gas:** Helium @ 1.5 mL/min (constant flow)  
**Oven Program:** 40 °C for 2 min to 260 °C @ 15 °C/min for 5 min to 320 °C @ 15 °C/min for 2 min  
**Detector:** MSD @ 340 °C, 45-450 amu  
**Note:** Sample dissolved at 10 ppm in Methylene chloride

**Sample:**

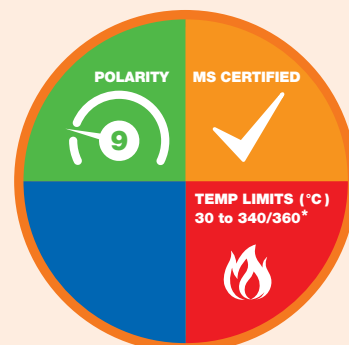
|                        |                          |                       |
|------------------------|--------------------------|-----------------------|
| 1. α-Pinene            | 9. trans-Geraniol        | 17. α-Caryophyllene   |
| 2. 2-Ethylhexanol      | 10. β-Citral             | 18. Germacrene D      |
| 3. Benzyl alcohol      | 11. Geranic acid         | 19. α-Bulnesene       |
| 4. Terpineol           | 12. Eugenol              | 20. Heptadecane (C17) |
| 5. Linalool            | 13. Geranyl acetate      | 21. Farnesol          |
| 6. Phenylethyl alcohol | 14. Eugenol methyl ether | 22. 1-Nonadecane      |
| 7. β-Citronellol       | 15. Caryophyllene        | 23. Nonadecane        |
| 8. cis-Geraniol        | 16. α-Guaiene            | 24. Vitamin E         |
|                        |                          | 25. α-Amirin          |

#### Ordering Information

| Zebron ZB-XLB GC Columns |        |                 |                             |
|--------------------------|--------|-----------------|-----------------------------|
| ID(mm)                   | df(µm) | Temp. Limits °C | Part No.                    |
| <b>10-Meter</b>          |        |                 |                             |
| 0.18                     | 0.18   | 30 to 340/360   | <a href="#">7CD-G019-08</a> |
| <b>15-Meter</b>          |        |                 |                             |
| 0.25                     | 0.25   | 30 to 340/360   | <a href="#">7EG-G019-11</a> |
| <b>20-Meter</b>          |        |                 |                             |
| 0.18                     | 0.18   | 30 to 340/360   | <a href="#">7FD-G019-08</a> |
| <b>30-Meter</b>          |        |                 |                             |
| 0.25                     | 0.25   | 30 to 340/360   | <a href="#">7HG-G019-11</a> |
| 0.25                     | 0.50   | 30 to 340/360   | <a href="#">7HG-G019-17</a> |
| 0.32                     | 0.25   | 30 to 340/360   | <a href="#">7HM-G019-11</a> |
| 0.32                     | 0.50   | 30 to 340/360   | <a href="#">7HM-G019-17</a> |
| 0.53                     | 1.50   | 30 to 320/340   | <a href="#">7HK-G019-28</a> |
| <b>60-Meter</b>          |        |                 |                             |
| 0.25                     | 0.25   | 30 to 340/360   | <a href="#">7KG-G019-11</a> |

Note: If you need a 5 in. cage, simply add a (-B) after the part number, e.g., [7HG-G019-11-B](#). Some exceptions may apply. Agilent 6850 and some SRI and process GC systems use only 5 in. cages.

#### Column Profile



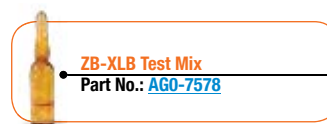
\*Thicker films (≥ 1.0 µm) are rated to 320/340 °C.

#### Phase Chemistry

- Proprietary

#### Recommended Applications

- Herbicides / Insecticides
- PCBs
- Pesticides
- Unknown Samples



Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-guard to your next Zebron GC order.

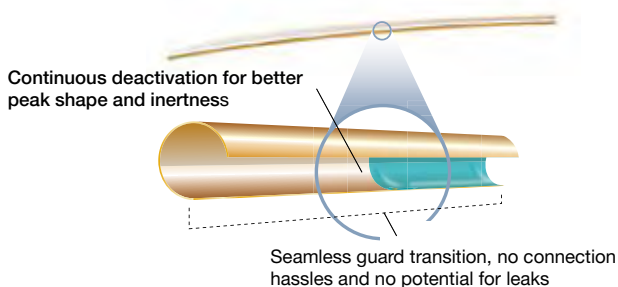
## Guardian Integrated Guard Columns

### Built-In Column Protection: No Leaks, No Worries!

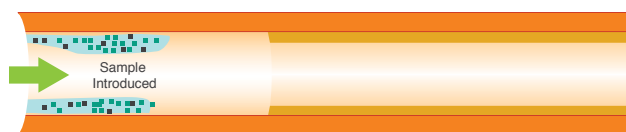
#### Why Choose Zebron With Guardian?

Guardian columns have the 2 m, 5 m or 10 m guard built directly into the analytical column in one continuous length of tubing. Unlike traditional guard columns, which are known to be difficult to seal and prone to leaking after normal column maintenance, the Guardian system provides the same inert column protection, but eliminates the possibility of leaks.

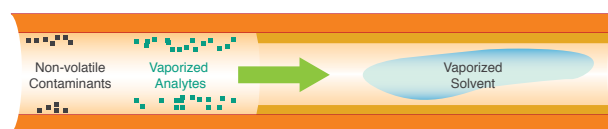
- Eliminate the potential for leaks
- Extend column life
- Improve analyte focusing for low boiling compounds
- Aggressively tested to ensure deactivation



#### How It Works



The sample is introduced onto the Guardian section of the column.



As temperature increases (oven ramp program), the sample is vaporized and moves unretained through the Guardian section of the column. Non-volatile contaminants are deposited on the Guardian section, better preserving the stationary phase and making it easier to trim contaminants off the front of the column.



When the analytes reach the stationary phase (analytical portion of the column), they are refocused, resulting in a narrower initial peak width. This can help improve resolution.

#### Ordering Information

##### Guardian: Integrated Guard Columns

| Zebron GC Column Phase          | Dimensions                   | 2m Guardian Part No.            | 5m Guardian Part No.            | 10m Guardian Part No.           |
|---------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|
| ZB-1PLUS <sup>™</sup>           | 15 meter x 0.25 mm x 0.25 μm | —                               | —                               | <a href="#">7EG-G031-11-GGC</a> |
| ZB-1PLUS                        | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G031-11-GGA</a> | <a href="#">7HG-G031-11-GGC</a> |
| ZB-1HT Inferno <sup>™</sup>     | 30 meter x 0.25 mm x 0.10 μm | —                               | <a href="#">7HG-G014-02-GGA</a> | —                               |
| ZB-5ms                          | 15 meter x 0.25 mm x 0.25 μm | —                               | —                               | <a href="#">7EG-G010-11-GGC</a> |
| ZB-5ms                          | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G010-11-GGA</a> | <a href="#">7HG-G010-11-GGC</a> |
| ZB-5ms                          | 30 meter x 0.25 mm x 0.50 μm | —                               | <a href="#">7HG-G010-17-GGA</a> | <a href="#">7HG-G010-17-GGC</a> |
| ZB-5ms                          | 30 meter x 0.32 mm x 0.25 μm | —                               | <a href="#">7HM-G010-11-GGA</a> | —                               |
| ZB-5ms                          | 30 meter x 0.32 mm x 1.00 μm | —                               | <a href="#">7HM-G010-22-GGA</a> | —                               |
| ZB-5MSPLUS <sup>™</sup>         | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G030-11-GGA</a> | <a href="#">7HG-G030-11-GGC</a> |
| ZB-5MSPLUS                      | 30 meter x 0.25 mm x 0.50 μm | —                               | —                               | <a href="#">7HG-G030-17-GGC</a> |
| ZB-5                            | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G002-11-GGA</a> | <a href="#">7HG-G002-11-GGC</a> |
| ZB-5                            | 30 meter x 0.25 mm x 0.50 μm | —                               | <a href="#">7HG-G002-17-GGA</a> | <a href="#">7HG-G002-17-GGC</a> |
| ZB-5                            | 60 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7KG-G002-11-GGA</a> | —                               |
| ZB-5HT Inferno                  | 30 meter x 0.25 mm x 0.10 μm | —                               | <a href="#">7HG-G015-02-GGA</a> | —                               |
| ZB-5HT Inferno                  | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G015-11-GGA</a> | —                               |
| ZB-5PLUS <sup>™</sup>           | 20 meter x 0.18 mm x 0.18 μm | —                               | <a href="#">7FD-G032-08-GGA</a> | —                               |
| ZB-5PLUS                        | 30 meter x 0.25 mm x 0.10 μm | —                               | <a href="#">7HG-G032-02-GGA</a> | —                               |
| ZB-5PLUS                        | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G032-11-GGA</a> | —                               |
| ZB-50                           | 10 meter x 0.18 mm x 0.18 μm | <a href="#">7CD-G004-08-GGT</a> | —                               | —                               |
| ZB-MultiResidue <sup>™</sup> -1 | 30 meter x 0.25 mm x 0.25 μm | —                               | —                               | <a href="#">7HG-G016-11-GGC</a> |
| ZB-SemiVolatiles                | 30 meter x 0.25 mm x 0.25 μm | —                               | <a href="#">7HG-G027-11-GGA</a> | <a href="#">7HG-G027-11-GGC</a> |

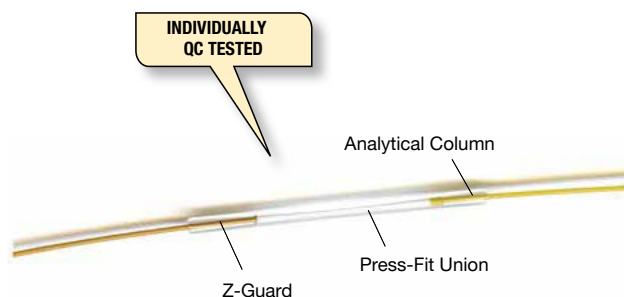


## Z-Guard™ Columns

### Protect and Extend Column Lifetime

- Individually QC tested to ensure the highest level of quality
- Extend column lifetime by preventing stationary phase damage
- Improve separation and peak shapes (especially early elutors)
- Improve sensitivity and accuracy of quantitative results
- Available as individual guard columns or as complete kits with connectors

To ensure that all Z-Guards are the highest possible quality, we individually test each one! The columns are attached to a reference Zebron ZB-5 column and are tested using our specially designed QC mix. We carefully monitor activity, bleed, and stability. This way, we are able to say with confidence that Z-Guards will provide the low activity and high quality your methods require.



#### Ordering Information

| Metal Z-Guard Columns |              |                                 |
|-----------------------|--------------|---------------------------------|
| ID (mm)               | Description  | Part No.                        |
| 5-Meter               |              |                                 |
| 0.53                  | Guard Column | <a href="#">7AK-G000-00-GM0</a> |

| High Temperature Z-Guard Columns and Kits |                  |                                 |                                 |
|---|------------------|---------------------------------|---------------------------------|
| ID (mm)                                   | Description      | Part No.                        | Part No.                        |
|   |                  | 5-Meter                         | 10-Meter                        |
| 0.25                                      | Guard Column     | <a href="#">7AG-G000-00-GH0</a> | <a href="#">7CG-G000-00-GH0</a> |
|   | Guard Column Kit | <a href="#">7AG-G000-00-GHK</a> | <a href="#">7CG-G000-00-GHK</a> |
| 0.32                                      | Guard Column     | <a href="#">7AM-G000-00-GH0</a> | <a href="#">7CM-G000-00-GH0</a> |
|   | Guard Column Kit | <a href="#">7AM-G000-00-GHK</a> | <a href="#">7CM-G000-00-GHK</a> |
| 0.53                                      | Guard Column     | <a href="#">7AK-G000-00-GH0</a> | <a href="#">7CK-G000-00-GH0</a> |
|   | Guard Column Kit | <a href="#">7AK-G000-00-GHK</a> | <a href="#">7CK-G000-00-GHK</a> |

