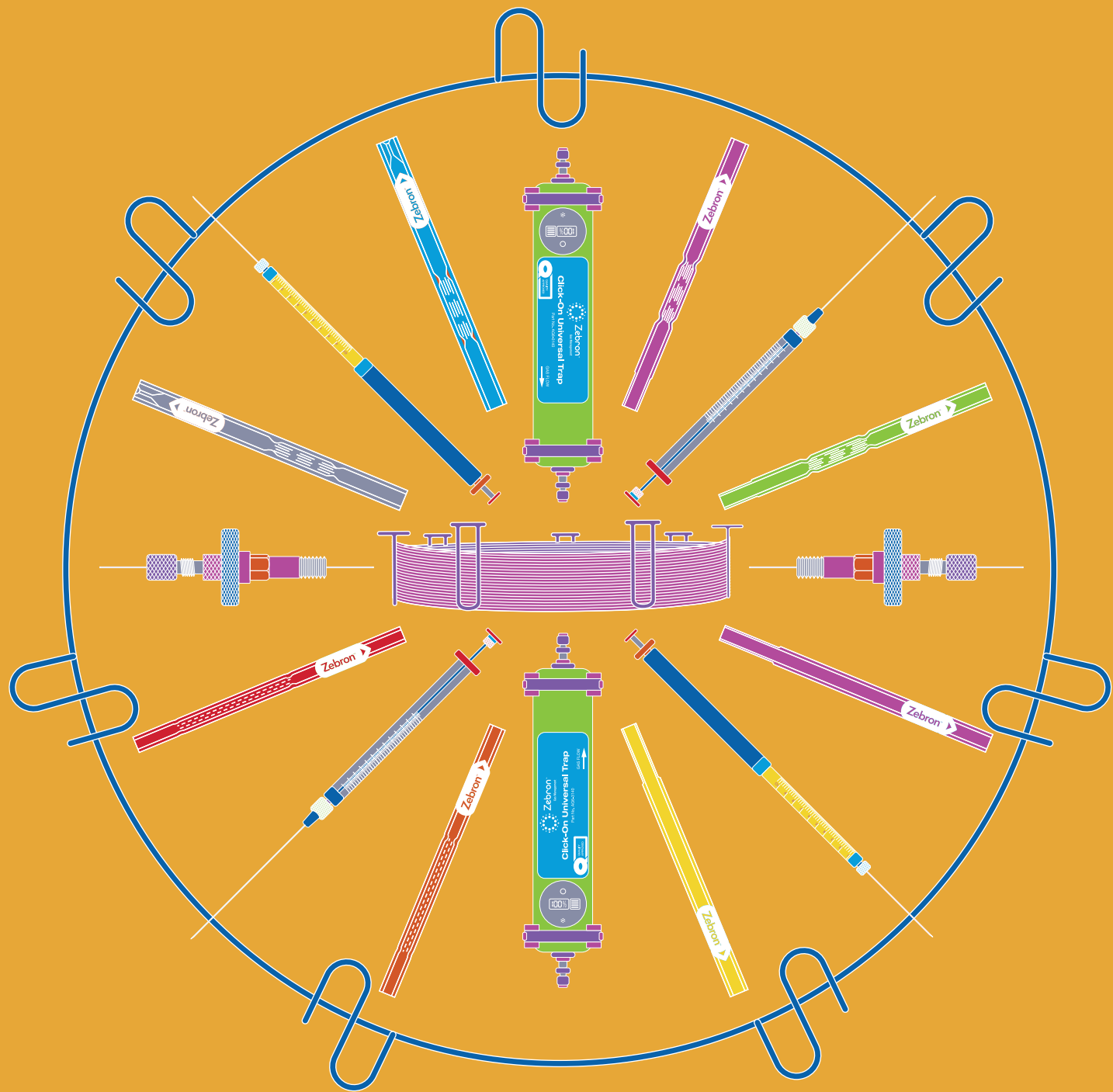


GC Product Guide
2025/26



Welcome



Our Mission

Keeping scientists at the heart of our every day through unforgettable support and standout technology to build a brighter future together.

Our Promise

Our mission drives us to build sincere and meaningful relationships by working alongside scientists and connecting labs with exceptional technology, unrivaled service, and world-class technical support.

The Phenomenex team is empowered by a culture built on trust, integrity, and kindness — one that places scientists at the heart of our every day. We are inspired by the impact our customers make on the world and we will always go above and beyond to help them in our shared pursuit to create a brighter future for humanity. That is our promise.

Dr. Kaveh Kahen
President

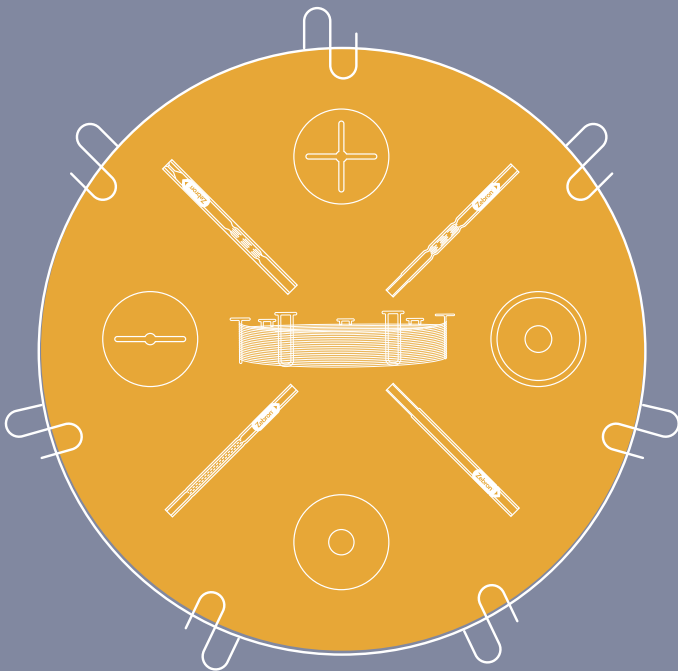


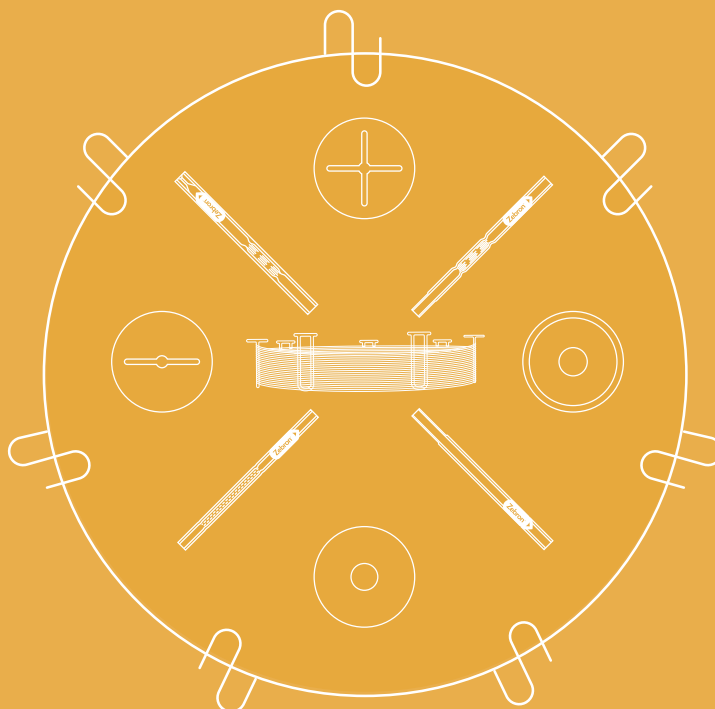
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GC Column Selection Guide



POLARITY	COMPOSITION	APPLICATIONS	RECOMMENDED USE	
5	ZB-1 Non-polar phase suited for boiling point separations	100 % Dimethylpolysiloxane	Ethanol, Hydrocarbons, Mercaptans, MTBE, Natural Gas Odorants, Oxygenates and GROs, Solvent Impurities, Light Sulfur Compounds	• Excellent resolving power of critical pairs in complex petrochemical samples • Used for “fingerprinting” and routine quality control analyses (e.g., citrus oils)
5	ZB-DHA-PONA Separation of paraffins, iso-paraffins, olefins, naphthenes, aromatics and polar compounds up to 430 °C for non-polar compounds	100 % Dimethylpolysiloxane	DHA, PONA, PIONA, PIANO, and ASTM Methods (D5134, D5441, D5501, D6729, D6730, D6733)	• Temperature stability and flexibility • Extensive Engineered Self Cross-linking (ESC) provides lowest bleed, excellent separation of Paraffins, Iso-paraffins, Olefins, Naphthenes, Aromatics and polar compounds
5	ZB-1PLUS™ Low bleed phase for non-polar compounds	100 % Dimethylpolysiloxane	Acids, Amines, Diesel Fuel, Drugs, Flavors and Fragrances, PCBs (EPA Method 1668), Pesticides, Essential Oils	• Especially suited to high sensitivity GC-MS • Improved signal-to-noise ratio for better sensitivity and mass spectral integrity • Extremely inert for active compounds
5	ZB-1HT Inferno™ High temperature stability up to 430 °C for non-polar compounds	100 % Dimethylpolysiloxane	Diesel Fuel, High Boiling Petroleum Products, High Molecular Weight Waxes, Long-chained Hydrocarbons, Motor Oils, Polymers/Plastics, Simulated Distillation	• Rugged, high temperature stable (430 °C) • Robust performance for high temperature bakeouts • True boiling point separation for hydrocarbon distillation methods • Recommended for high boilers, contaminants, or carryovers
5	ZB-1XT SimDist Glass Infusion™ metal column technology for efficient, reproducible separations	100 % Dimethylpolysiloxane	ASTM Methods (D2887, D2887X, D3710, D6352, D7169), Crude Oil, Gasoline Fractions, Petroleum Distillates, Petroleum Fractions, Simulated Distillation, Vacuum Distillates	• Uniform Glass Infusion coating for sharp peaks and high efficiency • Individually tested for improved reproducibility • 45 – 70 % higher efficiency than other manufacturers • Improved resolution of C50/C52 hour after hour
8	ZB-5 Low polarity phase for general purpose use	5 % Phenyl 95 % Dimethylpolysiloxan	Alkaloids, Dioxins, Drugs, Essential Oils/Flavors, FAMES, Halo-hydrocarbons, PCBs/ Aroclors, Pesticides/Herbicides, Phenols, Residual Solvents	• Versatile column recommended for a wide range of applications • Great column for unknown samples • Resilient to dirty samples – long column life
8	ZB-5ms General purpose 5 % phenyl-arylene phase with enhanced selectivity for aromatics	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Acids, Alkaloids, Amines, Dioxins, Drugs, EPA Methods, Essential Oils/Flavors, FAMES, Halo-hydrocarbons, PCBs/ Aroclors, Pesticides/Herbicides, Phenols, Residual Solvents, Semi-volatiles, Solvent Impurities	• Most popular starting column for method developers • Arylene Matrix Technology™ (AMT) provides a highly stable arylene phase for enhanced resolution of PAHs and multi-ring aromatic compounds • Suited to high sensitivity work using GC/MS
8	ZB-5PLUS™ Low bleed 5% phenyl selectivity	5 % Phenyl 95 % Dimethylpolysiloxane	Barbiturates, Benzodiazepines, Drugs of Abuse, EPA Methods, FAMES, Nitrosamines, Pesticides, Phenols, THC Metabolites	• Highly inert for improved peak shape of acidic/basic compounds, drugs of abuse, and pesticides • Maximum sensitivity and improved column-to-column performance
8	ZB-5MSPLUS™ Versatile, low bleed, inert 5 % Phenyl-Arylene phase for multi-use applications	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Acids, Alkaloids, Amines, Drugs, Ethanolamines, Essential Oils/Flavors, Halo-hydrocarbons, Pesticides/Herbicides, Phenols, Residual Solvents, Solvent Impurities	• Specialized deactivation for versatile selectivity with improved sensitivity • Low bleed and well-suited to high sensitivity GC-MS and GC-MS/MS work
8	ZB-5HT Inferno	5 % Phenyl 95 %Dimethylpolysiloxane	Diesel Fuels, High Boiling Petroleum Products, High Molecular Weight Waxes, Long-chained Hydrocarbons, Motor Oils, Polymers/Plastics, Simulated Distillation, Surfactants, Triglycerides	• Rugged, high temperature stable (430 °C) • Robust performance for high temperature bakeouts • True boiling point separation for hydrocarbon distillation methods • Recommended for high boilers, contaminants, or carryovers
8	ZB-SemiVolatiles 5 % phenyl-arylene phase specifically for improved inertness of acids and amines with Enviro-Inert™ Technology	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Semi-volatiles (SVOCs), PAHs, PBDEs, EPA Methods (525, 610, 625, 8100, 8270D)	• Popular choice for semi-volatiles, PAHs, and PBDEs • Inert, rugged performance for 5% phenyl-arylene selectivity with Enviro-Inert Technology • Supreme inertness for acids, amines, and other notoriously active compounds • Detect down to ultra-low levels (0.2 ng on-column) and improve critical pair resolution
9	ZB-XLB Low polarity si-arylene phase with extra low bleed for sensitive analyses	Proprietary	Herbicides/Insecticides, PCBs, Pesticides, Unknown Samples	• Low polarity si-arylene column for MS detectors • Alternative selectivity to standard 5-type phases • Used for confirmation of pesticide, PCB, or other environmental samples • Suited for unknown sample screening and identification
9	ZB-XLB-HT Inferno High temperature stability up to 400 °C with extra Low Bleed	Proprietary	Herbicides/Insecticides, PCBs, Pesticides, Unknown Samples	• Non-metal si-arylene low bleed phase stable to 400 °C • Provides alternate selectivity to 5% phenyl phases • Often used for confirmation of pesticides, PCB, or other environmental samples • Robust column performance for high temperature bakeouts
11	ZB-MultiResidue™ -1 Novel phase designed for pesticides, herbicides, and insecticides	Proprietary	Aroclors/PCBs, Haloacetic Acids, Insecticides, Multi-Pesticide Screening, Nitrogen Containing Pesticides, Organochlorine Pesticides, Organophosphorous Pesticides	• Specifically designed for optimized pesticide screening and confirmation by GC/ECD • Resolve common isomers with optimized selectivity • Decreased breakdown of sensitive pesticides such as DDT • Exceed EPA Method 8081 specifications when used with ZB-MultiResidue-2 • Our most popular phase for pesticide testing by GC/MS
13	ZB-624 Optimized for volatile organic compounds (VOCs) and organic volatile impurities (OVIs)	6 % Cyanopropylphenyl 94 % Dimethylpolysiloxane	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)	• Increased temperature limit speeds run times and re-equilibration • Popular for residual solvent testing (USP Monograph <467>) • Widely used to separate volatile organic flavor and fragrance additives and residual solvents in industrial or pharmaceutical products (OVIs)
13	ZB-624PLUS™ Next generation of inertness. Increased sensitivity for high boiling sovents	Proprietary	Cannabis, Terpenes, Residual Solvents, Volatile Amines, EPA Method 8260, EPA Method 524, EPA Method 624, Food, Flavors and Fragrances, Solvent Purity, Alcohols	• Enhanced peak shape with superior deactivation • Increased sensitivity for high boiling solvent • Extremely low bleed for GC-MS • High temperature stability (300/320 °C)
15	ZB-MultiResidue-2 Novel phase designed for pesticides, herbicides, and insecticides	Proprietary	Aroclors/PCBs, Haloacetic Acids, Insecticides, Multi-Pesticide Screening, Nitrogen Containing Pesticides, Organochlorine Pesticides, Organophosphorous Pesticides	• Specifically designed for optimized pesticide screening and confirmation by GC/ECD,GC/NPD, and GC/MS • Resolve common isomers with optimized selectivity • Decreased breakdown of sensitive pesticides such as DDT • Exceed EPA Method 8081 specifications when used with ZB-MultiResidue-

* Polarity scale is based on the McReynolds value, which provides a systematic approach to ranking GC stationary phases by polarity.



GC Column Selection Guide (cont'd)



POLARITY	COMPOSITION*		APPLICATIONS	RECOMMENDED USE
18	ZB-35 Intermediate polarity for high molecular weight samples and method development screening	35 % Phenyl 65 % Dimethylpolysiloxane	Amines, Aroclors, Drugs, EPA Methods (508, 608, 8081, 8141, 8151), Pesticides, Pharmaceuticals	- Intermediate polarity for high molecular weight analysis - Minimized analyte adsorption, improved reproducibility - More rugged (longer column life) than other polar phases - Excellent for trace analysis with bleed-sensitive detectors (MS, FID, ECD, NPD)
	ZB-35HT Inferno Intermediate polarity with high temperature stability up to 400 °C	35 % Phenyl 65 % Dimethylpolysiloxane	Amines, Aroclors, Chemicals, Drugs, EPA Methods (508, 608, 8081, 8141, 8151), Pesticides, Pharmaceuticals, Steroids	- Rugged, high temperature stable (400 °C) - Robust performance for high temperature bakeouts - True boiling point separation for hydrocarbon distillation methods - Recommended for high boilers, contaminants, or carry-overs
19	ZB-1701 Alternate selectivity to phenyl phases, with similar polarity	14 % Cyanopropylphenyl 86 % Dimethylpolysiloxane	Alcohols, Amines, Aromatic Hydrocarbons, Drugs, Esters, PAHs, PCBs, Pharmaceutical Intermediates, Phenols, Solvents, Steroids, TMS Sugars, Tranquilizers	- Fast run and re-equilibration times for enhanced sample throughput and productivity - Provides alternate selectivity to phenyl phases with similar polarity
	ZB-1701P Specifically designed for improved DDT and Endrin response	14 % Cyanopropylphenyl 86 % Dimethylpolysiloxane	Aroclors, Nitrogen Containing Pesticides, Organochlorine Pesticides, Organophosphorous Pesticides	- Specially tested to ensure response of DDT, Endrin, Endrin Aldehyde, and Endrin Ketone - Guaranteed column for pesticide analysis - EPA Method 8081 Certified
24	ZB-50 High polarity phase with stability for high temperature bakeouts	50 % Phenyl 50 % Dimethylpolysiloxane	Antidepressants, Aroclors, Cholesterol, Drugs of Abuse, EPA Methods (508, 608, 8081, 8141, 8151), Glycols, Pesticides/Herbicides, Steroids, Triglycerides	- High polarity column capable of high temperature bakeout to remove contaminants - Inert to minimize analyte adsorption, improve efficiency, and reproducibility - More rugged (longer column life) than other polar phases - Great for toxicology and environmental compounds
	ZB-WAX^{PLUS}™ 100 % aqueous stability with high retention of alcohols and chlorinated solvents	100 % Polyethylene Glycol (PEG)	Alcohols, Aldehydes, Aromatics, Essential Oils, Flavors & Fragrances, Free Fatty Acids, Glycols, OVIs, Pharmaceuticals, Solvents / Residual Solvents, Styrene, Xylene Isomers	- Exceptional stability to repeated injections - Extremely inert for acidic compounds - Enhanced selectivity for low boiling solvents; high retention of alcohols and chlorinated solvents - Increased efficiency at 20 °C
57	ZB-WAX Bonded, solvent rinseable phase excellent for complex polar samples	100 % Polyethylene Glycol (PEG)	Alcohols, Aldehydes, Aromatics, Basic Compounds, Essential Oils, Flavors & Fragrances, Glycols, Pharmaceuticals, Solvents, Styrene, Xylene Isomers	- Low activity for amines - Excellent separations of polar complex mixtures; widely used for profiling and "fingerprinting"
58	ZB-FFAP Excellent peak shape for underivatized acids, organic acids, free fatty acids, and alcohols	100 % Nitroterephthalic Modified Polyethylene Glycol	Acrylates, Alcohols, Aldehydes, Free Fatty Acids, Ketones, Organic Acids, Phenols, Volatile Free Acids	- Popular choice for food industry method development - High polarity with excellent thermal and chemical stability - Improve peak shape for underivatized acids, organic acids, free fatty acids, and alcohols - Bonded, solvent rinseable nitroterephthalic acid phase
PROPRIETARY	ZB-BAC-1 & 2 More accurate results for blood alcohols and post-mortem samples	Proprietary	Abused Inhalant Anesthetics, Blood Alcohol Analysis	- Enhance resolution of ethanol and acetone peaks - Resolve t-butanol and n-propanol for greater selection of internal standards 2 min run time with baseline resolution of key components - Dual-column confirmation with two elution order changes
	ZB-Bioethanol Fast and accurate bioethanol separations	Proprietary	Alcohols, Ethanol Testing, Fusel Alcohols	- Meet ASTM D5501 requirements – resolve methanol and ethanol from all other denaturant peaks - Great resolution of fusel alcohols - Allows for quick bakeout between runs to eliminate contaminants
	ZB-CLPesticides-1 & 2 Optimized chlorinated pesticide phases for dual-column methods on one column set	Proprietary	Dual-column chlorinated pesticide EPA Methods (8081 and 8081 extended, 8082, 8151, 504, 505, 508, 552)	- 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 on without changing columns – save time
	ZB-Drug-1 Optimized for drugs of abuse separations with resolution of target analytes and interferences	Proprietary	Drug Screening (6-MAM, Amphetamines, Barbiturates, Benzodiazepines, Opiates, PCP, THC)	- Specially deactivated to improve inertness, peak shape, and quantitation for drug compounds - Improve resolution of analytes from matrix interferences - Run amphetamines in under 6 minutes and opiates in under 5 minutes
	ZB-FAME Analysis of Fatty Acid Methyl Esters (FAMES)	Proprietary	Fatty acid methyl esters (FAMES), cis/trans FAME isomers, Omega 3 and Omega 6 FAMES	- Faster FAME GC Analysis. Reduced run times up to 75 % - Separate cis/trans FAME isomers with Rs ≥ 1.0 - High-cyanopropyl selectivity acceptable for use with AOCS, AOAC, and IOC methods
	ZB-PAH-EU Rapid analysis of PAHs	Proprietary	Analysis of 15+1 EU-regulated and EPA regulated PAHs in environmental, food testing, and consumer products	- Up to 70 % Faster PAH Analysis - Elevated Temperature Stability (340/360 °C) - Great Resolution of Critical Isomers, e.g. Benzo[b,j,k]fluoranthene
	ZB-PAH-CT Rapid analysis of PAHs (Enhanced Resolution for Chrysene and Triphenylene)	Proprietary	Analysis of 15+1 EU-regulated and EPA regulated PAHs, Chrysene, and Triphenylene separation in environmental, food testing, and consumer products	- Up to 70 % Faster PAH Analysis - Elevated Temperature Stability (320/340 °C) - Great Resolution of Critical Isomers, e.g. Benzo[b,j,k]fluoranthene, Chrysene and Triphenylene
	ZB-Dioxin Simplified Dioxin analysis	Proprietary	Dioxin in food and environment, Persistent Organic Pollutants (POPs) in food	- Improved lab productivity by 50% - Enhanced resolution of TCDD & TCDF - Improved column lifetime with integrated column option

* Polarity scale is based on the McReynolds value, which provides a systematic approach to ranking GC stationary phases by polarity.

➔ More tools for GC column selection starting on page 94.

➔ GC Accessories Ordering Information, see page 67.