| Standard Z-Guard Columns and Kits |                  |                                 |                                 |
|-----------------------------------|------------------|---------------------------------|---------------------------------|
| ID (mm)                           | Description      | Part No.                        | Part No.                        |
|                                   |                  | 5-Meter                         | 10-Meter                        |
| 0.10                              | Guard Column     | <a href="#">7AB-G000-00-GZ0</a> | <a href="#">7CB-G000-00-GZ0</a> |
|                                   | Guard Column Kit | <a href="#">7AB-G000-00-GZK</a> | —                               |
| 0.18                              | Guard Column     | <a href="#">7AD-G000-00-GZ0</a> | <a href="#">7CD-G000-00-GZ0</a> |
|                                   | Guard Column Kit | <a href="#">7AD-G000-00-GZK</a> | <a href="#">7CD-G000-00-GZK</a> |
| 0.20                              | Guard Column     | <a href="#">7AE-G000-00-GZ0</a> | —                               |
| 0.25                              | Guard Column     | <a href="#">7AG-G000-00-GZ0</a> | <a href="#">7CG-G000-00-GZ0</a> |
|                                   | Guard Column Kit | <a href="#">7AG-G000-00-GZK</a> | <a href="#">7CG-G000-00-GZK</a> |
| 0.32                              | Guard Column     | <a href="#">7AM-G000-00-GZ0</a> | <a href="#">7CM-G000-00-GZ0</a> |
|                                   | Guard Column Kit | <a href="#">7AM-G000-00-GZK</a> | <a href="#">7CM-G000-00-GZK</a> |
| 0.53                              | Guard Column     | <a href="#">7AK-G000-00-GZ0</a> | <a href="#">7CK-G000-00-GZ0</a> |
|                                   | Guard Column Kit | <a href="#">7AK-G000-00-GZK</a> | <a href="#">7CK-G000-00-GZK</a> |

| Bulk Z-Guard Columns |              |                                 |       |
|----------------------|--------------|---------------------------------|-------|
| ID (mm)              | Description  | Part No.                        | Unit  |
| 50-Meter             |              |                                 |       |
| 0.25                 | Guard Column | <a href="#">7JG-G000-00-GZ0</a> | ea    |
| 0.32                 | Guard Column | <a href="#">7JM-G000-00-GZ0</a> | ea    |
| 0.53                 | Guard Column | <a href="#">7JK-G000-00-GZ0</a> | ea    |
| 5-Meter              |              |                                 |       |
| 0.53                 | Guard Column | <a href="#">7AK-G000-00-GZ1</a> | 10/pk |

| ZB-5 Z-Guard Columns Multi-Pak |                            |                          |       |
|--------------------------------|----------------------------|--------------------------|-------|
| ID (mm)                        | Description                | Part No.                 | Unit  |
| 2-Meter                        |                            |                          |       |
| 0.25                           | Zebron ZB-5 Z-Guard Column | <a href="#">KG0-7868</a> | 25/pk |

**i** Universal GC Guard Column. Designed for use with virtually any GC Capillary column from virtually any manufacturer. Alternative to: Restek, Supelco, Agilent Technologies, and many more.

**i** Z-Guard Column Kits include 5 or 10 meters of deactivated fused silica tubing, 5 universal connectors and 0.5 mL of high-temperature polyimide resin.

| Replacement Parts for Z-Guard Kits             |                          |      |
|--|--------------------------|------|
| Description                                    | Part No.                 | Unit |
| Universal Capillary Column Union, Borosilicate | <a href="#">AG0-4716</a> | 5/pk |
| High Temperature Polyimide Resin, 0.5 mL       | <a href="#">AG0-8514</a> | ea   |

# GC Accessories

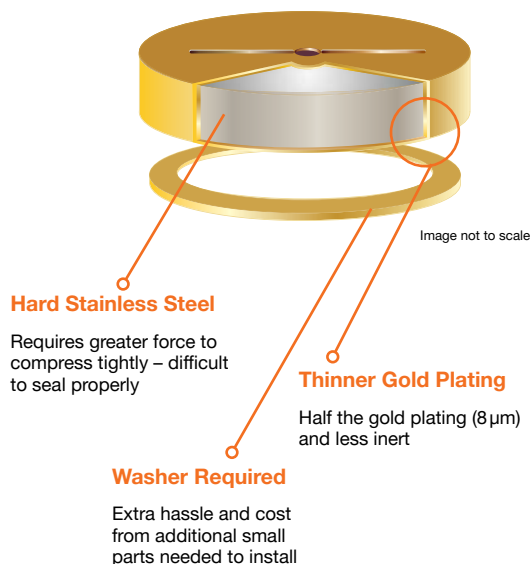
## Inlet Base Seals

### Easy Seals™ for Agilent® GCs

#### Phenomenex Easy Seals



#### Traditional Gold Plated Seals

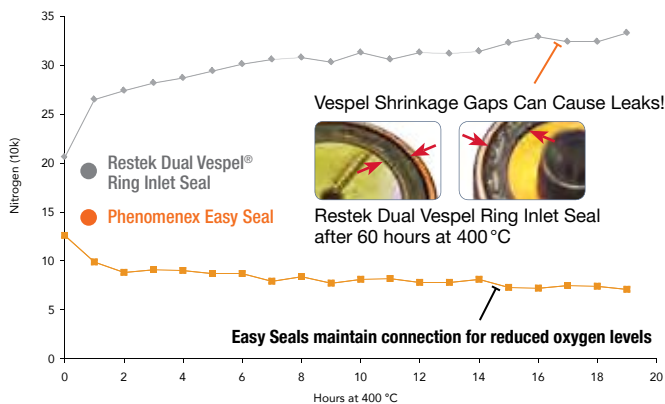


INLET BASE SEALS | GC ACCESSORIES

### The Oxygen Test: 20 Hours at 400 °C

Easy Seals are designed to create leak-tight connections that reduce the amount of oxygen entering the GC system, even up to 400 °C! Our testing showed that the Easy Seal maintained a good connection while the Restek® Dual Vespel® Ring Inlet Seal showed increasing levels of oxygen in the system – increased potential for contamination!

Test Conditions: Both inlet base seals were new and unused prior to testing. Seals were installed in an Agilent 6890 Series instrument with a 5973 MS with a Zebtron™ ZB-5ms GC column (15 meter x 0.25 mm x 0.25 µm). An initial air and water check was performed upon installation to ensure there was no error in installation. The inlet temperature was set to 400 °C and counts of oxygen were measured over time.



#### Ordering Information

| Easy Seals Inlet Base Seals |                |              |                          | 2/pk                     | 10/pk                    |
|-----------------------------|----------------|--------------|--------------------------|--------------------------|--------------------------|
| Description                 | Injection Type | Groove Style | Inlet Hole Diameter (mm) | Part No.                 | Part No.                 |
| Easy Seals Gold Inlet Seal  | Splitless      | Single       | 0.8                      | <a href="#">AG0-8619</a> | <a href="#">AG0-8620</a> |



# GC Accessories

## Inlet Base Seals (cont'd)

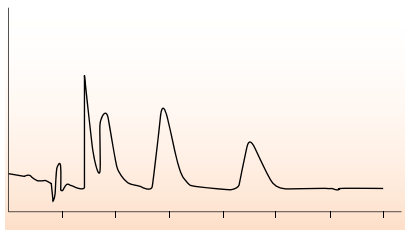
### Standard Inlet Base Seals & Washers

- Prevent leaks and reduce oxygen damage
- Trap non-volatile residues, septum fragments, and other contaminants
- Gold plated Easy Seals™ provide the best performance, inertness, and ease of use

An inert flow path through the entire GC system is critical to achieving the best results for your analysis –and that includes the seal at the base of the inlet! Leaks can allow air into the system and cause oxygen contamination, leading to:

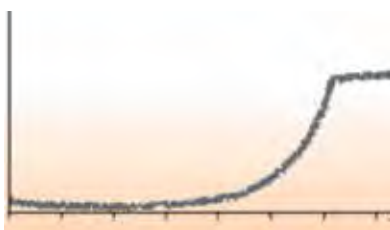
#### Difficult Quantitation

Stationary phase damage can distort peak shape



#### Low Sensitivity

Excessive bleed can lower signal-to-noise






#### Expensive Column Replacement

Oxygen damage is irreversible and can only be fixed by replacing your column



#### Ordering Information

##### Standard Inlet Base Seals

| Description                         | Injection Type  | Groove Style | Inlet Hole Diameter (mm) | Similar to Mfr No.* | 2/pk        | 10/pk                    |             |                          |
|-------------------------------------|---|--------------|--------------------------|---------------------|-------------|--------------------------|-------------|--------------------------|
|                                     |   |              |                          |                     | Part No.    | Part No.                 |             |                          |
| Standard Gold Inlet Seal            |  | Splitless    | Single                   | 0.8                 | 18740-20885 | <a href="#">AG0-7518</a> | 18740-20885 | <a href="#">AG0-7519</a> |
|                                     |   | Splitless    | Single                   | 1.2                 | 21305       | <a href="#">AG0-8581</a> | 21306       | <a href="#">AG0-8582</a> |
|                                     |  | Split        | Cross                    | 0.8                 | 5182-9652   | <a href="#">AG0-7520</a> | 5182-9652   | <a href="#">AG0-7521</a> |
|                                     |   | Split        | Cross                    | 1.2                 | 21009       | <a href="#">AG0-8583</a> | 21010       | <a href="#">AG0-8584</a> |
| Standard Stainless Steel Inlet Seal |  | Splitless    | Single                   | 0.8                 | 18740-20880 | <a href="#">AG0-8393</a> | 18740-20880 | <a href="#">AG0-8394</a> |
|                                     |   | Split        | Cross                    | 0.8                 | —           | <a href="#">AG0-8395</a> | —           | <a href="#">AG0-8396</a> |

#### Ordering Information

##### Standard Inlet Base Seal Replacement Washers

| Description                       | Similar to Mfr No.* | 12/pk                    |
|-----------------------------------|---------------------|--------------------------|
|                                   |                     | Part No.                 |
| Standard Gold Inlet Seal Washer   | —                   | <a href="#">AG0-8397</a> |
| Stainless Steel Inlet Seal Washer | 5061-5869           | <a href="#">AG0-7522</a> |



Due to different replacement frequencies, inlet seal washers are sold separately from inlet base seals.



\*Similar to but not always an exact equivalent to the original manufacturer's product.



For Sealing O-Rings, see p. 178

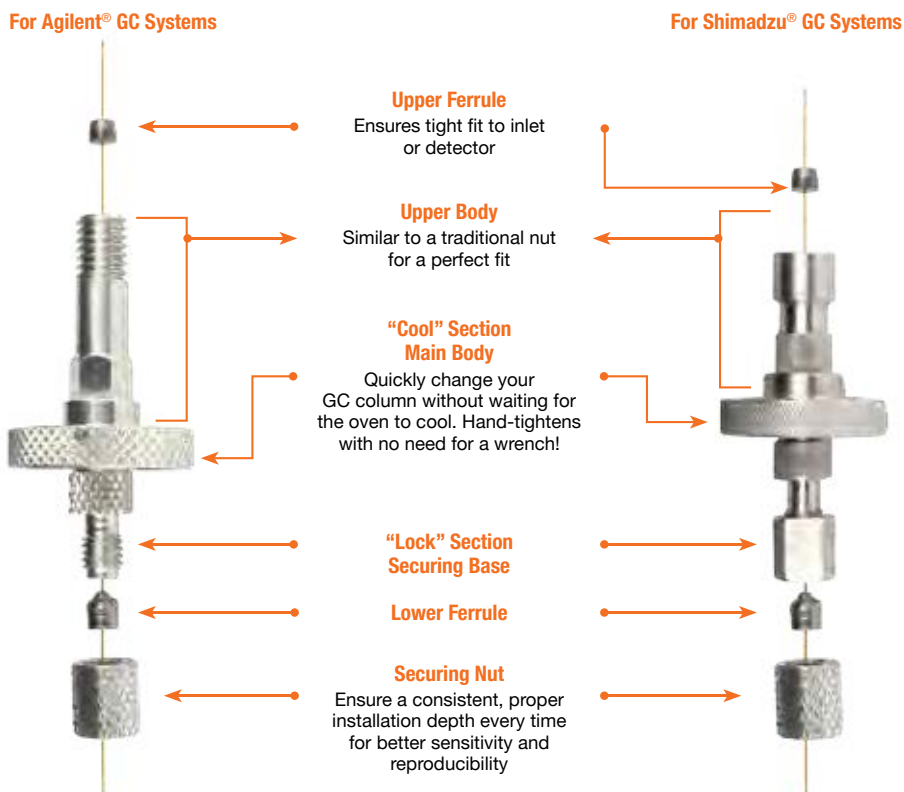
# GC Accessories

## Installation Nuts

### Cool-Lock™ Nut

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

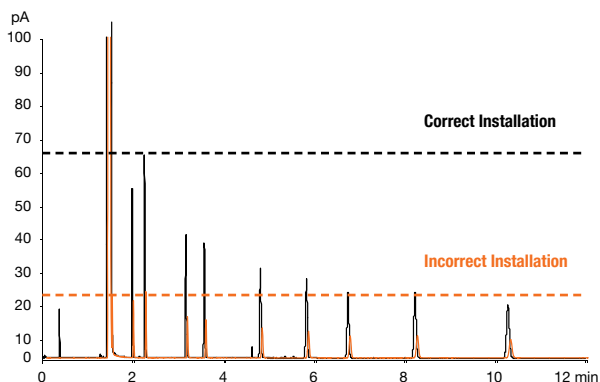
### Fast GC Column Installation Without The Burn



### Consistent, Accurate Installation Every Time

The red trace below is installed at 2mm, rather than the manufacturer’s recommended 6mm past the column on the injector side of the system. Correct installation noticeably increases sensitivity for all peaks; Cool-Lock Nut allows for locking of the proper insertion depth every time to improve run-to-run response reproducibility.

#### Correct Installation = 165% Better Signal



Conditions for both chromatograms:

- Column:** Zebron™ ZB-WAX
- Dimensions:** 30 meter x 0.25 mm x 0.25 μm
- Part No.:** 7HG-G007-11
- Injection:** Split 1:100 @ 250 °C, 1.4 μL
- Carrier Gas:** Helium @ 40 cm/sec (constant flow)
- Oven Program:** 140 °C for 10 minutes
- Detector:** FID @ 250 °C
- Sample:**
  - 1. 2-Octanone
  - 2. Tetradecane
  - 3. 1-Octanol
  - 4. Methyl decanoate
  - 5. Methyl undecanoate
  - 6. 1-Decanol
  - 7. Methyl dodecanoate
  - 8. 2,6-Dimethylaniline
  - 9. 2,6-Dimethylphenol

# GC Accessories





## Installation Nuts (cont'd)

### Cool-Lock™ Nut Selection Guide

| Shimadzu® Systems        | Agilent® Systems  |  |  |                            |
|--------------------------|---|--|--|----------------------------|
| <b>1 Use Part No.</b>    | <b>1 Decide On The Style of Cool-Lock Nut Needed</b>  |  | <b>2 Determine How Many Cool-Lock Nuts Needed Per System</b> |                            |
| <a href="#">AGO-8419</a> | <b>Short Style (AGO-8319)</b><br>Recommended for use with standard short style ferrules.<br><br>Also, use for both the inlet and detector configurations on Agilent 6890, 5890, and 7890 GC systems | <b>Long Style (AGO-8320)</b><br>Recommend for use with standard long style ferrules. | <b>Detector</b><br>MS  | <b>Number of Nuts</b><br>1 |
|                          |   |  | FID, ECD, Other  | 2                          |

### Ordering Information

#### Cool-Lock Installation Nuts and Gauges

| Description                  | Fits Model No.  | For Use With Ferrule Style   | Part No.                 | Unit                     |    |
|------------------------------|---|------------------------------|--------------------------|--------------------------|----|
| <b>For Agilent Systems</b>   |   |                              |                          |                          |    |
| Cool-Lock Installation Nut   |    | Short (1.65 mm)              | <a href="#">AGO-8319</a> | ea                       |    |
|                              |   | Long (2.4 mm)                | <a href="#">AGO-8320</a> | ea                       |    |
| Cool-Lock Installation Gauge |   | 5850, 5890, 6850, 6890, 7890 | —                        | <a href="#">AGO-8349</a> | ea |
| <b>For Shimadzu Systems</b>  |   |                              |                          |                          |    |
| Cool-Lock Installation Nut   |  | 2010, 2014, 2025             | —                        | <a href="#">AGO-8419</a> | ea |
| Cool-Lock Installation Gauge |  | 2010, 2014, 2025             | —                        | <a href="#">AGO-8420</a> | ea |




For Ferrule Selection Guide for Cool-Lock Nuts, see p. 176



### Ordering Information

#### Standard Installation Nut

| Description   | Similar to Mfr No.*   | For Use With Ferrule Style | Part No.                 | Unit                     |      |
|---|---|----------------------------|--------------------------|--------------------------|------|
| <b>For GC-MS Systems</b>  |   |                            |                          |                          |      |
| Brass Installation Nut, Nickel Plated                                 | —   | —                          | <a href="#">AGO-9076</a> | 5/pk                     |      |
| <b>For Other Systems</b>  |   |                            |                          |                          |      |
| Agilent Installation Nut, Standard<br>(1/16 in. Hex Stainless Steel)  |  | 5181-8830                  | Short (1.65 mm)          | <a href="#">AGO-5152</a> | 2/pk |
| Agilent Installation Nut, Deep Well<br>(1/16 in. Hex Stainless Steel) |   | 5020-8292                  | Long (2.4 mm)            | <a href="#">AGO-5153</a> | 2/pk |

\* Similar to but not always an exact equivalent to the original manufacturer's product.



**Caution:** For safety, please use common sense when handling metal surfaces within the GC oven, including the Cool-Lock Nut. The Cool-Lock Nut is designed to track the GC oven temperature as close as possible, therefore, when you cool down your GC oven, the Cool-Lock Nut will follow suit because it is related to oven temperature with the fan on. So if the oven is hot enough to cause severe burns, the Cool-Lock Nut will also be hot enough to cause severe burns. If the GC oven fan has turned off and the injection port temperature is still hot, the Cool-Lock Nut will begin to heat up causing it to be too hot to touch with the bare hand. For any questions regarding use of the Cool-Lock Nut, please contact your local Phenomenex representative.

# GC Accessories

## Ferrules

### Ferrule Selection Guide by Material

| Material                | Advantage   | Disadvantage   | Recommended for  |
|-------------------------|---|--|--|
| 100% Graphite           | <ul style="list-style-type: none"> <li>• Easy to use</li> <li>• Tight, stable seal</li> <li>• Rated to 450 °C</li> </ul>                                    | <ul style="list-style-type: none"> <li>• Porous to oxygen</li> <li>• Not for MS or other oxygen sensitive detectors</li> <li>• Easily deformed</li> <li>• Potential to contaminate system</li> </ul> | <ul style="list-style-type: none"> <li>• General use</li> <li>• FID and NPD</li> <li>• High temperature analysis</li> <li>• Cool on-column</li> </ul>          |
| 85/15% Vespel®/Graphite | <ul style="list-style-type: none"> <li>• Durable for long lifetime</li> <li>• Not porous to oxygen</li> <li>• Rated to 350 °C</li> </ul>                    | <ul style="list-style-type: none"> <li>• Non-reusable</li> <li>• Need to re-tighten frequently</li> <li>• Flows at high temperatures</li> </ul>  | <ul style="list-style-type: none"> <li>• Good for MS or other oxygen sensitive detectors</li> <li>• Most leak free</li> </ul>                                  |
| 60/40% Vespel/Graphite  | <ul style="list-style-type: none"> <li>• Easier to use than 85/15</li> <li>• Not porous to oxygen</li> <li>• Rated to 400 °C</li> </ul>                     | <ul style="list-style-type: none"> <li>• Non-reusable</li> <li>• Easier to deform than 85/15</li> </ul>  | <ul style="list-style-type: none"> <li>• Good for MS or other oxygen sensitive detectors</li> <li>• Best balance between tight seal and ease of use</li> </ul> |
| SilTite™                | <ul style="list-style-type: none"> <li>• No need to re-tighten</li> <li>• Reliable seal</li> <li>• No contamination</li> <li>• Rated &gt; 450 °C</li> </ul> | <ul style="list-style-type: none"> <li>• Easily deforms</li> </ul>   | <ul style="list-style-type: none"> <li>• High temperature MS analysis</li> </ul>   |

### Ferrule Selection Guide by Length

| Length | Advantage   | Disadvantage   | Recommended for  |
|--------|---|--|--|
| Short  | <ul style="list-style-type: none"> <li>• Robust seal</li> </ul>                   | <ul style="list-style-type: none"> <li>• Not recommended for MS detector connection</li> </ul> | <ul style="list-style-type: none"> <li>• Standard detectors and inlet</li> </ul> |
| Long   | <ul style="list-style-type: none"> <li>• Good nut and interface design</li> </ul> | <ul style="list-style-type: none"> <li>• Not recommended for inlet connection</li> </ul>       | <ul style="list-style-type: none"> <li>• MS detector connection</li> </ul>       |

### Ferrule Selection Guide for Cool-Lock™ Nuts

|                |                 | Agilent Systems          |                          |                          |                          | Shimadzu Systems         |                          |
|----------------|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                |                 | Long Style Nut           |                          | Short Style Nut          |                          |                          |                          |
| Column ID (mm) | Ferrule ID (mm) | Top Ferrule              | Bottom Ferrule           | Top Ferrule              | Bottom Ferrule           | Top Ferrule              | Bottom Ferrule           |
| 0.10-0.25      | 0.4             | <a href="#">AGO-4698</a> | <a href="#">AGO-4698</a> | <a href="#">AGO-8929</a> | <a href="#">AGO-4698</a> | <a href="#">AGO-8881</a> | <a href="#">AGO-4698</a> |
| 0.28-0.35      | 0.5             | <a href="#">AGO-4701</a> | <a href="#">AGO-4701</a> | <a href="#">AGO-7513</a> | <a href="#">AGO-4701</a> | <a href="#">AGO-8881</a> | <a href="#">AGO-4701</a> |
| 0.45-0.53      | 0.8             | <a href="#">AGO-4704</a> | <a href="#">AGO-4704</a> | <a href="#">AGO-8676</a> | <a href="#">AGO-4704</a> | <a href="#">AGO-8882</a> | <a href="#">AGO-4704</a> |



Ferrule ordering information on next page.



All ferrules are 1/16 in. (except SilTite™)  
Preconditioned for lower bleed.








All Vespel containing ferrules should be pre-shrunk  
in an oven at 250 °C for at least 4 hours prior to use.

# GC Accessories

## Ferrules (cont'd)

### Ordering Information

|  | Composition                           | GC Column ID (mm)  | Ferrule ID (mm)     | Similar to Mfr. No.*   | Preconditioned           | Part No.   | Unit   |                |
|--|---------------------------------------|--|---------------------|------------------------|--------------------------|--|--|----------------|
| <b>Short</b><br>                | <b>100% Graphite</b>                  | 0.10-0.25  | 0.4                 | 500-2114               | N                        | <a href="#">AGO-8929</a>                             | 10/pk  |                |
|  |                                       | 0.28-0.35  | 0.5                 | 072635<br>5080-8853    | Y                        | <a href="#">AGO-7513</a>                             | 10/pk  |                |
|  |                                       | 0.45-0.53  | 0.8                 | 072636<br>500-2118     | Y                        | <a href="#">AGO-8676</a>                             | 10/pk  |                |
|  | <b>85% Vespel® / 15% Graphite</b>     | 0.10-0.25  | 0.4                 | 5181-3323<br>5181-3322 | N<br>Y                   | <a href="#">AGO-7318</a><br><a href="#">AGO-7321</a> | 10/pk<br>10/pk                                       |                |
|  |                                       | 0.28-0.35  | 0.5                 | 5062-3514<br>5062-3513 | N<br>Y                   | <a href="#">AGO-7319</a><br><a href="#">AGO-7322</a> | 10/pk<br>10/pk                                       |                |
|  |                                       | 0.40-0.53  | 0.8                 | 5062-3512<br>5062-3511 | N<br>Y                   | <a href="#">AGO-7320</a><br><a href="#">AGO-7323</a> | 10/pk<br>10/pk                                       |                |
|  |                                       | <b>Long</b><br> | 0.10-0.25           | 0.4                    | 20200<br>20227           | N  | <a href="#">AGO-4698</a><br><a href="#">AGO-4699</a> | 10/pk<br>50/pk |
|  |                                       |  | 0.28-0.35           | 0.5                    | 72635                    | N  | <a href="#">AGO-4701</a><br><a href="#">AGO-4702</a> | 10/pk<br>50/pk |
|  |                                       |  | 0.45-0.53           | 0.8                    | 82636                    | N  | <a href="#">AGO-4704</a><br><a href="#">AGO-4705</a> | 10/pk<br>50/pk |
| <b>85% Vespel® / 15% Graphite</b>  | 0.10-0.25                             | 0.4  | 072663<br>5062-3508 | Y                      | <a href="#">AGO-8677</a> | 10/pk  |  |                |
|  | 0.28-0.35                             | 0.5  | 072654<br>5062-3506 | Y                      | <a href="#">AGO-8678</a> | 10/pk  |  |                |
|  | 0.45-0.53                             | 0.8  | 072655<br>5062-3538 | Y                      | <a href="#">AGO-8679</a> | 10/pk  |  |                |
|  | <b>60% Vespel / 40% Graphite</b>      | 0.10-0.25  | 0.4                 | 20211<br>20229         | Y                        | <a href="#">AGO-4707</a><br><a href="#">AGO-4708</a> | 10/pk<br>50/pk                                       |                |
|  |                                       | 0.28-0.35  | 0.5                 | 20212<br>20231         | Y                        | <a href="#">AGO-4710</a><br><a href="#">AGO-4711</a> | 10/pk<br>50/pk                                       |                |
|  |                                       | 0.45-0.53  | 0.8                 | 20213<br>20230         | Y                        | <a href="#">AGO-4713</a><br><a href="#">AGO-4714</a> | 10/pk<br>50/pk                                       |                |
| <b>Two Hole</b><br>           | <b>85% Vespel / 15% Graphite</b>      | 0.10-0.25  | 0.4                 | 072662<br>5062-3580    | Y                        | <a href="#">AGO-8680</a>                             | 10/pk  |                |
|  |                                       | 0.28-0.35  | 0.5                 | 212222<br>5062-3581    | N                        | <a href="#">AGO-8681</a>                             | 10/pk  |                |
|  |                                       | 0.45-0.53  | 0.8                 | 072674                 | Y                        | <a href="#">AGO-8682</a>                             | 10/pk  |                |
| <b>SilTite</b><br>            | <b>SilTite™</b>                       | 0.10-0.25  | 0.4                 | 073220                 | Y                        | <a href="#">AGO-8762</a>                             | 10/pk  |                |
|  |                                       | 0.28-0.35  | 0.5                 | 073221                 | Y                        | <a href="#">AGO-8757</a>                             | 10/pk  |                |
|  |                                       | 0.45-0.53  | 0.8                 | 073222                 | Y                        | <a href="#">AGO-8758</a>                             | 10/pk  |                |
| <b>Metal Encapsulated</b><br> | <b>100% Graphite for Shimadzu GCs</b> | 0.10-0.25  | 0.4                 | 221-32126-05           | Y                        | <a href="#">AGO-8881</a>                             | 10/pk  |                |
|  |                                       | 0.25-0.35  | 0.5                 | 221-32126-05           | Y                        | <a href="#">AGO-8881</a>                             | 10/pk  |                |
|  |                                       | 0.45-0.53  | 0.8                 | 221-32126-08           | Y                        | <a href="#">AGO-8882</a>                             | 10/pk  |                |