ZB-PAH-EU

- Up to 70 % faster PAH analysis
- Elevated temperature stability (340/360 °C)
- Great resolution of critical isomers, e.g. Benzo[b,j,k]fluoranthene

Upgrade to Zebron from traditional phases used for PAHs:

Agilent®

- DB®-EUPAH

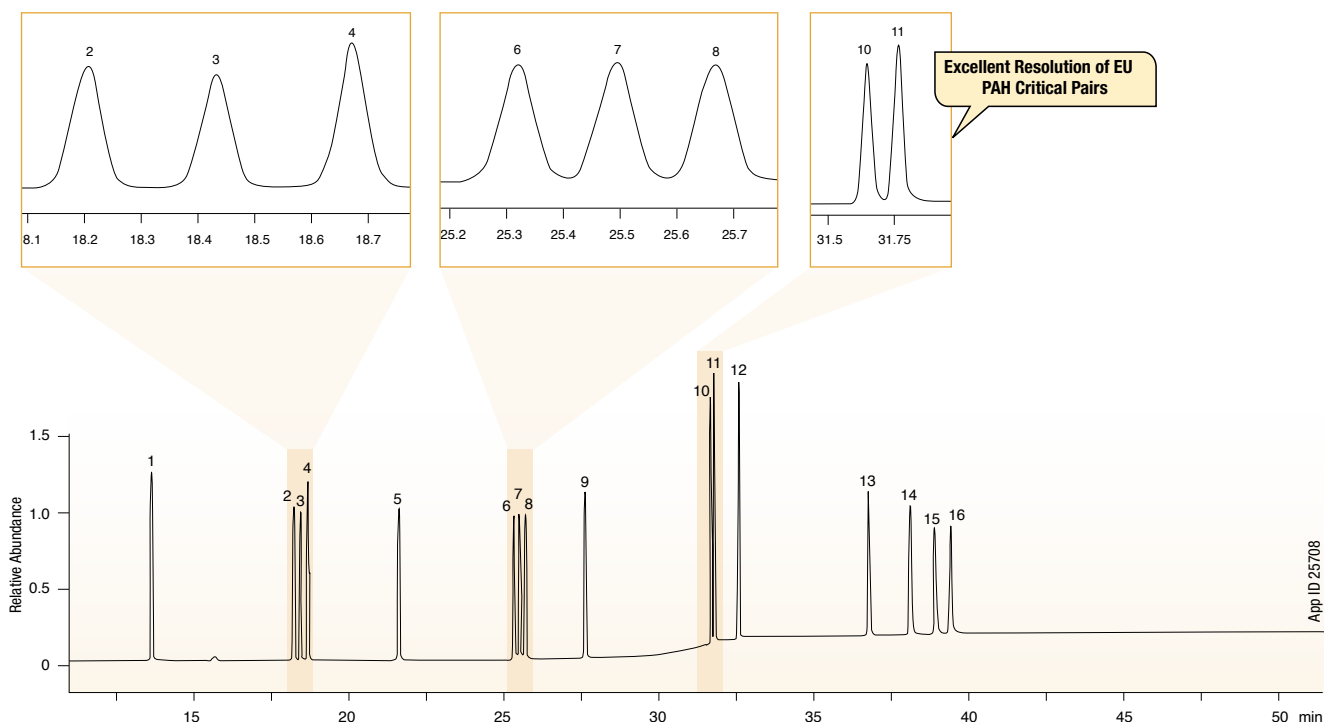
Restek®

- Rxi®-PAH

Priority PAH Analysis by GC

The ZB-PAH-EU and ZB-PAH-CT GC columns offer unparalleled performance through the power of targeted selectivity when analyzing Polycyclic Aromatic Hydrocarbons (PAHs).

Analysis of EU 15+1 PAHs



GC-MS conditions:

Column: Zebron ZB-PAH-EU
Dimensions: 30 meter x 0.25 mm x 0.20 µm
Part No.: ZHG-G043-10
Injection: Split 5:1 @ 330 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™
Liner Part No.: AG2-4B13-05 (for Shimadzu® 2010 GC)
Carrier Gas: Helium @ 24 psi (constant pressure)
Oven Program: 45 °C for 0.8 min to 200 °C @ 45 °C/min to 226 °C @ 3 °C/min for 0 min to 320 °C @ 10 °C/min for 20 min
Detector: MSD, 50-500 m/z
Transfer Line Temperature: 300 °C
Source Temperature: 300 °C

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,i]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 |

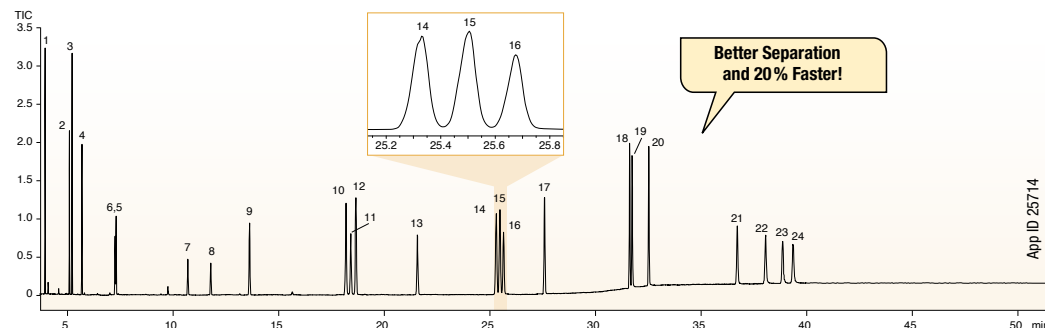
ZB-PAH-EU (cont'd)

Better Combination of Resolution and Speed

Zebron outperforms popular GC columns for the separation of EU 15+1 and EPA 610 PAHs.

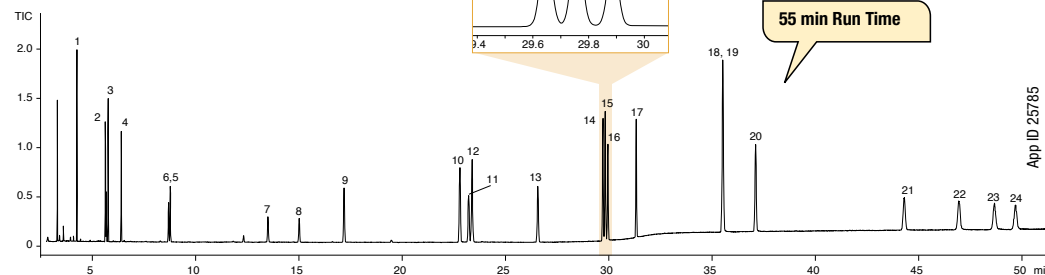
Zebron ZB-PAH-EU

30 meter x 0.25 mm x 0.20 µm



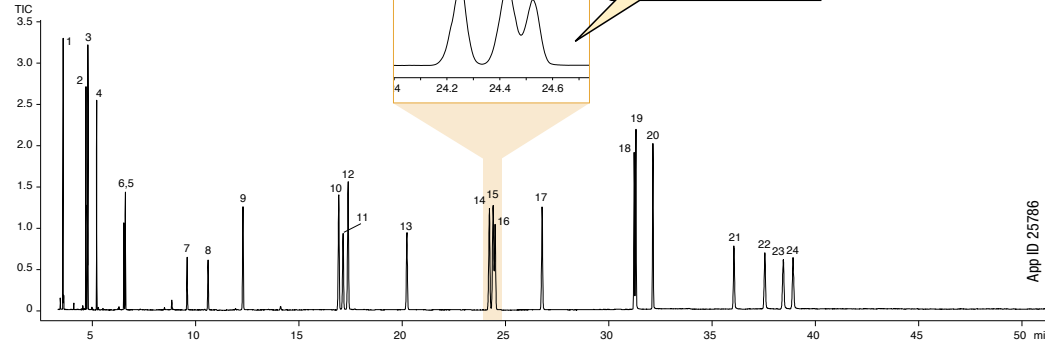
Popular Brand A

30 meter x 0.25 mm x 0.25 µm



Popular Brand B

30 meter x 0.25 mm x 0.10 µm



GC-MS conditions for both applications:

Column: As Indicated
 Part No.: [ZH-G043-10](#) (for ZB-PAH-EU)
 Dimension: As indicated
 Injection: Split 5:1 @ 330 °C, 1 µL
 Recommended Liner: Zebron PLUS Single Taper Z-Liner™
 Liner Part No.: [AG2-4B13-05](#) (for Shimadzu® 2010 GC)
 Carrier Gas: Helium @ 24 psi (constant pressure)
 Oven Program: 45 °C for 0.8 min to 200 °C @ 45 °C/min to 226 °C @ 3 °C/min for 0 min to 320 °C @ 10 °C/min for 20 min
 Detector: MSD, 50-500 m/z
 Transfer Line Temperature: 300 °C
 Source Temperature: 300 °C

Sample:

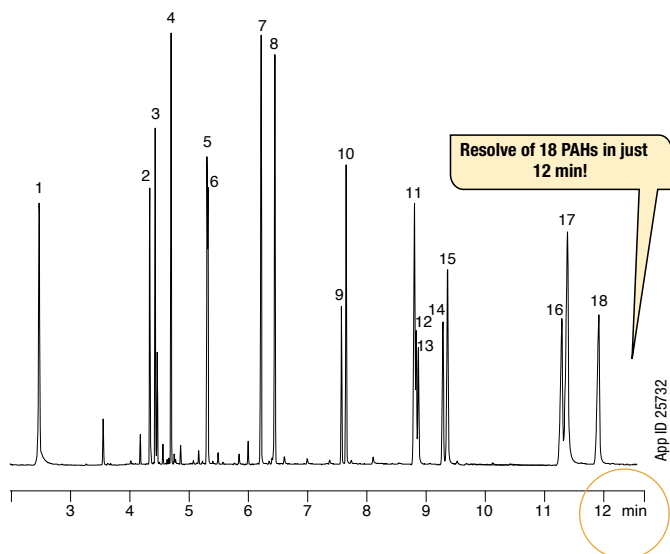
- | | | |
|-------------------|---------------------------|----------------------------|
| 1. Naphthalene | 9. Benzo[c]fluorene | 17. Benzo[a]pyrene |
| 2. Acenaphthylene | 10. Benz[a]anthracene | 18. Indeno[1,2,3-cd]pyrene |
| 3. Acenaphthene | 11. Cyclopenta[c,d]pyrene | 19. Dibenzo[a,h]anthracene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

Comparative separations may not be representative of all applications.

ZB-PAH-EU (cont'd)

GC-MS Analysis of PAHs in Rubber and Plastic

The ZB-PAH-EU GC column separates the 18 PAH isomers within 12 minutes, resolving all critical pairs while demonstrating consistent column inertness.



The high temperature limits of the ZB-PAH-EU (340/360 °C) is extremely helpful for easy bakeout of dirty matrices and allows for eluting heavy PAHs!

Column: Zebtron ZB-PAH-EU
Dimensions: 10 meter x 0.10 mm x 0.08 µm
Part No.: [7CB-G043-59](#)
Injection: Split 5:1 @ 320 °C, 1 µL
Recommended Liner: Zebtron PLUS Single Taper Z-Liner™
Liner Part No.: [AG2-4B13-05](#) (for Shimadzu® 2010 GC System)
Carrier Gas: Helium @ 0.68 mL/min (constant flow)
Oven Program: 100 °C for 3.0 min to 200 °C @ 60 °C/min to 270 °C @ 22 °C/min to 300 °C @ 4.5 °C/min to 330 °C @ 80 °C/min for 0.5 min
Detector: MSD, 50-500 m/z
Transfer Line Temperature: 300 °C
Source Temperature: 330 °C

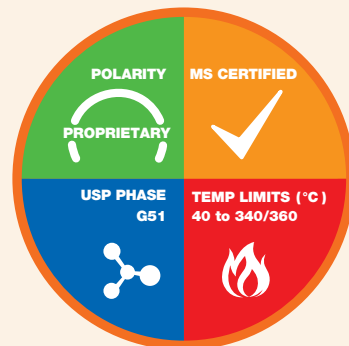
Sample:

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

Ordering Information

Zebtron ZB-PAH-EU GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.08	40 to 340/360	7CB-G043-59
20-Meter			
0.18	0.14	40 to 340/360	7FD-G043-47
30-Meter			
0.25	0.20	40 to 340/360	7HG-G043-10
60-Meter			
0.25	0.20	40 to 340/360	7KG-G043-10

Column Profile



Phase Chemistry

- Proprietary

Recommended Applications

- Analysis of 15+1 EU-regulated and EPA regulated PAHs in food testing, rubber, plastic, coal
- Sources include cigarette smoke, vehicle exhausts, asphalt roads, coal, coal tar, wildfires, agricultural burning, residential wood burning, municipal, industrial waste incineration

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

ZB-PAH-CT

- Enhanced resolution for chrysene and triphenylene (PAH Interferences)
- Increased Benzo[b,k] fluoranthene separation
- Optimal performance and resolution of regulated PAH isomers
- Great resolution of critical isomers, e.g. Benzo[b,j,k]fluoranthene

i Use the column finder to replace or upgrade an existing column:
www.phenomenex.com/FindGC

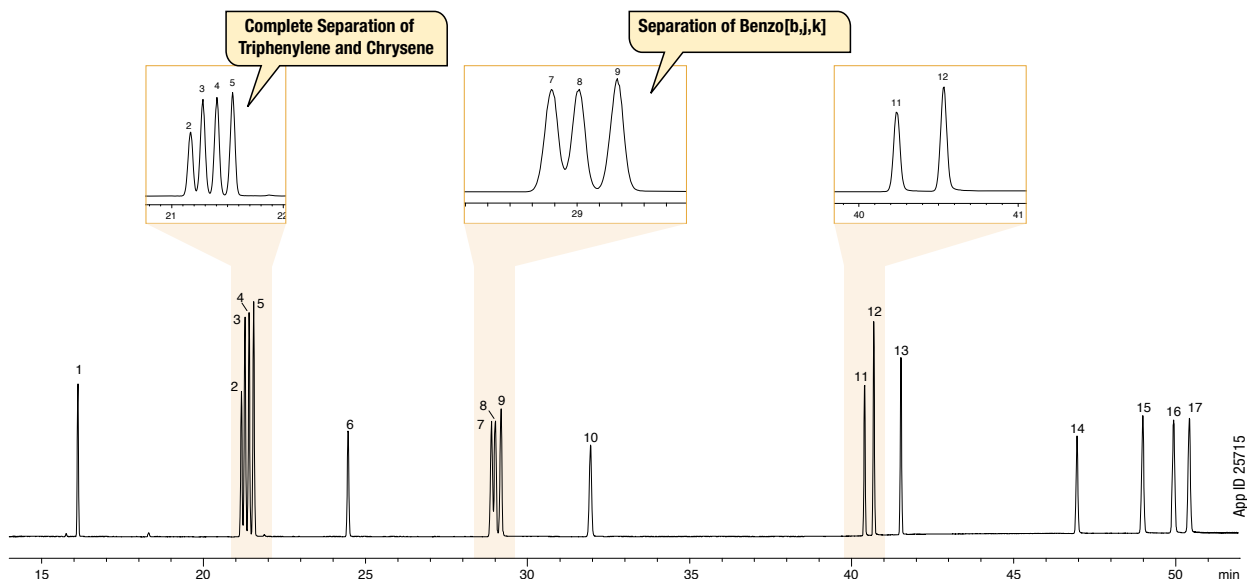
Priority PAH Analysis by GC

ZB-PAH-CT GC columns are manufactured to provide the most optimal performance for EU-regulated polycyclic aromatic hydrocarbons (PAHs) and EPA regulated PAHs.

Excellent Resolution of Chrysene and Triphenylene

We designed the ZB-PAH-CT GC column to achieve complete resolution of Chrysene from Triphenylene along with other EU 15+1 PAH compounds. Its unique selectivity helps eliminate false positives while resolving PAH isomers, providing easy, fast, and accurate quantification of PAHs in environmental and food samples.

EU 15+1 PAH Analysis Using Zebtron ZB-PAH-CT



Column: Zebtron ZB-PAH-CT
Dimensions: 40 meter x 0.18 mm x 0.14 µm

Part No.: [ZPD-G044-47](#)

Injection: Split 30:1 @ 320 °C, 1 µL

Recommended Liner: Zebtron PLUS Single Taper Z-Liner™

Liner Part No.: [AG2-4B13-05](#) (for Shimadzu® 2010 GC)

Carrier Gas: Helium @ 78 psi (constant pressure)

Oven Program: 45 °C for 0.8 min to 200 °C @ 45 °C/min to 265 °C @ 3 °C/min for 5 min to 270 °C @ 1 °C/min to 320 °C @ 10 °C/min for 15 min

Detector: MSD (Shimadzu GC-MS-QP2010 Ultra)

Mode: SIM

SIM Ions: 216, 226, 228, 242, 252, 276, 278, 302 m/z

Transfer Line Temperature: 300 °C

Source Temperature: 300 °C

- Sample:**
- | | |
|--------------------------|-----------------------------|
| 1. Benzo[c]fluorene | 10. Benzo[a]pyrene |
| 2. Cyclopenta[c,d]pyrene | 11. Indeno[1,2,3-c,d]pyrene |
| 3. Benz[a]anthracene | 12. Dibenzo[a,h]anthracene |
| 4. Triphenylene | 13. Benzo[g,h,i]perylene |
| 5. Chrysene | 14. Dibenzo[a,l]pyrene |
| 6. 5-Methylchrysene | 15. Dibenzo[a,e]pyrene |
| 7. Benzo[b]fluoranthene | 16. Dibenzo[a,i]pyrene |
| 8. Benzo[j]fluoranthene | 17. Dibenzo[a,h]pyrene |
| 9. Benzo[k]fluoranthene | |

ZB-PAH-CT (cont'd)

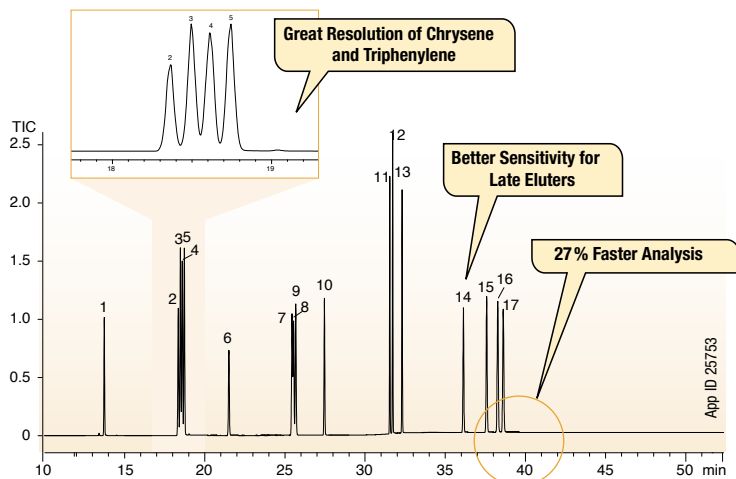
Comparison of ZB-PAH-CT vs. Popular GC PAH column

The result: Shorter run time and better sensitivity

Analysis of EU 15+1 and Triphenylene PAHs

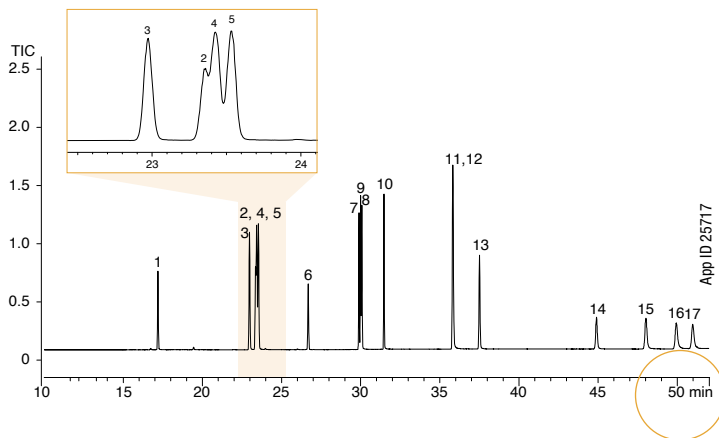
Zebron ZB-PAH-CT

30 meter x 0.25 mm x 0.20 μ m



Popular Brand A

30 meter x 0.25 mm x 0.15 μ m



GC-MS conditions for both applications:

Column: As Indicated

Dimensions: As Indicated

Part No.: [7HG-G044-10](#) (Zebron ZB-PAH-CT)

Injection: Split 15:1 @ 320 °C, 1 μ L

Recommended Liner: Zebron PLUS Single Taper Z-Liner™

Liner Part No.: [AG2-4B13-05](#)

Carrier Gas: Helium @ 23.7 psi (constant pressure)

Oven Program: 45 °C for 0.8 min to 200 °C @ 45 °C/min to 266 °C @ 3 °C/min for 0 min to 320 °C @ 10 °C/min to 320 °C for 20 min

Detector: MSD (Shimadzu® GC-MS-QP2010 Ultra)

Mode: SIM

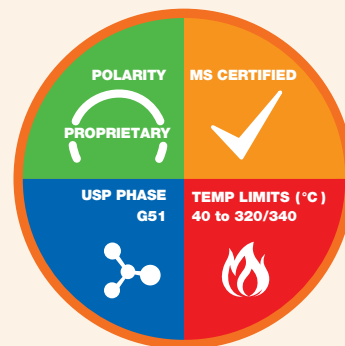
SIM Ions: 216, 226, 228, 242, 252, 276, 278, 302 m/z

Transfer Line Temperature: 300 °C

Source Temperature: 300 °C

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

Column Profile



Phase Chemistry

- Proprietary

Recommended Applications

- Analysis of 15+1 EU-regulated and EPA regulated PAHs in food testing, rubber, plastic, coal
- Sources include cigarette smoke, vehicle exhausts, asphalt roads, coal, coal tar, wildfires, agricultural burning, residential wood burning, municipal, industrial waste incineration.

- i** 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.

Ordering Information

Zebron ZB-PAH-CT GC Columns

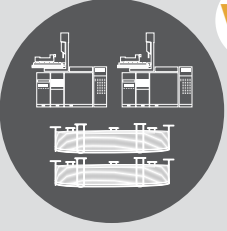
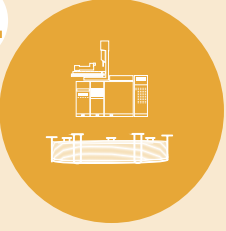
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	40 to 320/340	7CB-G044-02
20-Meter			
0.18	0.14	40 to 320/340	7FD-G044-47
30-Meter			
0.25	0.20	40 to 320/340	7HG-G044-10
40-Meter			
0.18	0.14	40 to 320/340	7PD-G044-47

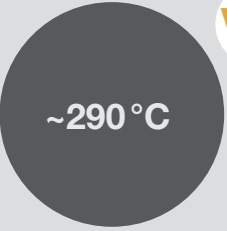
Comparative separations may not be representative of all applications.

ZB-Dioxin

Increase Throughput and Improve Resolution of Dioxins and PCBs

The ZB-Dioxin GC column has a unique phase that allows for improved resolution of critical dioxin and PCB congeners. Its consistent film thickness allows for optimal dioxin analysis on a single column.

Number of Columns	
Traditional  PCB and Dioxin required 2 different GC columns	ZB-Dioxin Upgrade VS.  ZB-Dioxin GC column is a single column solution for Dioxin and PCB

Temperature Limits	
Traditional  Some GC Dioxin columns do not exceed 290 °C temperature limits	ZB-Dioxin Upgrade VS.  Low bleed GC column temp with 320/340 °C temperature limits, provides higher sensitivity for later eluters and the ability to bake out major contaminants

Total Run Time	
Traditional  - Long run time for Dioxin analysis - First column (5 % phenyl phase) ~60 minutes - Second column (225 phase) ~30 minutes	ZB-Dioxin Upgrade VS.  Faster run time of ~40 minutes using one ZB-Dioxin GC column

Fast Dioxin and PCB Analysis

The current analysis of tetra-octa dioxin and furan is time consuming and requires two GC columns and two GC-HRMS instruments. Zebtron ZB-Dioxin columns are specifically tailored for the analysis of aromatic compounds like dioxins, furans and PCBs in food and environmental matrices. By switching to ZB-Dioxin, you will gain enhanced resolution of 2,3,7,8-TCDD and 2,3,7,8-TCDF from its isomers in one run, with one column. In addition, ZB-Dioxin serves as your single column solution for Dioxin and PCB analysis. Upgrade your existing GC column to a Zebtron ZB-Dioxin and get all the analytical benefits and productivity gains of a single column solution.

Learn more at:

www.phenomenex.com/GCDioxin

Our Customer Says YES!

“The ZB-Dioxin [GC column] achieves superior resolution for both 2,3,7,8-TCDD and 2,3,7,8-TCDF while not only maintaining chromatography for the hexes but actually improving it. This is all performed while reducing the overall runtime over traditional 5ms dioxin columns by as much as 25%. The ZB-Dioxin increases throughput by not only eliminating the need for a second column confirmation, but also by allowing additional samples to be analyzed in each 12-hour analytical sequence.”