\* Similar to but not always an exact equivalent to the original manufacturer's product.

Note: SilTite ferrules are to be used with SilTite nuts. Please contact your Phenomenex technical consultant or distributor for the appropriate nut and ferrule part numbers for your GC system.



For Replacement Ferrules for Mini-unions, see p. 188



All ferrules are 1/16 in. (except SilTite™) Preconditioned for lower bleed.






All Vespel containing ferrules should be pre-shrunk in an oven at 250 °C for at least 4 hours prior to use.

# GC Accessories

## O-Rings

### Ordering Information

#### O-Rings

| Fits Liners for Manufacturer | Description   | Similar to Mfr. No.*                   | Part No.     | Unit                     |       |
|------------------------------|---|--|--------------|--------------------------|-------|
| Agilent®                     |  | Viton® Fluorocarbon, rated to < 300 °C | 5180-4182    | <a href="#">AGO-7326</a> | 10/pk |
|                              |   | Graphite, rated to 450 °C              | 5180-4168    | <a href="#">AGO-7327</a> | 10/pk |
| PerkinElmer®                 |  | Viton for 6.2 mm OD inlet liners       | N9302783     | <a href="#">AGO-8674</a> | 10/pk |
| Shimadzu®<br>(Model 2010)    |  | Viton                                  | 036-11203-84 | <a href="#">AGO-8675</a> | 10/pk |

\* Similar to but not always an exact equivalent to the original manufacturer's product.

### Septa Sizes by GC Instrument



| Manufacturer       | Instrument Model                                     | Septa Diameter                               |  |            |
|--------------------|--|--|--|------------|
|                    |  | 9.5 mm<br>( <sup>3</sup> / <sub>8</sub> in.) | 11 mm<br>( <sup>7</sup> / <sub>16</sub> in.) | Septa Plug |
| Agilent® (HP)      | 5850, 5880A, 5890, 6850, 6890, 7890                  |  | •  |            |
|                    | 5700 series, 5880                                    | •  |  |            |
| Antek®             | All  | •  |  |            |
| Thermo Scientific® | Finnigan 9600  | •  |  |            |
| GOW-MAC®           | All  | •  |  |            |
| HNU                | Portable GC  | •  |  |            |
| PerkinElmer®       | Sigma series, 900, 990, 8000, AutoSystem, Clarus 500 |  | •  |            |
| Shimadzu®          | All  |  |  | •          |
| SRI                | All  |  |  | •          |
| Tracor             | 550, 560   | •  |  |            |
| Varian®            | 1040, 1041, 1060, 1061                               | •  |  |            |
|                    | 1075, 1077, 1078, 1079                               | •  |  |            |
|                    | 3700 / Vista, Capillary Injectors                    |  | •  |            |
|                    | Packed Column Injectors                              | •  |  |            |
|                    | SPI  |  |  | •          |

## Septa

Advanced silicone formulations reduce coring, enhance durability and re-sealing capabilities, and increase septum lifetime. Septa with GuideRight™ holes guide the needle during injection, for longer lifetime and less bent needles.

### Ordering Information

#### Septa

| Type                  | Description  |  | Diameter                     |                              | Includes GuideRight Hole | Part No.                 | Unit   |
|-----------------------|--|--|------------------------------|------------------------------|--------------------------|--------------------------|--------|
|                       |  |  | (mm)                         | (in.)                        |                          |                          |        |
| Silicone Rubber Septa |   | <ul style="list-style-type: none"> <li>Our most popular choice for low-bleed septa, rated to 400 °C</li> <li>Designed and conditioned for high sensitivity</li> <li>Durometer rating of 50 with typical injection life of 150 punctures</li> </ul> | 9.5                          | <sup>3</sup> / <sub>8</sub>  | ✓                        | <a href="#">AGO-7916</a> | 50/pk  |
|                       |  |  | 9.5                          | <sup>3</sup> / <sub>8</sub>  |                          | <a href="#">AGO-4690</a> | 50/pk  |
|                       |  |  | 9.5                          | <sup>3</sup> / <sub>8</sub>  |                          | <a href="#">AGO-4691</a> | 100/pk |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> | ✓                        | <a href="#">AGO-7917</a> | 50/pk  |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> |                          | <a href="#">AGO-4696</a> | 50/pk  |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> |                          | <a href="#">AGO-4697</a> | 100/pk |
|                       | PhenoGreen™ -400   | <ul style="list-style-type: none"> <li>Long-life, high temperature septa for use up to 400 °C</li> </ul>   | 9.5                          | <sup>3</sup> / <sub>8</sub>  |                          | <a href="#">AGO-8572</a> | 50/pk  |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> | ✓                        | <a href="#">AGO-7875</a> | 50/pk  |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> |                          | <a href="#">AGO-8573</a> | 50/pk  |
|                       | PhenoBlue™ -300  | <ul style="list-style-type: none"> <li>Low-bleed septum heat stable to 350 °C</li> <li>Durometer rating of 50 - 60 for easy puncture up to 100 injections at 300 °C</li> </ul>   | 9.5                          | <sup>3</sup> / <sub>8</sub>  |                          | <a href="#">AGO-4688</a> | 50/pk  |
|                       |  |  | 9.5                          | <sup>3</sup> / <sub>8</sub>  |                          | <a href="#">AGO-4689</a> | 100/pk |
|                       |  |  | 11                           | <sup>7</sup> / <sub>16</sub> |                          | <a href="#">AGO-4694</a> | 50/pk  |
| PhenoGrey™ -250       | <ul style="list-style-type: none"> <li>General purpose silicone rubber septum rated to 250 °C</li> <li>Durometer rating of 40 - 45 for easy puncture up to 100 injections</li> </ul> | 11   | <sup>7</sup> / <sub>16</sub> |                              | <a href="#">AGO-4695</a> | 100/pk                   |        |
|                       |  | 9.5  | <sup>3</sup> / <sub>8</sub>  |                              | <a href="#">AGO-4686</a> | 50/pk                    |        |
|                       |  | 11   | <sup>7</sup> / <sub>16</sub> |                              | <a href="#">AGO-4692</a> | 50/pk                    |        |
| Injector Septa Plugs  |   | <ul style="list-style-type: none"> <li>Fits Shimadzu (9A, 14, 15A, 17A, 2010) and SRI injectors</li> <li>Rated to 400 °C</li> </ul>  | 11                           | <sup>7</sup> / <sub>16</sub> |                          | <a href="#">AGO-4693</a> | 100/pk |
|                       |  |  |                              |                              |                          | <a href="#">AGO-7517</a> | 50/pk  |
|                       |  |  |                              |                              |                          |                          |        |



For additional parts and accessories contact Phenomenex or visit: [www.phenomenex.com/GC](http://www.phenomenex.com/GC)



# GC Accessories

## Merlin Microseal™ Septum

- Improves chromatographic performance and quantitative results by reducing bleed and ghost peaks
- Improves reliability and performance during extended automated runs
- Thousands of injections before seal replacement
- Save time changing septa, instrument downtime and troubleshooting

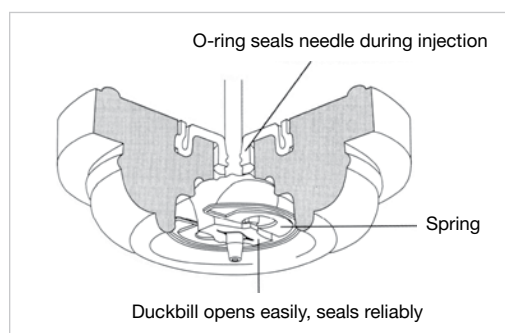


The Merlin Microseal Septum is a long-life replacement for the standard septum on the capillary inlet or the purged-packed inlet of Agilent GC systems.

The Microseal is a patented inlet assembly that provides two distinct sealing mechanisms. The first is a double O-ring seal around the syringe that ensures gas leak integrity during time of injection. There is no traditional septum to core or flake, which can cause bleeding and ghost peaks, and less force is required for the user to make a manual injection. The second seal is a spring-assisted duckbill that reliably maintains a high-pressure seal within the injection port at all times.

Since the syringe does not pierce any septum material, seal lifetime is significantly extended – Microseals are typically used for up to one year or more under normal conditions before septum replacement. Many laboratories experience lifetimes of 5,000 to 10,000 injections or more. This means you save tremendously in time changing septa, instrument downtime and troubleshooting. Chromatographic performance will also improve due to less bleed and fewer ghost peaks, improving quantitation and data reliability.

Instrument Compatibility: The Merlin Microseal systems can be used manually with all Agilent 5800, 6800, and 7890 series GCs. However, for autosampler use it is compatible with only the 7673A and 7673B units. Other inlets or autosampler systems from Agilent or other manufacturers are not compatible.



(1) Complete High Pressure Kits include the nut and one or two Microseal septa. All High Pressure Kits are rated for inlet pressures up to 100 psi. For long-term operation (>6 months) with the Microseal septum use the following injection port limits: (a) Agilent 6890, 5890 Series II - 325 °C; (b) Agilent 5890A - 300 °C. Higher temperatures will result in shorter lifetimes.

(2) The Merlin Microseal Septum should only be used with a blunt-tipped, 0.63 mm diameter (0.025 in., 23 gauge) syringe needle (typically used with the Agilent 7673 autosampler). Sharp-pointed or sharp-edged needles should not be used as they may slice or pierce the seals.

### Ordering Information

#### Merlin Microseal Septum

| Part No.                 | Description  | Unit |
|--------------------------|--|------|
| <a href="#">AGO-5985</a> | Merlin Microseal High Pressure Septum Standard Kit, includes nut and 2 septa | ea   |
| <a href="#">AGO-5986</a> | Merlin Microseal High Pressure Septum Starter Kit, includes nut and 1 septum | ea   |

#### Replacement Parts

|                          |                                       |    |
|--------------------------|---------------------------------------|----|
| <a href="#">AGO-5987</a> | Merlin Microseal High Pressure Septum | ea |
|--------------------------|---------------------------------------|----|

## Syringes for Use With the Merlin Microseal

### Ordering Information

| Part No.                             | Mfr. No. | Agilent P/N | Description*            | Capacity (µL) | Unit |
|--------------------------------------|----------|-------------|-------------------------|---------------|------|
| <b>For Agilent 7673 Autosamplers</b> |          |             |                         |               |      |
| <a href="#">ASO-4386</a>             | 87987    | 9301-0892   | 75ASN (23s/1.71in./HP)  | 5             | ea   |
| <a href="#">ASO-4387</a>             | 80387    | 9301-0713   | 701ASN (23s/1.71in./HP) | 10            | ea   |
| <a href="#">ASO-4388</a>             | 80390    | 9301-0725   | 701ASN (23s/1.71in./HP) | 10            | 6/pk |

NOTE: Replacement needles are available in packs of three.

\* Values in parentheses denote the following: (gauge/length/point style). "s" after gauge denotes smaller/reduced internal needle diameter.



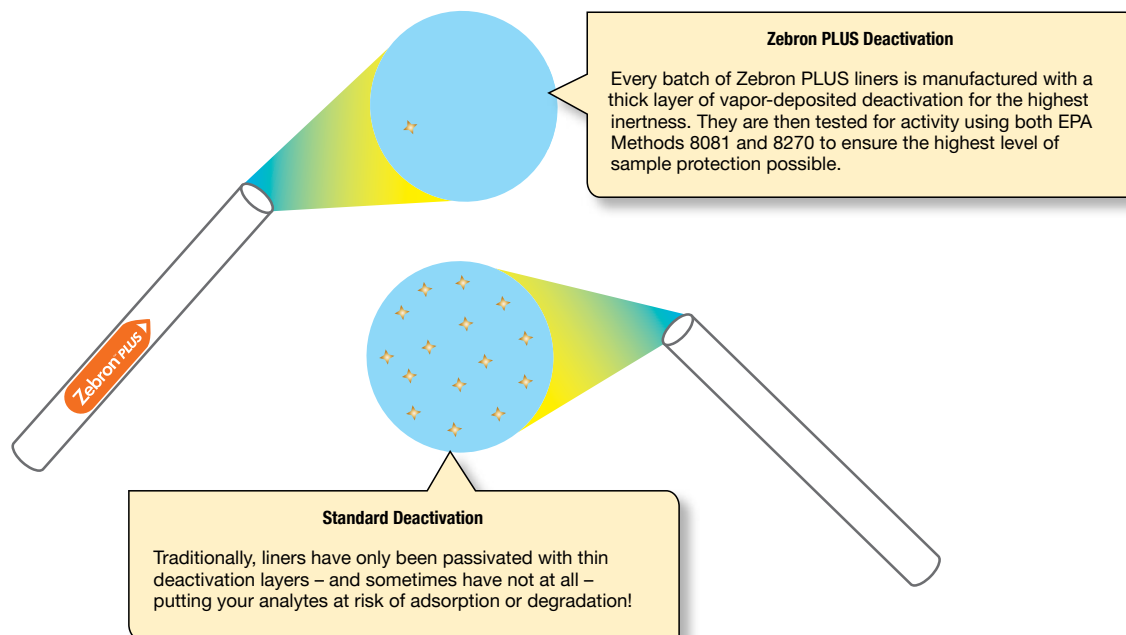
Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

## Inlet Liners

### Protect Your Samples with Zebron® PLUS GC Inlet Liners

Zebron PLUS GC inlet liners undergo a unique deactivation process, resulting in a remarkably inert pathway that prevents sample adsorption and degradation for active compounds.

### See The Difference: Zebron PLUS vs. Traditional Deactivation



### Enhance Your Analysis

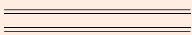
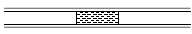

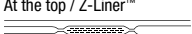

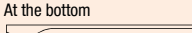
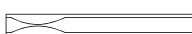


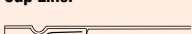
Analysis of dirty samples, samples with wide boiling points, or samples with wide molecular weights can be enhanced by choosing a Zebron PLUS liner with quartz wool. Liners packed with wool can prevent non-volatile compounds from entering the column and also improve sample vaporization for a more robust, reproducible analysis.

### Why Use Pre-Packed Liners?

Though the upfront cost of self-packing your liner may seem attractive, the time and headaches caused by resulting tailing or irreproducible peaks can be sizeable! Self-packed wool fibers commonly break during installation and any existing deactivation on the liner can also be scratched or damaged. Pre-packed Zebron PLUS liners undergo the deactivation process with the quartz wool already in place, which ensures that any active sites that form during packing are not exposed.

## Inlet Liners

### Liner Geometry Selection Guide

| Liner Style*  | Function  | Advantages  | Disadvantages   | Recommended For  |
|---|---|---|---|--|
| <b>Straight</b><br>  | Low surface area for less activity  | <ul style="list-style-type: none"> <li>Simple to use</li> <li>Least expensive</li> <li>Low activity</li> </ul>  | <ul style="list-style-type: none"> <li>Possible inlet discrimination</li> <li>More frequent gold seal maintenance from exposure to sample contamination</li> <li>Possible inconsistency if sample injection bypasses split ratio</li> </ul> | Volatiles  |
| <b>Glass Wool</b><br>In the middle<br>                               | Traps non-volatiles; mixes sample; vaporizes sample above the column                            | <ul style="list-style-type: none"> <li>Reduces gold seal/column contamination and maintenance</li> <li>More reproducible results</li> <li>Can help focus analytes</li> <li>Extends column life</li> </ul>   | <ul style="list-style-type: none"> <li>Higher surface area that can become active</li> <li>Glass wool can become dislodged</li> </ul>   | Dirty samples, volatiles, high initial oven temperatures   |
| At the bottom<br>  | Traps non-volatiles; mixes sample; vaporizes sample above the column                            | <ul style="list-style-type: none"> <li>Reduces gold seal/column contamination and maintenance</li> <li>More reproducible results</li> <li>Can provide higher responses than wool in middle</li> </ul>   | <ul style="list-style-type: none"> <li>Higher surface area that can become active</li> <li>Glass wool can become dislodged</li> </ul>   | Dirty samples  |
| At the top / Z-Liner™<br>  | Keeps glass wool in place; wipes syringe needle clean   | <ul style="list-style-type: none"> <li>Reduces gold seal/column contamination and maintenance</li> <li>More reproducible results</li> <li>Can help focus analytes</li> <li>Extends column life</li> </ul>   | <ul style="list-style-type: none"> <li>Higher surface area that can become active</li> </ul>  | Pressure pulsed injections, dirty samples, volatiles, high initial oven temperatures                                   |
| <b>Taper / Gooseneck</b><br>At the top<br>                          | Limits the expansion of the solvent to the inlet  | <ul style="list-style-type: none"> <li>Allows for larger injection volumes</li> <li>Decrease backflash</li> </ul>   | <ul style="list-style-type: none"> <li>Higher risk of needle breakage</li> <li>Increased cost</li> <li>Cannot self-pack with glass wool</li> </ul>  | Water injections   |
| At the bottom<br>  | Directs flow onto column; low surface area  | <ul style="list-style-type: none"> <li>Reduces gold seal/column contamination and maintenance</li> <li>Improved sensitivity</li> <li>Lower activity</li> </ul>  | <ul style="list-style-type: none"> <li>Increased cost</li> </ul>  | Pesticides (without wool), semi-volatiles (with wool)  |
| <b>Direct Connect</b><br>  | Connects directly to column to aid transfer of analytes   | <ul style="list-style-type: none"> <li>Better sensitivity for splitless injections</li> <li>Decreases inlet discrimination</li> </ul>   | <ul style="list-style-type: none"> <li>Only used for splitless injections</li> <li>Increased cost</li> <li>One-time use</li> </ul>  | Trace analysis, splitless injections, separation from solvent peak (with top hole), aqueous samples (with bottom hole) |
| <b>Internal Diameter (ID)</b><br>Small<br>                         | Small internal volume and surface area; restricts sample diffusion                              | <ul style="list-style-type: none"> <li>Better peak shape of gaseous samples</li> <li>Less activity for small injections of active compounds</li> </ul>  | <ul style="list-style-type: none"> <li>Very small internal volume is easy to overload with normal injection volumes</li> </ul>  | Headspace, purge and trap, or gas injections; active samples with low expansion solvents                               |
| <b>Outer Diameter (OD) / Splitless</b><br>Large OD / Splitless<br> | Fits tightly inside the inlet and limits sample contact with inlet components                   | <ul style="list-style-type: none"> <li>Better sensitivity for long splitless hold times</li> </ul>  | <ul style="list-style-type: none"> <li>Not very amenable for changing to large split ratios</li> </ul>  | Splitless injections of active compounds   |
| <b>Cup Liner</b><br>   | Cup traps non-volatiles but has lower surface area than wool; vaporizes sample above the column | <ul style="list-style-type: none"> <li>Good sample mixing</li> <li>Reduces gold seal/column contamination and maintenance</li> <li>More reproducible results</li> <li>Improves results for active compounds</li> <li>Provides receptacle for multiple injections</li> </ul> | <ul style="list-style-type: none"> <li>Increased cost</li> <li>Higher surface area than straight liner can result in increased activity for very active compounds</li> </ul>  | Multiple or large volume injections, active samples, dirty samples   |

\*Examples given are only one possible option. Other available options may be better suited for your analysis.

### What's A Z-Liner?

Zebron PLUS Liners with a Z-Liner geometry contain optimally-placed deactivated quartz wool, which is held in place by two tapered sections of glass inside the liner. This ensures that the wool



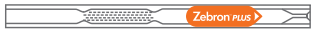




remains in the correct position for injection, wipes the needle tip completely clean, and properly volatilizes the sample.

# GC Accessories

## Liners for Agilent® GC Systems








### Ordering Information


#### Zebron® PLUS Liners

| Description  | Application  | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|--|--|-------------|------------------------|--------------|---|---------------------|
| <b>For 5890, 6890 and 7890 Models</b>  |  |             |                        |              |   |                     |
| <b>Direct Connect</b><br>         | Trace analysis, Splitless injections                     | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A50-01</a><br><a href="#">AG2-0A50-05</a><br><a href="#">AG2-0A50-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper</b><br>           | Pesticides   | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A10-01</a><br><a href="#">AG2-0A10-05</a><br><a href="#">AG2-0A10-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper Z-Liner™</b><br>  | Semi-volatiles, Dirty samples                            | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A13-01</a><br><a href="#">AG2-0A13-05</a><br><a href="#">AG2-0A13-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper with Wool</b><br> | Semi-volatiles   | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A11-01</a><br><a href="#">AG2-0A11-05</a><br><a href="#">AG2-0A11-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight</b><br>               | Volatiles  | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A00-01</a><br><a href="#">AG2-0A00-05</a><br><a href="#">AG2-0A00-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight Z-Liner</b><br>       | Dirty samples, Volatiles, High initial oven temperatures | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A03-01</a><br><a href="#">AG2-0A03-05</a><br><a href="#">AG2-0A03-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight Single Baffle</b><br> | Semi-volatiles, Pesticides                               | S/SL        | 1.8 x 71               | PLUS Inert   | <a href="#">AG2-1F06-01</a><br><a href="#">AG2-1F06-05</a><br><a href="#">AG2-1F06-25</a> | ea<br>5/pk<br>25/pk |

### Ordering Information

#### Zebron Essentials Liners

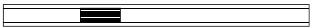

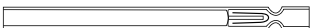






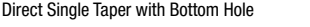
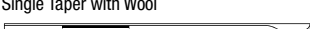




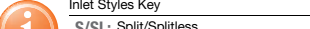
| Description  | Application  | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|--|--|-------------|------------------------|--------------|---|---------------------|
| <b>For 5890, 6890 and 7890 Models</b>  |  |             |                        |              |   |                     |
| <b>Direct Connect</b><br>         | Trace analysis, Splitless injections                     | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A50-01</a><br><a href="#">AG1-0A50-05</a><br><a href="#">AG1-0A50-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper</b><br>           | Pesticides   | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A10-01</a><br><a href="#">AG1-0A10-05</a><br><a href="#">AG1-0A10-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper Z-Liner</b><br>   | Semi-volatiles, Dirty samples                            | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A13-01</a><br><a href="#">AG1-0A13-05</a><br><a href="#">AG1-0A13-25</a> | ea<br>5/pk<br>25/pk |
| <b>Single Taper with Wool</b><br> | Semi-volatiles   | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A11-01</a><br><a href="#">AG1-0A11-05</a><br><a href="#">AG1-0A11-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight</b><br>               | Volatiles  | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A00-01</a><br><a href="#">AG1-0A00-05</a><br><a href="#">AG1-0A00-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight Z-Liner</b><br>       | Dirty samples, Volatiles, High initial oven temperatures | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A03-01</a><br><a href="#">AG1-0A03-05</a><br><a href="#">AG1-0A03-25</a> | ea<br>5/pk<br>25/pk |
| <b>Straight Single Baffle</b><br> | Semi-volatiles, Pesticides                               | PTV         | 1.8 x 71               | Standard     | <a href="#">AG1-1F06-01</a><br><a href="#">AG1-1F06-05</a><br><a href="#">AG1-1F06-25</a> | ea<br>5/pk<br>25/pk |

|   |   |
|---|---|
|  | <b>Inlet Styles Key</b>                     |
|   | S/SL: Split/Splitless                       |
|   | PTV: Programmed-Temperature Vaporization    |
|   | PSS: Programmed-Temperature Split/Splitless |
|   | SPI: Single Point Injection                 |