Andrew Patterson, Technical Director
Eurofins Specialty Services, USA

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

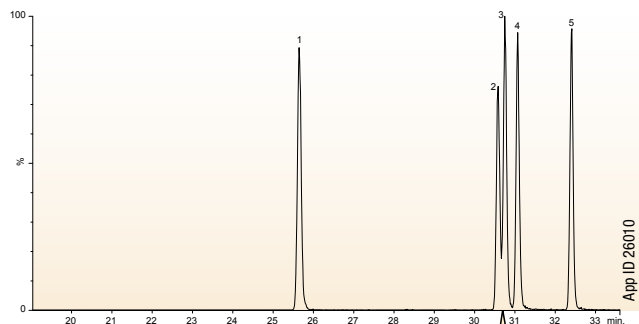
ZB-Dioxin (cont'd)

Column Performance Comparison

TCDD on a ZB-Dioxin GC Column and a Popular Brand A

Zebron ZB-Dioxin GC Column

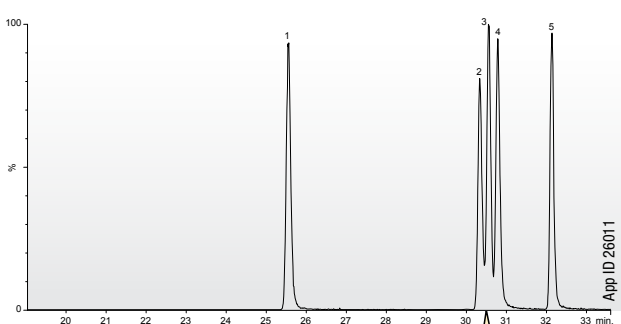
Part No. [7KG-G045-10](#)
60 meter x 0.25 mm x 0.20 μ m



High Resolution of 2,3,7,8-TCDD by using ZB-Dioxin which exceeds 25% valley EPA-1613 method requirement and provided extended lifetime

Brand A Premium 5MS Phase

60 meter x 0.25 mm x 0.25 μ m



2,3,7,8-TCDD is not completely resolved which affects the column lifetime

Sample:	ZB-Dioxin	Brand A
1. 1,3,6,8-TCDD	25.65	23.20
2. 1,2,3,7-TCDD	30.58	30.33
3. 1,2,3,8-TCDD	30.75	30.55
4. 2,3,7,8-TCDD	31.07	30.78
5. 1,2,8,9-TCDD	32.41	32.13

Conditions for all separations:

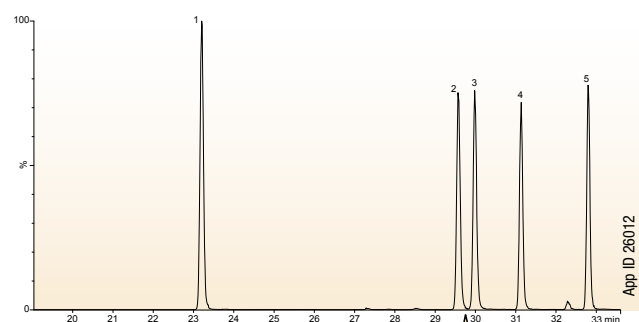
Column 1: Zebron ZB-Dioxin
Column 1 Dimension: 60 meter x 0.25 mm x 0.20 μ m
Column Part No.: [7KG-G045-10](#)
Column 2: Brand A Premium 5MS
Column 2 Dimension: 60 meter x 0.25 mm x 0.25 μ m
Guard Column: 5 meter Z-Guard™ Kit
Guard Kit Part No.: [7AG-G000-00-GZK](#)
Injection: Pulse Splitless (2.0 min, 60 psi) @ 280 °C, 1 μ L
Liner: Zebron PLUS 4 mm ID Single Taper Liner
Liner Part No.: [AG2-0A10-05](#)

Carrier Gas: Helium @ 1.25 mL/min (constant flow)
Oven Program: 160 °C for 2.4 min to 200 °C @ 25 °C/min to 220 °C @ 5 °C/min for 19 min to 288 °C @ 4 °C/min to 300 °C @ 5 °C/min for 7.6 min
Detector: HRMS
Transfer Line Temperature: 300 °C

TCDF on a ZB-Dioxin GC Column and a Popular Brand A

Zebron ZB-Dioxin GC Column

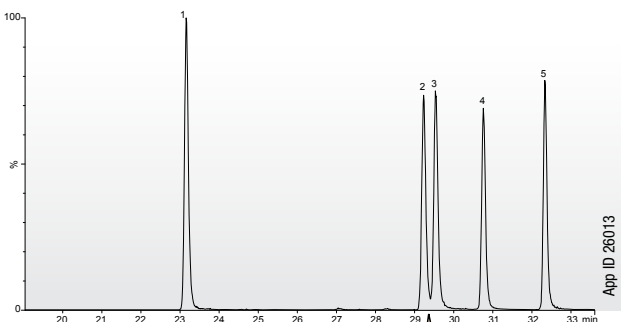
Part No. [7KG-G045-10](#)
60 meter x 0.25 mm x 0.20 μ m



Complete resolution of 2,3,7,8-TCDF on a single column ZB-Dioxin—NO NEED FOR ADDITIONAL CONFIRMATION COLUMN

Brand A Premium 5MS Phase

60 meter x 0.25 mm x 0.25 μ m



2,3,7,8-TCDF are not completely resolved and need an additional GC column to confirm isomers separation

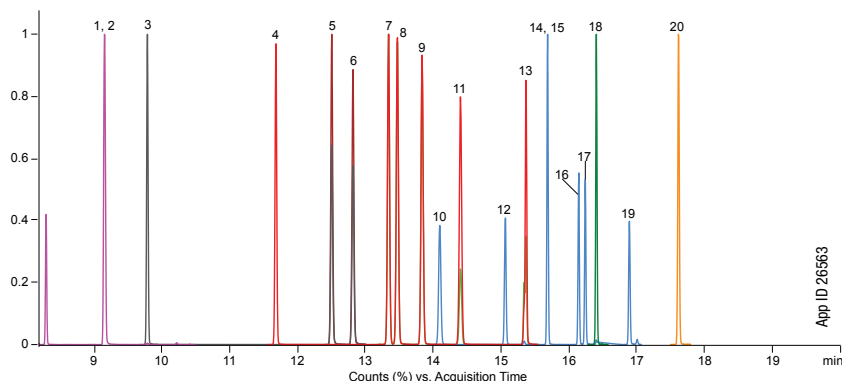
Sample:	ZB-Dioxin	Brand A
1. 1,3,6,8-TCDF	23.20	23.16
2. 1,3,4,7-TCDF	29.57	29.23
3. 2,3,7,8-TCDF	29.98	29.53
4. 1,2,3,9-TCDF	31.14	30.76
5. 1,2,8,9-TCDF	32.79	32.33

Comparative separations may not be representative of all applications.



ZB-Dioxin (cont'd)

Fast GC-MS/MS Analysis of PCBs on a Single 40-meter Zebron ZB-Dioxin GC Column



GC-MS/MS Conditions:

Column: Zebron ZB-Dioxin

Dimension: 40 meter x 0.18 mm x 0.14 μ m

Part No.: [7PD-G045-47](#)

Injection: Splitless for 1.5 min @ 290 °C, 1 μ L

Recommended Liner: Zebron PLUS Z-Liner™
(Compatible with Agilent® & Thermo® GC instrument)

Part No.: [AG2-0A13-05](#)

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

Oven Program: 45 °C for 0 min to 175 °C @ 50 °C/min, to 220 °C @ 15 °C/min, to 250 °C @ 5 °C/min for 3 min, to 300 °C @ 50 °C/min for 10 min

Detector: GC-MS/MS

Transfer Line Temperature: 300 °C

Mode: Scan (100-450 m/z)

Source Temperature: 300 °C

Quad Temperature: 150 °C

Solvent Delay: 8.0 min

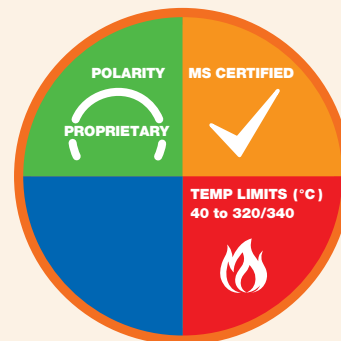
Analyte:

1. PCB-28
2. PCB-31
3. PCB-52
4. PCB-101
5. PCB-81
6. PCB-77
7. PCB-123
8. PCB-118
9. PCB-114
10. PCB-153
11. PCB-105
12. PCB-138
13. PCB-126
14. PCB-167
15. PCB-128
16. PCB-156
17. PCB-157
18. PCB-180
19. PCB-169
20. PCB-189

Ordering Information

Zebron ZB-Dioxin GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
40-Meter			
0.18	0.14	40 to 320/340	7PD-G045-47
60-Meter			
0.25	0.20	40 to 320/340	7KG-G045-10
60-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.20	40 to 320/340	7KG-G045-10-GGA

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

- Dioxin and PCB in food and environmental samples
- POPs in food 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.

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:

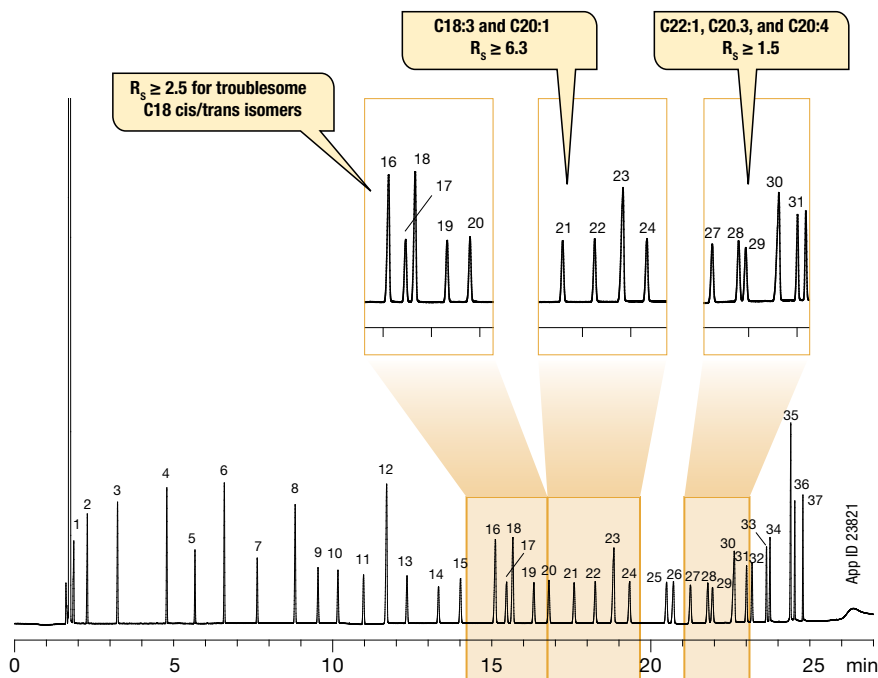
Agilent®

- CP-Sil 88
- HP-88
- DB®-23

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.: [7HG-G033-10](#)

Injection: Split 50:1 @ 240 °C, 1 µL

Recommended Liner: Zebron PLUS Single Taper with Wool, 4 mm ID

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

Easy Liner Selection

**Remarkably
Inert!**



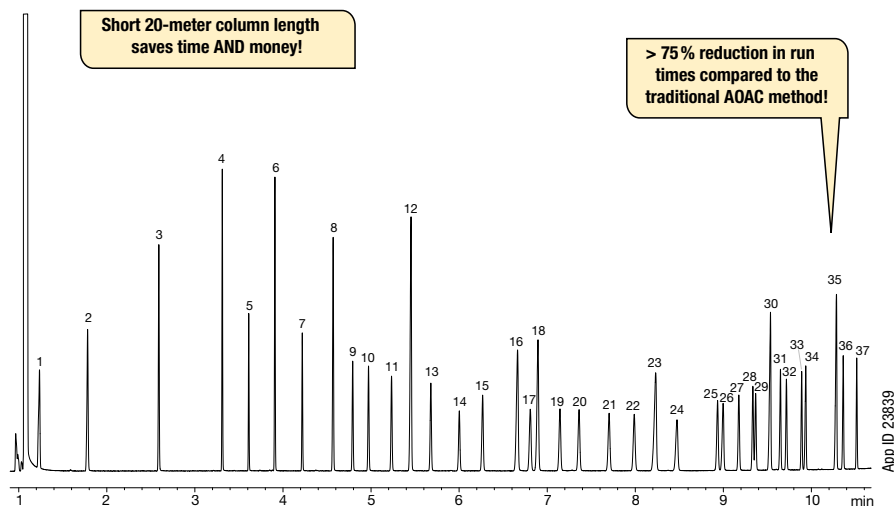
Our GC liner finder tool makes liner selection a breeze. You can even search by application, injection type, GC system, or your current liner part number.

www.phenomenex.com/FindLiner

The Fast FAME GC Column (cont'd)

Traditionally, cis/trans FAME separations require the use of long columns (100 meters or more) and can run up to 60 minutes, resulting in a bottleneck to higher productivity. ZB-FAME GC column 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: Zebtron 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: Zebtron 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

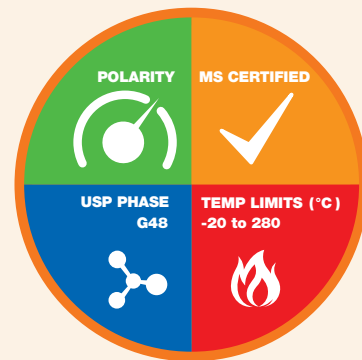


Ordering Information

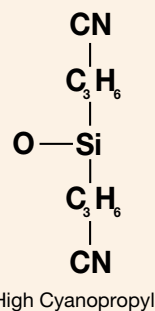
Zebtron ZB-FAME GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
20-Meter			
0.18	0.15	-20 to 280	7FD-G033-05
30-Meter			
0.25	0.20	-20 to 280	7HG-G033-10
30-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.20	-20 to 280	7HG-G033-10-GGA
60-Meter			
0.25	0.20	-20 to 280	7KG-G033-10
100-Meter			
0.25	0.20	-20 to 280	7MG-G033-10