## Liners for Agilent® GC Systems

### Ordering Information

#### GC Liners

| Description   | Application   | Inlet Style | Dimensions ID x L (mm) | Deactivation    | Part No.   | Unit          |
|---|---|-------------|------------------------|-----------------|--|---------------|
| <b>For 5890, 6890, and 7890 Models</b>  |   |             |                        |                 |  |               |
| <br>Straight with Wool                     | Large injection, Trace analysis                     | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-4655</a><br><a href="#">AGO-4656</a> | 5/pk<br>25/pk |
| <br>Single Taper with Wool                 | Large injection, Trace analysis                     | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-4657</a><br><a href="#">AGO-4658</a> | 5/pk<br>25/pk |
| <br>Cup                                    | High and low MW compounds, Large volume injections  | S/SL        | 4 x 78.5               | Not Deactivated | <a href="#">AGO-4647</a><br><a href="#">AGO-4648</a> | 5/pk<br>25/pk |
| <br>Cup with Wool                          | Large volume injection of dirty samples             | S/SL        | 4 x 78.5               | Not Deactivated | <a href="#">AGO-7853</a>                             | 5/pk          |
| <br>Straight                               | Large injection, Trace analysis                     | S/SL        | 2 x 78.5               | Not Deactivated | <a href="#">AGO-4649</a><br><a href="#">AGO-4650</a> | 5/pk<br>25/pk |
| <br>Straight                               | Large injection, Trace analysis                     | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-4651</a><br><a href="#">AGO-4652</a> | 5/pk<br>25/pk |
| <br>Single Taper                           | Small injection, Trace analysis                     | S/SL        | 2 x 78.5               | Standard        | <a href="#">AGO-4653</a>                             | 5/pk          |
| <br>Direct                               | Injection < 1 µL, Purge and Trap/Headspace          | S/SL        | 1.5 x 78.5             | Standard        | <a href="#">AGO-4659</a><br><a href="#">AGO-4660</a> | 5/pk<br>25/pk |
| <br>Recessed Gooseneck with Wool         | Large injection of dirty samples                    | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-4661</a><br><a href="#">AGO-4662</a> | 5/pk<br>25/pk |
| <br>Direct Single Taper with Top Hole    | Trace analysis of active compounds                  | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-7850</a>                             | 5/pk          |
| <br>Direct Single Taper with Bottom Hole | Trace analysis of active compounds                  | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-7851</a>                             | 5/pk          |
| <br>Single Taper with Wool               | General use, Dirty samples                          | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-8172</a>                             | 5/pk          |
| <br>Double Taper                         | Large injection, Trace analysis of active compounds | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-8173</a>                             | 5/pk          |
| <br>Double Gooseneck with Bottom Hole    | Trace analysis of active compounds                  | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-8430</a>                             | 5/pk          |
| <br>Straight with Wool                   | Large injection Trace analysis,                     | S/SL        | 4 x 78.5               | Standard        | <a href="#">AGO-8653</a><br><a href="#">AGO-8654</a> | 5/pk<br>25/pk |
| <br>Straight with Stabilized Wool        | Small injection, Trace analysis of dirty samples    | S/SL        | 2.3 x 78.5             | Standard        | <a href="#">AGO-8379</a>                             | 5/pk          |

**i** Inlet Styles Key

- S/SL: Split/Splitless
- PTV: Programmed-Temperature Vaporization
- PSS: Programmed-Temperature Split/Splitless
- SPI: Single Point Injection

## Find Your Liner Online!

Easily search by part numbers, applications, injection mode, or system manufacturer for quick selection **in under 1 minute!**




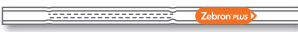

[www.phenomenex.com/FindLiner](http://www.phenomenex.com/FindLiner)



## Liners for PerkinElmer® GC Systems


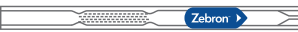



### Ordering Information

#### Zebron® PLUS Liners

| Description  | Application                      | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|--|----------------------------------|-------------|------------------------|--------------|---|---------------------|
| <b>For AutoSystem™, AutoSystem XL, Clarus 500, and Clarus 600 Models</b>                                   |                                  |             |                        |              |   |                     |
| Single Taper<br>          | Pesticides                       | S/SL        | 4 x 92                 | PLUS Inert   | <a href="#">AG2-2A10-01</a><br><a href="#">AG2-2A10-05</a><br><a href="#">AG2-2A10-25</a> | ea<br>5/pk<br>25/pk |
| Single Taper Z-Liner™<br> | Semi-volatiles,<br>Dirty samples | S/SL        | 4 x 92                 | PLUS Inert   | <a href="#">AG2-2A13-01</a><br><a href="#">AG2-2A13-05</a><br><a href="#">AG2-2A13-25</a> | ea<br>5/pk<br>25/pk |
| Straight<br>              | Volatiles                        | S/SL        | 4 x 92                 | PLUS Inert   | <a href="#">AG2-2A00-01</a><br><a href="#">AG2-2A00-05</a><br><a href="#">AG2-2A00-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>      | Volatiles,<br>Dirty samples      | PSS         | 2 x 86.2               | PLUS Inert   | <a href="#">AG2-2E03-01</a><br><a href="#">AG2-2E03-05</a><br><a href="#">AG2-2E03-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>      | High initial oven temperatures   | S/SL        | 4 x 92                 | PLUS Inert   | <a href="#">AG2-2A03-01</a><br><a href="#">AG2-2A03-05</a><br><a href="#">AG2-2A03-25</a> | ea<br>5/pk<br>25/pk |



### Ordering Information

#### Zebron Essentials Liners

| Description   | Application                      | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|---|----------------------------------|-------------|------------------------|--------------|---|---------------------|
| <b>For AutoSystem, AutoSystem XL, Clarus 500, and Clarus 600 Models</b>                                     |                                  |             |                        |              |   |                     |
| Single Taper<br>         | Pesticides                       | S/SL        | 4 x 92                 | Standard     | <a href="#">AG1-2A10-01</a><br><a href="#">AG1-2A10-05</a><br><a href="#">AG1-2A10-25</a> | ea<br>5/pk<br>25/pk |
| Single Taper Z-Liner<br> | Semi-volatiles,<br>Dirty samples | S/SL        | 4 x 92                 | Standard     | <a href="#">AG1-2A13-01</a><br><a href="#">AG1-2A13-05</a><br><a href="#">AG1-2A13-25</a> | ea<br>5/pk<br>25/pk |
| Straight<br>             | Volatiles                        | S/SL        | 4 x 92                 | Standard     | <a href="#">AG1-2A00-01</a><br><a href="#">AG1-2A00-05</a><br><a href="#">AG1-2A00-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>     | Volatiles,<br>Dirty samples      | PSS         | 2 x 86.2               | Standard     | <a href="#">AG1-2E03-01</a><br><a href="#">AG1-2E03-05</a><br><a href="#">AG1-2E03-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>     | High initial oven temperatures   | S/SL        | 4 x 92                 | Standard     | <a href="#">AG1-2A03-01</a><br><a href="#">AG1-2A03-05</a><br><a href="#">AG1-2A03-25</a> | ea<br>5/pk<br>25/pk |

### Ordering Information

#### GC Liners

| Description   | Application                        | Inlet Style | Dimensions ID x L (mm) | Deactivation    | Part No.                 | Unit |
|---|------------------------------------|-------------|------------------------|-----------------|--------------------------|------|
| <b>For AutoSystem, AutoSystem XL, Clarus 500, and Clarus 600 Models</b>                               |                                    |             |                        |                 |                          |      |
| Straight<br>       | General use,<br>Trace samples      | S/SL        | 4 x 92                 | Not Deactivated | <a href="#">AG0-4665</a> | 5/pk |
| Sintered Glass<br> | Large injection,<br>Trace analysis | PSS         | 2 x 86.2               | Standard        | <a href="#">AG0-8658</a> | 5/pk |



#### Inlet Styles Key

S/SL: Split/Splitless

PTV: Programmed-Temperature Vaporization

PSS: Programmed-Temperature Split/Splitless







SPI: Single Point Injection

# GC Accessories

## Liners for Shimadzu® GC Systems







### Ordering Information

#### Zebron® PLUS Liners

| Description  | Application   | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|--|---|-------------|------------------------|--------------|---|---------------------|
| <b>For 17A, 2014 and 2025 Models</b>   |   |             |                        |              |   |                     |
| Single Taper Z-Liner™<br> | Pesticides  | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-3B13-01</a><br><a href="#">AG2-3B13-05</a><br><a href="#">AG2-3B13-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>      | Volatiles, Dirty samples,<br>High initial oven temperatures | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-3B03-01</a><br><a href="#">AG2-3B03-05</a><br><a href="#">AG2-3B03-25</a> | ea<br>5/pk<br>25/pk |
| <b>For 2010 Models</b>   |   |             |                        |              |   |                     |
| Single Taper<br>          | Volatiles, Dirty samples,<br>High initial oven temperatures | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-4B10-01</a><br><a href="#">AG2-4B10-05</a><br><a href="#">AG2-4B10-25</a> | ea<br>5/pk<br>25/pk |
| Single Taper Z-Liner<br>  | Pesticides  | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-4B13-01</a><br><a href="#">AG2-4B13-05</a><br><a href="#">AG2-4B13-25</a> | ea<br>5/pk<br>25/pk |
| Straight<br>              | Volatiles   | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-4B00-01</a><br><a href="#">AG2-4B00-05</a><br><a href="#">AG2-4B00-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>      | Volatiles, Dirty samples,<br>High initial oven temperatures | S/SL        | 3.4 x 95               | PLUS Inert   | <a href="#">AG2-4B03-01</a><br><a href="#">AG2-4B03-05</a><br><a href="#">AG2-4B03-25</a> | ea<br>5/pk<br>25/pk |

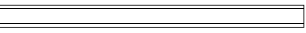




### Ordering Information

#### Zebron Essentials Liners

| Description   | Application   | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|---|---|-------------|------------------------|--------------|---|---------------------|
| <b>For 17A, 2014, and 2025 Models</b>   |   |             |                        |              |   |                     |
| Single Taper Z-Liner<br> | Pesticides  | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-3B13-01</a><br><a href="#">AG1-3B13-05</a><br><a href="#">AG1-3B13-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>     |   | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-3B03-01</a><br><a href="#">AG1-3B03-05</a><br><a href="#">AG1-3B03-25</a> | ea<br>5/pk<br>25/pk |
| <b>For 2010 Models</b>  |   |             |                        |              |   |                     |
| Single Taper<br>         | Volatiles, Dirty samples,<br>High initial oven temperatures | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-4B10-01</a><br><a href="#">AG1-4B10-05</a><br><a href="#">AG1-4B10-25</a> | ea<br>5/pk<br>25/pk |
| Single Taper Z-Liner<br> | Pesticides  | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-4B13-01</a><br><a href="#">AG1-4B13-05</a><br><a href="#">AG1-4B13-25</a> | ea<br>5/pk<br>25/pk |
| Straight<br>             | Volatiles   | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-4B00-01</a><br><a href="#">AG1-4B00-05</a><br><a href="#">AG1-4B00-25</a> | ea<br>5/pk<br>25/pk |
| Straight Z-Liner<br>     | Volatiles, Dirty samples,<br>High initial oven temperatures | S/SL        | 3.4 x 95               | Standard     | <a href="#">AG1-4B03-01</a><br><a href="#">AG1-4B03-05</a><br><a href="#">AG1-4B03-25</a> | ea<br>5/pk<br>25/pk |

### Ordering Information



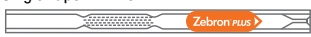
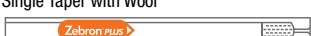


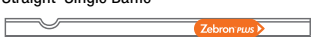
#### GC Liners

| Description   | Application                        | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.                 | Unit |
|---|------------------------------------|-------------|------------------------|--------------|--------------------------|------|
| <b>For 17A, 2014, and 2025 Models</b>   |                                    |             |                        |              |                          |      |
| Straight<br>                     | Small injection,<br>Trace analysis | S/SL        | 2.6 x 95               | Standard     | <a href="#">AGO-4667</a> | 5/pk |
| <b>For 14A Models</b>   |                                    |             |                        |              |                          |      |
| Straight<br>                     | Trace analysis                     | WBC         | 3.4 x 139              | Standard     | <a href="#">AGO-4669</a> | 5/pk |
| Single Taper FocusLiner™<br>     | General use,<br>Dirty samples      | S/SL        | 3.4 x 99               | Standard     | <a href="#">AGO-4682</a> | 5/pk |
| Middle Gooseneck<br>             | General use,<br>Dirty samples      | S/SL        | 3.4 x 95               | Standard     | <a href="#">AGO-8661</a> | 5/pk |
| Recessed Gooseneck with Wool<br> | General use,<br>Dirty samples      | S/SL        | 3.4 x 95               | Standard     | <a href="#">AGO-8663</a> | 5/pk |