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Phase Chemistry



Recommended Applications

- Fatty Acid Methyl Ester (FAMES)
- cis/trans FAME isomers
- Omega 3, Omega 6 FAMES

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®

- DB®-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®

- Rxi®-5Sil MS
- Rxi-5ms

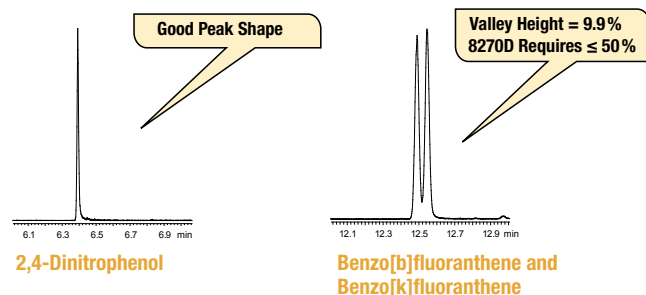
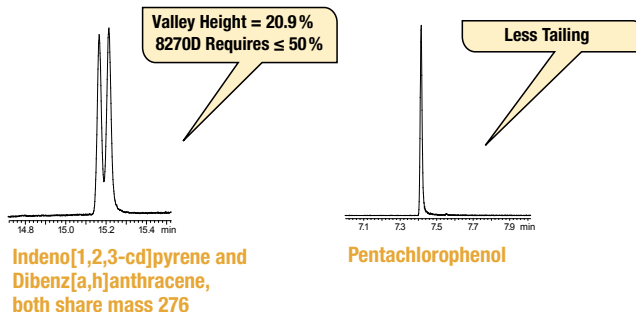
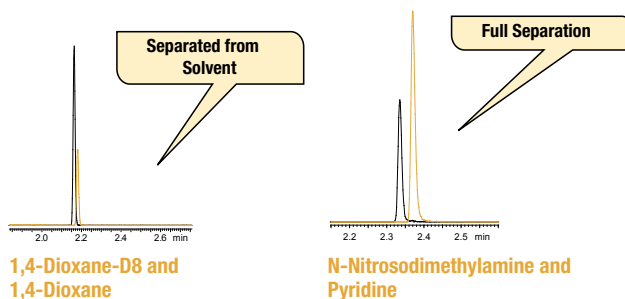
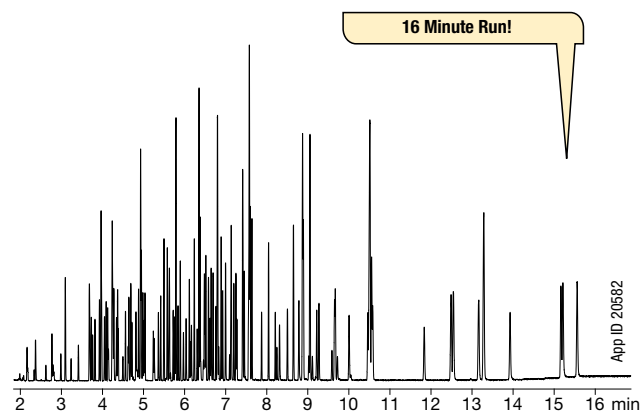
Supelco®

- SLB®-5ms

135 Compounds in Under 16 Minutes

ZB-SemiVolatiles GC column 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
Liner: AGO-8499 (Single Taper with Wool)
Septum: AGO-4697 (PhenoRed™-400)
Inlet Seal: AGO-8620 (Easy Seals™ Inlet Base Seal)
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 40 °C for 0.5 min to 260 °C @ 40 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min
Detector: MSD @ 340 °C; 45 – 450 amu
Sample: Analytes are 25 ppm in Dichloromethane
135 compounds in EPA Method 8270D

ZB-SemiVolatiles (cont'd)

QC Tested to Meet the Method's Requirements

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.

Meet Requirements Out-of-the-Box

Test Probe	Criteria	EPA Requirement	Our Requirement
Pyridine 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
Pentachlorophenol Disappears and tails on active columns; it is important to measure relative response and peak skew criteria.	Peak Skew Peak Response	≤ 2.0 Not Specified	≤ 2.0 ≥ 0.3
Benzidine Active amine that tails when column activity is present, complicating peak quantification.	Peak Skew	≤ 2.0	≤ 2.0
DDT Breaks down in an active system to DDE and DDD. With our QC test, you are assured that your column will meet the EPA requirements upon installation.	Breakdown	< 20%	< 20%
Injection 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

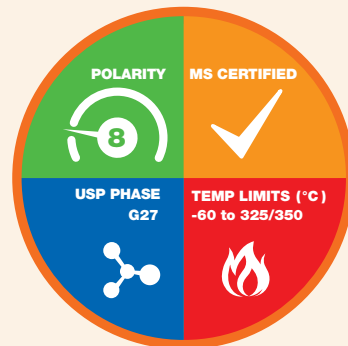
Extraordinary Reproducibility. Higher Productivity

“
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

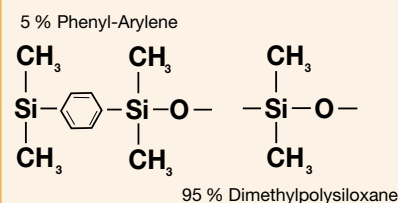
i The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



Recommended Applications

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

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

Ordering Information

Zebtron ZB-SemiVolatiles GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.25	-60 to 325/350	7EG-G027-11
20-Meter			
0.18	0.18	-60 to 325/350	7FD-G027-08
0.18	0.36	-60 to 325/350	7FD-G027-53
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G027-11
0.25	0.50	-60 to 325/350	7HG-G027-17
0.32	0.25	-60 to 325/350	7HM-G027-11
30-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGA
0.25	0.50	-60 to 325/350	7HG-G027-17-GGA
30-Meter with 10-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGC
0.25	0.50	-60 to 325/350	7HG-G027-17-GGC
60-Meter			
0.25	0.25	-60 to 325/350	7KG-G027-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

ZB-CLPesticides-1 and -2

7 EPA Methods, One Column Set that Saves Time!

- **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

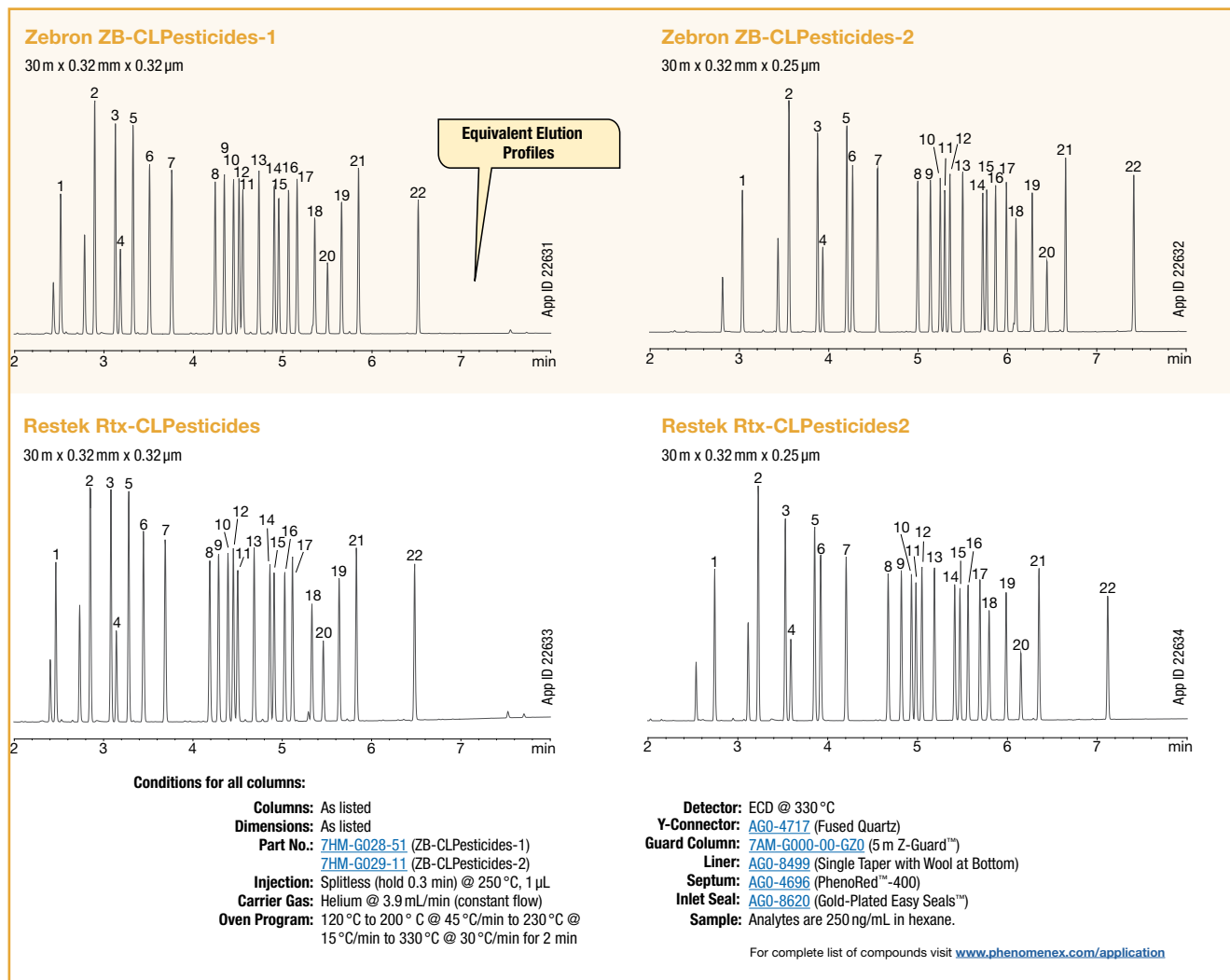
*not exact equivalent, selectivity may differ

Direct Replacement for Restek Rtx-CLPesticides Phases

Achieve optimized performance for pesticides by GC-ECD detector, without time-consuming method development with the Zebron. We've delivered a direct replacement**! ZB-CLPesticides-1 and -2 GC columns.

Guaranteed drop-in performance compared to your current Rtx-CLPesticides column set, without the hassle.

EPA 8081



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

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	δ -BHC	6.9	6.9	< 20
5	d-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

ZB-CLPesticides GC Column Kits

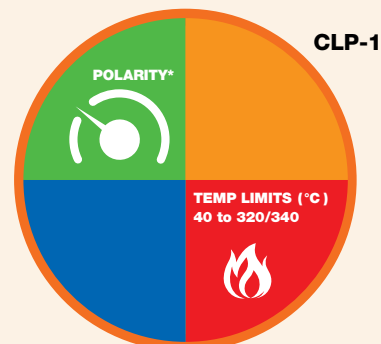
Ordering Information

0.32 mm ID Kit (includes 1 of each below)			Part No.: KG0-9286
Description	Dimension	Part No.	
ZB-CLPesticides-1	30 meter x 0.32 mm x 0.32 μ m	7HM-G028-51	
ZB-CLPesticides-2	30 meter x 0.32 mm x 0.25 μ m	7HM-G029-11	
Z-Guard Column	5 meter x 0.32 mm	7AM-G000-00-GZ0	
Y-Connector	Fused Quartz	AG0-4717	
Polyimide Resin	0.5 mL, rated to 350 °C	AG0-5722	

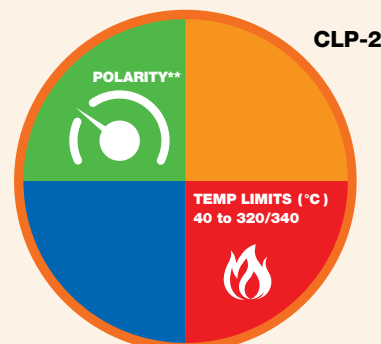
0.53 mm ID Kit (includes 1 of each below)			Part No.: KG0-9290
Description	Dimension	Part No.	
ZB-CLPesticides-1	30 meter x 0.53 mm x 0.50 μ m	7HK-G028-17	
ZB-CLPesticides-2	30 meter x 0.53 mm x 0.42 μ m	7HK-G029-16	
Z-Guard Column	5 meter x 0.53 mm	7AK-G000-00-GZ0	
Y-Connector	Fused Quartz	AG0-4717	
Polyimide Resin	0.5 mL, rated to 350 °C	AG0-5722	

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

Column Profile



*Similar polarity to ZB-35.