## Liners for Thermo Scientific® GC Systems




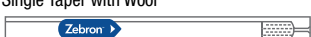


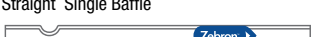
### Ordering Information

#### Zebron® PLUS Liners

| Description   | Application  | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|---|--|-------------|------------------------|--------------|---|---------------------|
| <b>For 5890, 6890 and 7890 Models</b>   |  |             |                        |              |   |                     |
| <br>Direct Connect         | Trace analysis, Splitless injections                     | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A50-01</a><br><a href="#">AG2-0A50-05</a><br><a href="#">AG2-0A50-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper           | Pesticides   | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A10-01</a><br><a href="#">AG2-0A10-05</a><br><a href="#">AG2-0A10-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper Z-Liner™  | Semi-volatiles, Dirty samples                            | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A13-01</a><br><a href="#">AG2-0A13-05</a><br><a href="#">AG2-0A13-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper with Wool | Semi-volatiles   | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A11-01</a><br><a href="#">AG2-0A11-05</a><br><a href="#">AG2-0A11-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight               | Volatiles  | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A00-01</a><br><a href="#">AG2-0A00-05</a><br><a href="#">AG2-0A00-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight Z-Liner       | Dirty samples, Volatiles, High initial oven temperatures | S/SL        | 4 x 78.5               | PLUS Inert   | <a href="#">AG2-0A03-01</a><br><a href="#">AG2-0A03-05</a><br><a href="#">AG2-0A03-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight Single Baffle | Semi-volatiles, Pesticides                               | PTV         | 1.8 x 71               | PLUS Inert   | <a href="#">AG2-1F06-01</a><br><a href="#">AG2-1F06-05</a><br><a href="#">AG2-1F06-25</a> | ea<br>5/pk<br>25/pk |

### Ordering Information

#### Zebron Essentials Liners

| Description   | Application  | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.  | Unit                |
|---|--|-------------|------------------------|--------------|---|---------------------|
| <b>For 5890, 6890 and 7890 Models</b>   |  |             |                        |              |   |                     |
| <br>Direct Connect         | Trace analysis, Splitless injections                     | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A50-01</a><br><a href="#">AG1-0A50-05</a><br><a href="#">AG1-0A50-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper           | Pesticides   | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A10-01</a><br><a href="#">AG1-0A10-05</a><br><a href="#">AG1-0A10-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper Z-Liner   | Semi-volatiles, Dirty samples                            | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A13-01</a><br><a href="#">AG1-0A13-05</a><br><a href="#">AG1-0A13-25</a> | ea<br>5/pk<br>25/pk |
| <br>Single Taper with Wool | Semi-volatiles   | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A11-01</a><br><a href="#">AG1-0A11-05</a><br><a href="#">AG1-0A11-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight               | Volatiles  | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A00-01</a><br><a href="#">AG1-0A00-05</a><br><a href="#">AG1-0A00-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight Z-Liner       | Dirty samples, Volatiles, High initial oven temperatures | S/SL        | 4 x 78.5               | Standard     | <a href="#">AG1-0A03-01</a><br><a href="#">AG1-0A03-05</a><br><a href="#">AG1-0A03-25</a> | ea<br>5/pk<br>25/pk |
| <br>Straight Single Baffle | Semi-volatiles, Pesticides                               | PTV         | 1.8 x 71               | Standard     | <a href="#">AG1-1F06-01</a><br><a href="#">AG1-1F06-05</a><br><a href="#">AG1-1F06-25</a> | ea<br>5/pk<br>25/pk |



#### Inlet Styles Key

- S/SL: Split/Splitless
- PTV: Programmed-Temperature Vaporization
- PSS: Programmed-Temperature Split/Splitless
- SPI: Single Point Injection



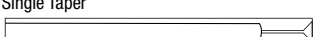






# GC Accessories

## Liners for Thermo Scientific® GC Systems (cont'd)

### Ordering Information


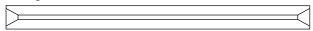





#### GC Liners

| Description   | Application                     | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.   | Unit          |
|---|---------------------------------|-------------|------------------------|--------------|--|---------------|
| <b>For TRACE 8000 and FOCUS Models</b>  |                                 |             |                        |              |  |               |
| Double Taper FocusLiner™<br> | Trace analysis of dirty samples | S/SL        | 5 x 105                | Standard     | <a href="#">AGO-4679</a><br><a href="#">AGO-7863</a> | 5/pk<br>25/pk |
| Straight<br>                 | General use                     | S/SL        | 3 x 105                | Standard     | <a href="#">AGO-4645</a>                             | 5/pk          |
| Single Taper<br>             | Trace analysis                  | S/SL        | 5 x 105                | Standard     | <a href="#">AGO-7852</a>                             | 5/pk          |
| Straight<br>                 | General use                     | S/SL        | 5 x 105                | Standard     | <a href="#">AGO-8669</a>                             | 5/pk          |
| Single Taper FocusLiner<br>  | General use, Dirty samples      | S/SL        | 5 x 105                | Standard     | <a href="#">AGO-8671</a>                             | 5/pk          |
| Single Taper<br>             | Small injection, Trace analysis | S/SL        | 3 x 105                | Standard     | <a href="#">AGO-8672</a>                             | 5/pk          |
| Straight FocusLiner<br>      | General use, Dirty samples      | S/SL        | 5 x 105                | Standard     | <a href="#">AGO-8673</a>                             | 5/pk          |

## Liners for Bruker/Varian® GC Systems

### Ordering Information

#### GC Liners

| Description   | Application                     | Inlet Style | Dimensions ID x L (mm) | Deactivation | Part No.                 | Unit |
|---|---------------------------------|-------------|------------------------|--------------|--------------------------|------|
| <b>For 1093 / 1094 Models</b>   |                                 |             |                        |              |                          |      |
| Straight<br>                 | Large injection, Trace analysis | S/SL        | 4 x 75                 | Standard     | <a href="#">AGO-4673</a> | 5/pk |
| <b>For 1078 / 1079 Models</b>   |                                 |             |                        |              |                          |      |
| Straight<br>                 | Trace analysis                  | S/SL        | 0.5 x 54               | Standard     | <a href="#">AGO-8665</a> | 5/pk |
| Single Taper FocusLiner™<br> | General use or Dirty samples    | S/SL        | 3.4 x 54               | Standard     | <a href="#">AGO-8666</a> | 5/pk |
| Single Taper<br>             | Large injection, Trace analysis | S/SL        | 3.4 x 54               | Standard     | <a href="#">AGO-8667</a> | 5/pk |
| Single Taper<br>             | Small injection, Trace analysis | S/SL        | 2 x 54                 | Standard     | <a href="#">AGO-8668</a> | 5/pk |
| <b>For 1075 / 1077 Models</b>   |                                 |             |                        |              |                          |      |
| Straight<br>                 | For 0.25 and 0.32 mm ID Column  | SPI         | 0.5 x 54               | Standard     | <a href="#">AGO-4675</a> | 5/pk |
| Straight<br>                 | For 0.53 mm ID Column           | SPI         | 0.8 x 54               | Standard     | <a href="#">AGO-4677</a> | 5/pk |



#### Inlet Styles Key

S/SL: Split/Splitless  
PTV: Programmed-Temperature Vaporization  
PSS: Programmed-Temperature Split/Splitless  
SPI: Single Point Injection

## Inlet Consumables Are Available Online!

Need inlet seals, septa, or syringes? Explore hundreds of available parts online at:

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



## Column Unions, Mini-Unions, and Splitters

### Selection Guide

| Use the Union or Mini-Union for:   | Use the Y-Connector (splitter) for:   |
|--|---|
| <ul style="list-style-type: none"> <li>Connecting a guard column to an analytical column</li> <li>Connecting columns of different selectivities</li> <li>Connecting transfer lines to, e.g., mass spec</li> <li>Repairing a broken column</li> </ul> | <ul style="list-style-type: none"> <li>Splitting a sample onto two columns (perform confirmational analysis in a single injection)</li> <li>Splitting the column eluent to two detectors</li> </ul> |

### Mini-Unions

- High-precision unions for connecting capillary GC columns of same or dissimilar sizes
- Inert and precise glass-lined bore
- Low dead volume



#### Graphite/Vespel® Ferrule Mini-Unions

- 15% Graphite / 85% Vespel ferrules, Rated to 350 °C
- Includes 1 mini-union, 2 nuts, and 5 ferrules

#### Ordering Information

##### Graphite/Vespel Ferrule Mini-Unions

| Column 1 ID (mm) | Column 2 ID (mm) | Ferrule ID (mm) | Similar to Mfr. No.* | Part No.                 | Unit |
|------------------|------------------|-----------------|----------------------|--------------------------|------|
| 0.10-0.25        | 0.10-0.53        | 0.4             | 103431               | <a href="#">AG0-5160</a> | ea   |
| 0.28-0.35        | 0.32-0.53        | 0.5             | 103432               | <a href="#">AG0-5161</a> | ea   |
| 0.45-0.53        | 0.45-0.53        | 0.8             | 103433               | <a href="#">AG0-5162</a> | ea   |

##### Replacement Ferrules

| Column ID (mm) | Ferrule ID (mm) | Similar to Mfr. No.* | Part No.                 | Unit  |
|----------------|-----------------|----------------------|--------------------------|-------|
| 0.10-0.25      | 0.4             | 072696               | <a href="#">AG0-7033</a> | 10/pk |
| 0.28-0.35      | 0.5             | 072697               | <a href="#">AG0-7034</a> | 10/pk |
| 0.45-0.53      | 0.8             | 072698               | <a href="#">AG0-7035</a> | 10/pk |

### SilTite™ Mini-Unions

- Supplied with SilTite ferrules – no more leaks and no need to re-tighten after installation
- Recommended for high temperature analysis. Stable above 450 °C.

#### Ordering Information

##### SilTite Mini-Unions

| Column 1 ID (mm) | Column 2 ID (mm) | Ferrule ID (mm) | Similar to Mfr. No.* | Part No.                 | Unit |
|------------------|------------------|-----------------|----------------------|--------------------------|------|
| 0.10-0.25        | 0.10-0.53        | 0.4             | 073550               | <a href="#">AG0-8763</a> | ea   |
| 0.28-0.35        | 0.32-0.53        | 0.5             | 073551               | <a href="#">AG0-8764</a> | ea   |
| 0.45-0.53        | 0.45-0.53        | 0.8             | 073554               | <a href="#">AG0-8825</a> | ea   |

##### Replacement Ferrules

| Column ID (mm) | Ferrule ID (mm) | Similar to Mfr. No.* | Part No.                 | Unit  |
|----------------|-----------------|----------------------|--------------------------|-------|
| 0.10-0.25      | 0.4             | 073470               | <a href="#">AG0-8759</a> | 10/pk |
| 0.28-0.35      | 0.5             | 073471               | <a href="#">AG0-8760</a> | 10/pk |
| 0.45-0.53      | 0.8             | 073473               | <a href="#">AG0-8824</a> | 10/pk |

\* Similar to but not always an exact equivalent to the original manufacturer's product.