**Similar polarity to ZB-MultiResidue-2

Phase Chemistry

- Proprietary

Recommended Applications

- Dual-column chlorinated pesticide methods
- EPA Methods (8081 and 8081 extended, 8082, 8151, 504, 505, 508, 552)

ZB-CLPesticides GC Columns

Ordering Information

ZB-CLPesticides-1 GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.25	40 to 320/340	7HG-G028-11
0.32	0.32	40 to 320/340	7HM-G028-51
0.32	0.50	40 to 320/340	7HM-G028-17
0.53	0.50	40 to 320/340	7HK-G028-17

ZB-CLPesticides-2 GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.20	40 to 320/340	7HG-G029-10
0.32	0.25	40 to 320/340	7HM-G029-11
0.32	0.50	40 to 320/340	7HM-G029-17
0.53	0.42	40 to 320/340	7HK-G029-16

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 ≤ 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 Zebbron from these similar* phases:

Agilent®

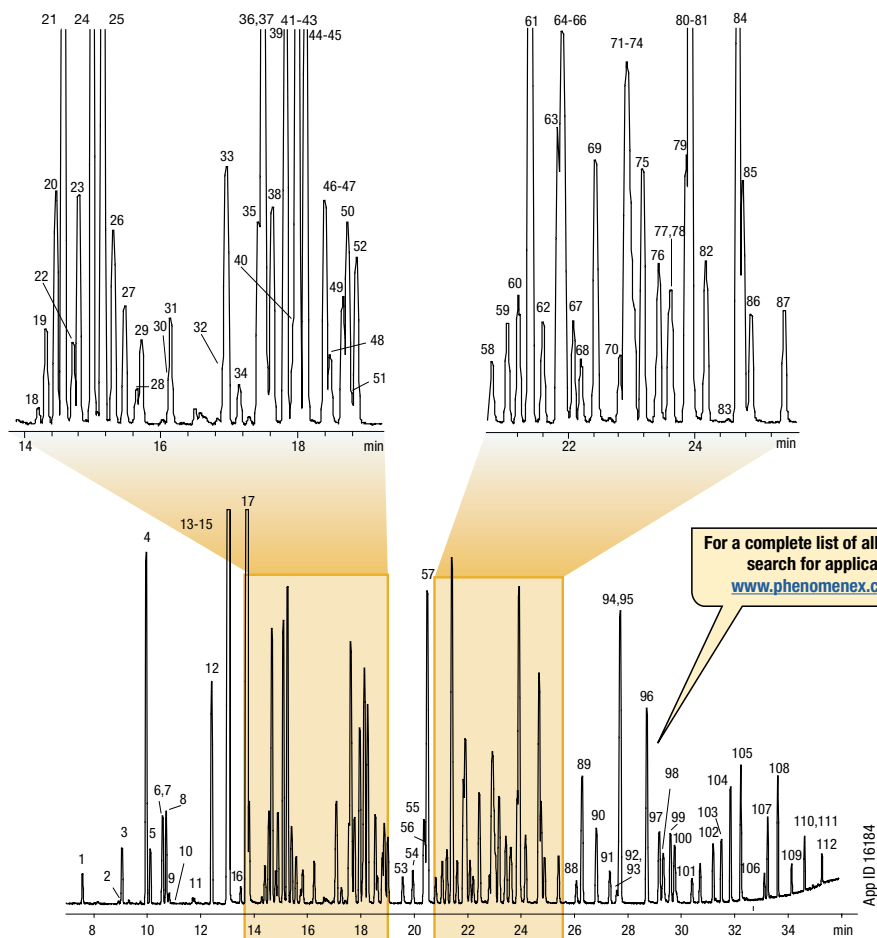
- DB®-CLP1
- DB-CLP2

Restek®

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

*not exact equivalent, selectivity may differ

Improved Multi-Residue Pesticide Screening by GC-MS

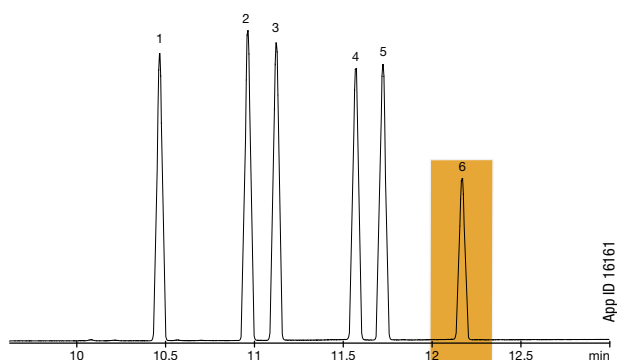


Column: Zebbron MultiResidue-1
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G016-11
Injection: Splitless @ 260 °C, 1 µL
Carrier Gas: Helium @ 0.9 mL/min (constant flow)
Oven Program: 80 °C for 0.5 min to 150 °C @ 10 °C/min to 240 °C @ 4 °C/min to 320 °C @ 15 °C/min for 3 min
Detector: MSD @ 320 °C; 45-400 amu
Sample: Analytes were 1 ppm in Dichloromethane

ZB-MultiResidue™ -1 and -2 (cont'd)

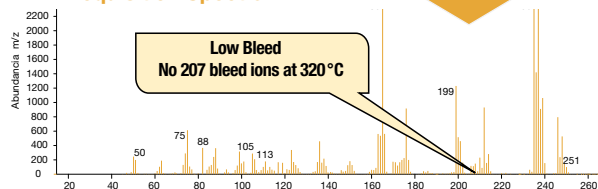
Resolve Common Pesticide Isomers

ZB-MultiResidue GC columns feature optimized that 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.

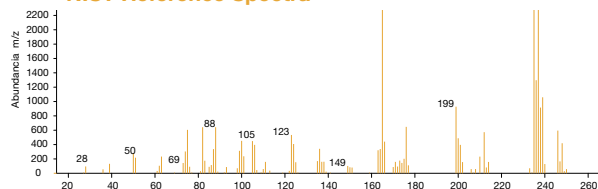


App ID 16161

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 @ 25 °C/min to 320 °C @ 15 °C/min for 2 min
Detector: MSD @ 320 °C, 45-400 amu
Sample: 1. o,p-DDE 4. o,p-DDT
 2. p,p-DDE 5. p,p-DDD
 3. o,p-DDD 6. p,p-DDT

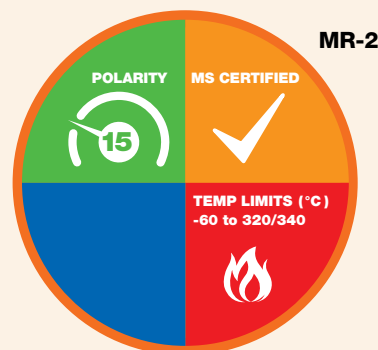
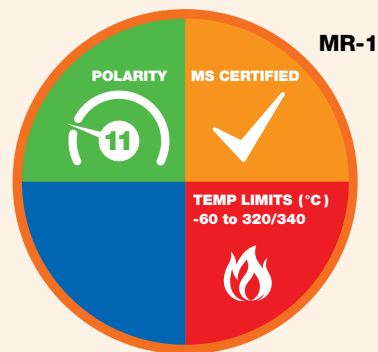
Ordering Information

Zebron ZB-MultiResidue -1 GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
20-Meter			
0.18	0.18	-60 to 320/340	7FD-G016-08
30-Meter			
0.25	0.25	-60 to 320/340	7HG-G016-11
0.32	0.25	-60 to 320/340	7HM-G016-11
0.32	0.50	-60 to 320/340	7HM-G016-17
0.53	0.50	-60 to 320/340	7HK-G016-17

Ordering Information

Zebron ZB-MultiResidue -2 GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.20	-60 to 320/340	7HG-G017-10
0.32	0.25	-60 to 320/340	7HM-G017-11

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

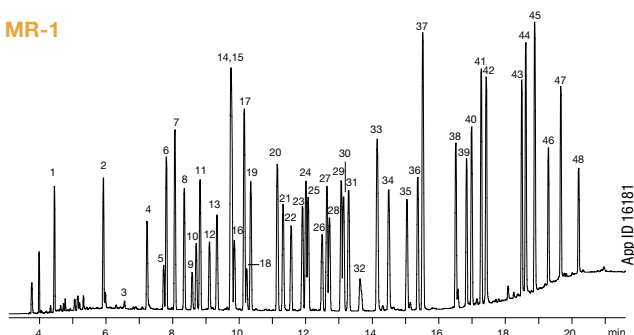
Recommended Applications

- Haloacetic Acids (HAAs)
- Herbicides / Insecticides
- Multi-pesticide screening
- Nitrogen-containing pesticides
- Organochlorine pesticides
- Organophosphorous pesticides
- PCBs / Aroclors

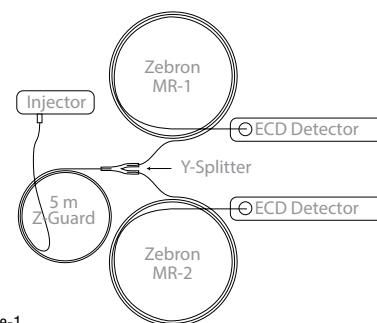
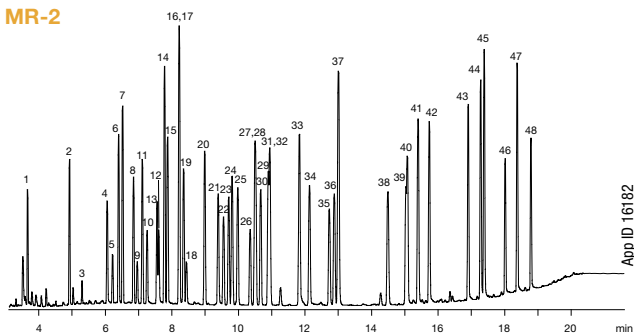
ZB-MultiResidue™ -1 and -2 (cont'd)

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.: [ZHM-G016-17](#)

[ZHM-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 5 m 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 |

ZB-MultiResidue Column Kits

Ordering Information

0.25 mm ID (kit consists of products below)		
Description	Dimension	Part No.
ZB-MultiResidue-1 Column	30 meter x 0.25 mm x 0.25 µm df	ZHG-G016-11
ZB-MultiResidue-2 Column	30 meter x 0.25 mm x 0.20 µm df	ZHG-G017-10
Z-Guard™	5 meter x 0.25 mm	ZAG-G000-00-GZ0
Universal Capillary Column Y-connector, Fused Quartz	—	AG0-4717
Polyimide Resin	0.5 mL, rated to 350 °C	AG0-5722
0.32 mm ID (kit consists of products below)		
Description	Dimension	Part No.
ZB-MultiResidue-1 Column	30 meter x 0.32 mm x 0.50 µm df	ZHM-G016-17
ZB-MultiResidue-2 Column	30 meter x 0.32 mm x 0.25 µm df	ZHM-G017-11
Z-Guard	5 meter x 0.32 mm	ZAM-G000-00-GZ0
Universal Capillary Column Y-connector, Fused Quartz	—	AG0-4717
Polyimide Resin	0.5 mL, rated to 350 °C	AG0-5722
0.53 mm ID (kit consists of products below)		
Description	Dimension	Part No.
ZB-MultiResidue-1 Column	30 meter x 0.53 mm x 0.50 µm df	ZHK-G016-17
ZB-MultiResidue-2 Column	30 meter x 0.53 mm x 0.50 µm df	*
Z-Guard	5 meter x 0.53 mm	ZAK-G000-00-GZ0
Universal Capillary Column Y-connector, Fused Quartz	—	AG0-4717
Polyimide Resin	0.5 mL, rated to 350 °C	AG0-5722



Extend column lifetime.
Add a Z-Guard™ to your
Zebron GC order.