### Press-Fit Unions and Splitters

- Connect fused silica capillary tubing of the same or different diameter, from 0.10 to 0.53 mm ID
- Patented laser-formed linear taper
- Provides leak-free seal without tools, glue, or fittings
- Stays sealed even at high temperatures and pressures
- Laser-cut smooth ends prevent column damage during insertion



#### Ordering Information

##### Capillary Unions and Splitters

| Part No.                 | Description  | Unit |
|--------------------------|--|------|
| <a href="#">AG0-4716</a> | Universal Capillary Column Union, Fused Quartz       | 5/pk |
| <a href="#">AG0-4717</a> | Universal Capillary Column Y-connector, Fused Quartz | ea   |

### Polyimide Resins

- Permanently connects unions and splitters to capillary tubing
- Prevents connections from dislodging due to vibration or shock



#### Ordering Information

##### Polyimide Resins

| Part No.                 | Description                                       | Unit |
|--------------------------|---|------|
| <a href="#">AG0-5722</a> | Polyimide Resin, 350 °C, 0.5 mL                   | ea   |
| <a href="#">AG0-8514</a> | High Temperature, 400 °C, Polyimide Resin, 0.5 mL | ea   |



For GC Retention Gaps and Guard Column Kits, see p. 171

## Moisture, Oxygen, and Hydrocarbon Gas Traps/Purifiers






- Extends column lifetimes
- Protects columns from irreversible damage
- Improve analytical reliability (identification and quantitation results)
- Reliable and affordable high-capacity, high-performance purifiers


### Recommended Gas Traps


| Use         | Gas                           | Recommended Trap(s)           |
|-------------|-------------------------------|-------------------------------|
| Carrier Gas | Helium, Hydrogen, or Nitrogen | Moisture, Hydrocarbon, Oxygen |
|             | Air                           | Hydrocarbon                   |
| FID, NPD    | Make-up                       | Hydrocarbon                   |
|             | Hydrogen                      | Hydrocarbon                   |
| ECD         | Make-up                       | Water, Oxygen                 |
| TCD         | Same as carrier               | Moisture, Hydrocarbon, Oxygen |

### Ordering Information

#### Moisture, Oxygen, and Hydrocarbon Gas Traps / Purifiers

| Type              | Media                           | Max Pressure | Purity                      | Capacity  | Indicating  | Fittings | Part No.                 | Unit                     |    |
|-------------------|---------------------------------|--------------|-----------------------------|---|-------------|----------|--------------------------|--------------------------|----|
| Moisture          | Molecular Sieve 13x             | 100 psi      | ≤10 ppb water               |    | 100 cc      | Yes      | 1/8 in.                  | <a href="#">AG0-4766</a> | ea |
|                   |                                 |              |                             | 250 cc  | Yes         | 1/8 in.  | <a href="#">AG0-4768</a> | ea                       |    |
|                   |                                 |              |                             | 250 cc  | Yes         | 1/4 in.  | <a href="#">AG0-4769</a> | ea                       |    |
| Hydrocarbon       | Impregnated carbon filter media | 250 psi      | Call for specific compounds |    | 100 cc      | No       | 1/8 in.                  | <a href="#">AG0-4770</a> | ea |
|                   |                                 |              |                             | 100 cc  | No          | 1/4 in.  | <a href="#">AG0-4771</a> | ea                       |    |
|                   |                                 |              |                             | 200 cc  | No          | 1/8 in.  | <a href="#">AG0-4772</a> | ea                       |    |
| Oxygen            | Proprietary                     | 50 psi       | ≤1 ppb oxygen               |   | 50 cc       | Yes      | 1/8 in.                  | <a href="#">AG0-4774</a> | ea |
|                   |                                 |              |                             | 150 cc  | Yes         | 1/8 in.  | <a href="#">AG0-4776</a> | ea                       |    |
|                   |                                 |              |                             | 150 cc  | Yes         | 1/4 in.  | <a href="#">AG0-4777</a> | ea                       |    |
| Oxygen / Moisture | Proprietary                     | 250 psi      | ≤5 ppb oxygen               |  | 5.5 x 2 in. | No       | 1/8 in.                  | <a href="#">AG0-4792</a> | ea |
|                   |                                 |              |                             | 5.5 x 2 in.   | No          | 1/4 in.  | <a href="#">AG0-4791</a> | ea                       |    |
| Oxygen / Moisture | Proprietary                     | 250 psi      | ≤15 ppb oxygen and water    |  | 150 cc      | No       | 1/8 in.                  | <a href="#">AG0-4778</a> | ea |
|                   |                                 |              |                             | 150 cc  | No          | 1/4 in.  | <a href="#">AG0-4779</a> | ea                       |    |





 To get the greatest lifetime out of gas traps, try placing a large capacity non-indicating trap in-line before an indicating trap. Replace the large capacity trap only when the indicating trap starts to change color. Mark the color transition on the indicating trap with a marker. The color transition moves only when the large capacity trap is saturated. This gives long term savings by eliminating unnecessary maintenance and maintains quality gas.

 For maximum efficiency, flow rates for any trap should not exceed 3 L/min. Trapping efficiency will drop-off rapidly as flow rates increase.

## Tools & Maintenance Kits

### Ordering Information

#### Tools & Maintenance Kits

| Description  | Part No.                 | Unit |
|--|--------------------------|------|
| <b>Ferrule Remover Tool Kit</b> <ul style="list-style-type: none"> <li>• Simple, effective tools effectively remove stuck ferrules</li> <li>• Spiral-cut ratchet grabs ferrules tightly</li> <li>• Includes two tools for removing ferrules from 0.4 to 0.8 mm ID</li> </ul>   | <a href="#">AD0-4725</a> | ea   |
| <b>Ceramic Scoring Wafers</b> <ul style="list-style-type: none"> <li>• High-quality ceramic cutting tool for fused silica columns</li> </ul>   | <a href="#">AG0-4718</a> | 2/pk |
| <b>Flame Detector Jet Cleaning Kit</b> <ul style="list-style-type: none"> <li>• For routine maintenance of FIDs</li> <li>• Use either while flame jet has been taken apart or still installed</li> <li>• Includes: 3 jet reamers (0.008, 0.08, 0.02 in.); 1 stainless steel and 1 brass brush; 1 dual-ended pin vise</li> </ul>  | <a href="#">AD0-4723</a> | ea   |
| <b>Injection Port Cleaning Kit</b> <ul style="list-style-type: none"> <li>• For fast, effective cleaning of GC injection ports</li> <li>• Includes: 1 septa scraper pick; 3 stainless steel brushes (5 mm for Shimadzu instruments, 1/4 in., 3/8 in.)</li> </ul>   | <a href="#">AD0-4724</a> | ea   |

# GC Accessories

## Test the Performance of GC Columns

- Convenient way to check column performance
- Essential tool for GC troubleshooting
- Affordable and easy to use
- Suitable for Phenomenex Zebron® and equivalent brands
- Sealed in 2 mL glass ampules—prevent evaporation and increase shelf life
- All test mixes supplied with Certificate of Analysis



App ID: 15840

**Zebtron ZB-1<sup>PLUS</sup>**

**Part No.:** [AGO-7805](#)

500 µg/mL each in acetone:

|                         |                      |
|-------------------------|----------------------|
| 1. Decane               | 5. Tridecane         |
| 2. 2-Ethylhexanoic Acid | 6. 1-Undecanol       |
| 3. 4-Chlorophenol       | 7. Dicyclohexylamine |
| 4. Naphthalene          | 8. Pentadecane       |

App ID: 5160, App ID: 10714

**Zebtron ZB-1, ZB-5, ZB-1HT, and ZB-5HT**

**Part No.:** [AGO-5155](#)

250 µg/mL each in hexane:

|                   |                      |
|-------------------|----------------------|
| 1. Undecane       | 4. 1-Undecanol       |
| 2. 4-Chlorophenol | 5. Dicyclohexylamine |
| 3. Tridecane      | 6. Pentadecane       |

App ID: 14836

**Guardian™ Integrated Guard / ZB-5**

**Part No.:** [AGO-7549](#)

250 µg/mL each in acetone:

|                         |                        |
|-------------------------|------------------------|
| 1. Decane               | 6. 1-Methylnaphthalene |
| 2. 2-Ethylhexanoic Acid | 7. 1-Undecanol         |
| 3. 1,6-Hexanediol       | 8. Tetradecane         |
| 4. 4-Chlorophenol       | 9. Dicyclohexylamine   |
| 5. Tridecane            |                        |

App ID: 16438

**Zebtron ZB-5<sup>PLUS</sup>**

**Part No.:** [AGO-8362](#)

250 µg/mL each in acetone:

|                     |                      |
|---------------------|----------------------|
| 1. Decane           | 6. 1,8-Octanediol    |
| 2. Methyl Caprylate | 7. Dihexylamine      |
| 3. 1,6-Hexanediol   | 8. 1-Undecanol       |
| 4. 4-Chlorophenol   | 9. Dicyclohexylamine |
| 5. Tridecane        | 10. Pentadecane      |

App ID: 14973

**Zebtron ZB-5ms, ZB-SemiVolatiles, ZB-XLB, and ZB-XLB-HT**

**Part No.:** [AGO-7578](#)

250 µg/mL each in acetone:

|                         |                        |
|-------------------------|------------------------|
| 1. Decane               | 6. 1-Methylnaphthalene |
| 2. 2-Ethylhexanoic Acid | 7. 1-Undecanol         |
| 3. 1,6-Hexanediol       | 8. Tetradecane         |
| 4. 4-Chlorophenol       | 9. Dicyclohexylamine   |
| 5. Tridecane            | 10. Pentadecane        |

App ID: 5162, App ID: 5161

**Zebtron ZB-35, ZB-35HT, ZB-1701, and ZB-1701P**

**Part No.:** [AGO-5156](#)

250 µg/mL each in hexane:

|                        |                        |
|------------------------|------------------------|
| 1. Undecane            | 5. 1-Undecanol         |
| 2. 2,4-Dimethylphenol  | 6. 1-Methylnaphthalene |
| 3. 2,6-Dimethylaniline | 7. Hexadecane          |
| 4. Tetradecane         |                        |

App ID: 5163

**Zebtron ZB-50**

**Part No.:** [AGO-5157](#)

250 µg/mL each in hexane:

|                        |                        |
|------------------------|------------------------|
| 1. Undecane            | 5. 1-Undecanol         |
| 2. Tridecane           | 6. 1-Methylnaphthalene |
| 3. 2,4-Dimethylphenol  | 7. Hexadecane          |
| 4. 2,6-Dimethylaniline |                        |

App ID: 5165

**Zebtron ZB-624**

**Part No.:** [AGO-5159](#)

1000 µg/mL each in methanol:

|                        |                  |
|------------------------|------------------|
| 1. 1,2-Dichloropropane | 4. Chlorobenzene |
| 2. Octane              | 5. Nonane        |
| 3. Tetrachloroethylene |                  |

App ID: 16214

**Zebtron ZB-WAX<sup>PLUS</sup>**

**Part No.:** [AGO-7869](#)

250 µg/mL each in hexane:

|                |                       |                         |
|----------------|-----------------------|-------------------------|
| 1. 2-Octanone  | 6. Methyl decanoate   | 11. Methyl dodecanoate  |
| 2. Tetradecane | 7. Heptadecane        | 12. 2,6-Dimethylaniline |
| 3. Pentadecane | 8. Methyl undecanoate | 13. Nonadecane          |
| 4. 1-Octanol   | 9. 1-Decanol          | 14. 2,6-Dimethylphenol  |
| 5. Hexadecane  | 10. Octadecane        |                         |

App ID: 14326, App ID: 5164

**Zebtron ZB-WAX and ZB-FFAP**

**Part No.:** [AGO-5158](#)

250 µg/mL each in hexane:

|                       |                        |
|-----------------------|------------------------|
| 1. 2-Octanone         | 6. 1-Decanol           |
| 2. Tetradecane        | 7. Methyl dodecanoate  |
| 3. 1-Octanol          | 8. 2,6-Dimethylaniline |
| 4. Methyl decanoate   | 9. 2,6-Dimethylphenol  |
| 5. Methyl undecanoate |                        |

App ID: 18461

**Zebtron ZB-Drug-1**

**Part No.:** [AGO-8431](#)

250 µg/mL each in acetone:

|                   |                        |
|-------------------|------------------------|
| 1. Dodecane       | 5. 1-Undecanol         |
| 2. Tridecane      | 6. 1-Methylnaphthalene |
| 3. 4-Chlorophenol | 7. Dicyclohexylamine   |
| 4. Tetradecane    | 8. Hexadecane          |

App ID: 19305

**Zebtron ZB-1XT SimDist**

**Part No.:** [AGO-8645](#)

1000 µg/mL each in hexane:

|              |                      |
|--------------|----------------------|
| 1. Undecane  | 4. 1-Undecanol       |
| 2. Dodecane  | 5. Dicyclohexylamine |
| 3. Tridecane | 6. Pentadecane       |

App ID: 5158

**Grob Test Mixture**

**Part No.:** [AGO-5154](#)

400 µg/mL each in methylene chloride:

|                   |                         |                        |
|-------------------|-------------------------|------------------------|
| 1. 2,3-Butanediol | 5. 1-Nonanal            | 9. Methyl decanoate    |
| 2. Decane         | 6. 2-Ethylhexanoic acid | 10. Methyl undecanoate |
| 3. Undecane       | 7. 2,6-Dimethylphenol   | 11. Dicyclohexylamine  |
| 4. 1-Octanol      | 8. 2,6-Dimethylaniline  | 12. Methyl dodecanoate |



Test mix components are shown in order of elution

# Switching To Zebtron® Is Easy!

Use the **NEW** GC Column Finder web app for easy column selection in under 1 minute!



## Find It The Way You Want

Simply choose by part number, manufacturer, application, or official method to find the right GC column for your method.



## Column Selection, Simplified

Choose a category, choose your criteria, get a recommendation instantly. Simple as that.



## Get More Than Just Results

Get applications and column overviews with your results – and save them for easy viewing.

Get it all at  
[www.phenomenex.com/FindGC](http://www.phenomenex.com/FindGC)