* Only available with kit 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®

- DB®-1
- HP-1
- CP-Sil 5 CB

Restek®

- Rtx®-1
- Rxi®-1ms

SGE®

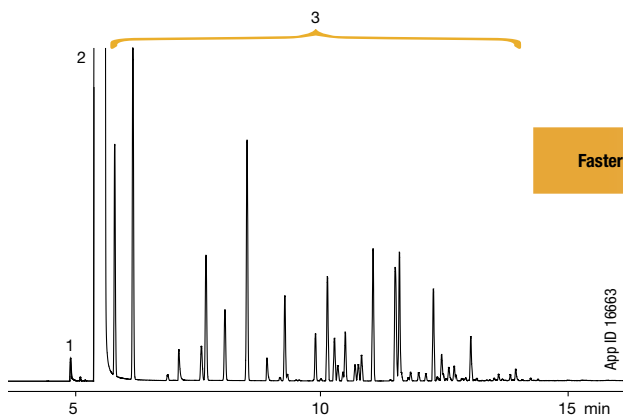
- BP1

Supelco®

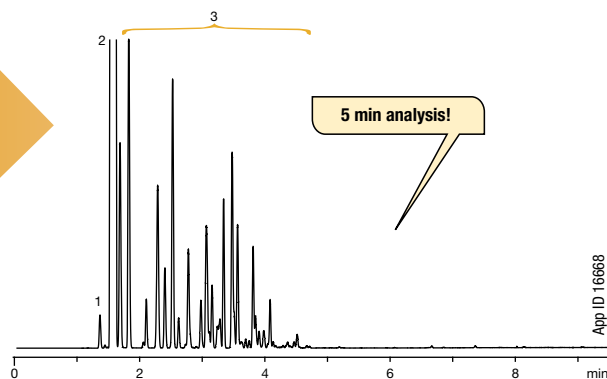
- SPB®-1
- SE-30

Fast, Accurate Analysis

Determination of Denatured Bioethanol: ASTM Method D5501



Faster Results

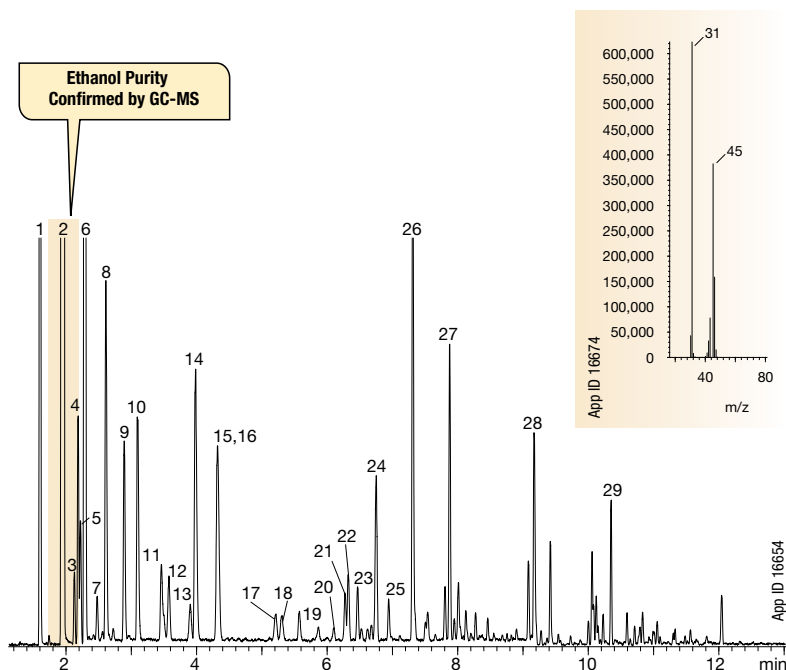


Column: Zebron ZB-1
Dimensions: 100 meter x 0.25 mm x 0.50 µm
Part No.: [7MG-G001-17](#)
Injection: Split 50:1 @ 300 °C, 1 µL
Carrier Gas: Helium @ 35 cm/sec (constant flow)
Oven Program: 45 °C for 7 min to 255 °C @ 30 °C/min for 6 min
Detector: FID @ 300 °C
Instrument: Shimadzu® GC-2010 with Flame Ionization
Sample: 1. Methanol
 2. Ethanol
 3. Denaturant

Column: Zebron ZB-Bioethanol
Dimensions: 15 meter x 0.25 mm x 1.00 µm
Part No.: [7EG-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

ZB-Bioethanol (cont'd)

Resolve Fusel Alcohols



Column: Zebtron 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:

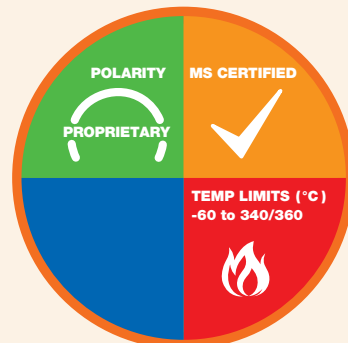
1. Methanol	17. Methylcyclopentane
2. Ethanol	18. 2,4-Dimethylpentane
3. Acrolein	19. Benzene
4. Acetone	20. Cyclohexane
5. 2-Methylbutane	21. 2-Methylhexane
6. Isopropyl alcohol	22. 2,3-Dimethylpentane
7. Pentane	23. 3-Methylhexane
8. t-Butanol	24. 2,2,4-Trimethylpentane
9. Allyl alcohol	25. Heptane
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	

Ordering Information

Zebtron ZB-Bioethanol GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	1.00	-60 to 340/360	7EG-G020-22
30-Meter			
0.25	1.00	-60 to 340/360	7HG-G020-22

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

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.

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

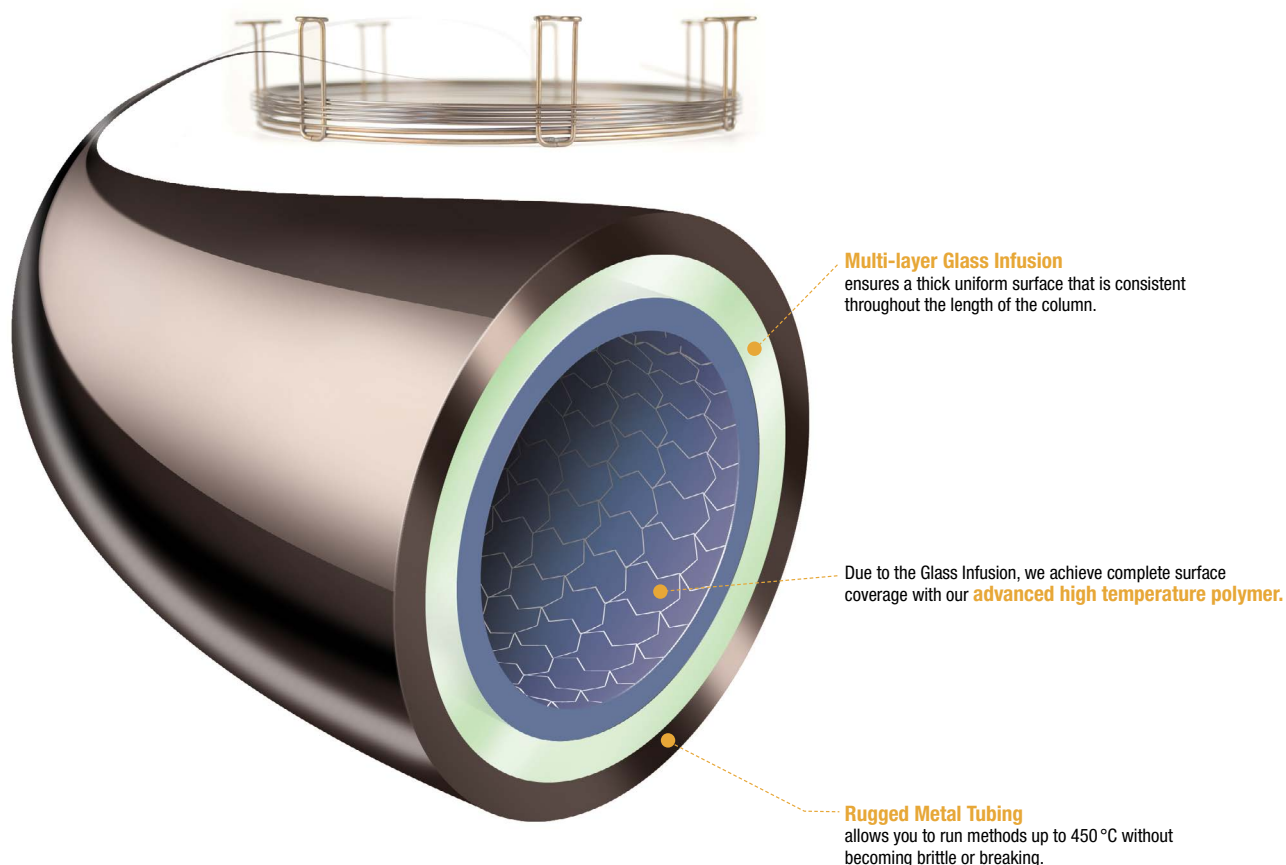
Restek®

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

SGE®

- BP1
- BPX1-SimD

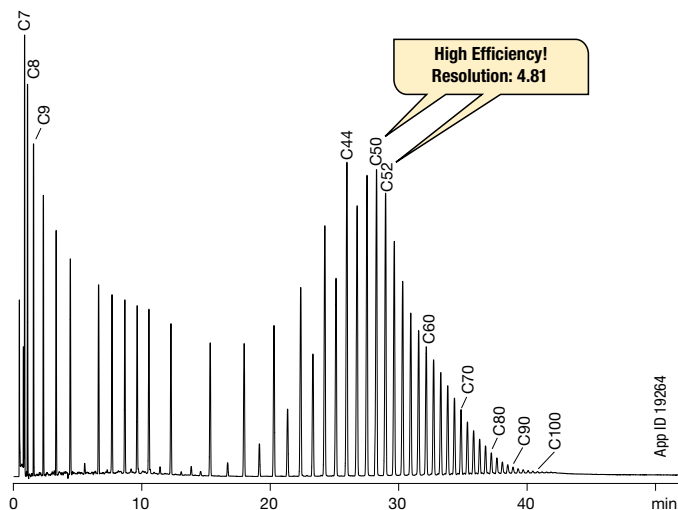
Glass Infusion Technology for Improved Performance



ZB-1XT SimDist (cont'd)

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 CS₂

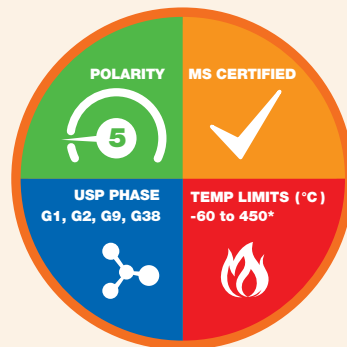
Note: Chromatogram is baseline subtracted.

Ordering Information

Zebron ZB-1XT SimDist GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
5-Meter			
0.53	0.09	-60 to 450	7AK-G026-55
0.53	0.15	-60 to 450	7AK-G026-05
0.53	0.88	-60 to 450	7AK-G026-49
5-Meter with 2-Meter Guardian™ Integrated Guard			
0.53	0.09	-60 to 450	7AK-G026-55-GGT
0.53	0.15	-60 to 450	7AK-G026-05-GGT
10-Meter			
0.53	0.15	-60 to 450	7CK-G026-05
0.53	0.88	-60 to 450	7CK-G026-49
0.53	2.65	-60 to 400	7CK-G026-35
15-Meter			
0.53	0.25	-60 to 450	7EK-G026-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

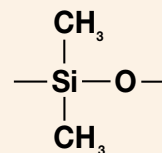
Column Profile



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

Engineered Self Cross-linking™ (ESC)

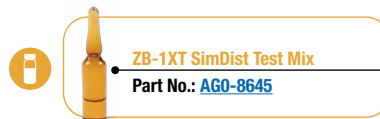
Phase Chemistry



100 % Dimethylpolysiloxane

Recommended Applications

- ASTM Methods (D2887, D3710, D6352, D7169)
- Crude oil
- Gasoline fractions
- Petroleum distillates
- Petroleum fractions
- Simulated distillation
- Vacuum distillates



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

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

ZB-DHA-PONA

- Excellent peak shape for polar and nonpolar compounds
- Temperature stability and flexibility
- Highly efficient dimension and consistent film thickness delivers excellent separation of paraffins, iso-paraffins, olefins, naphthenes, aromatics and polar compounds
- Extensive ESC™ provides intact stationary phase and MS certified low bleed
- Well-suited for true boiling point separation
- Excellent resolving power for critical pairs in complex petrochemical samples

Upgrade to Zebtron from any 100 % dimethylpolysiloxane phase:

Agilent®

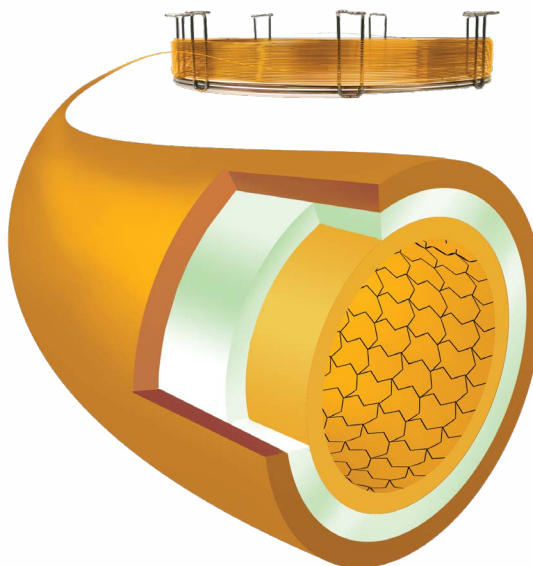
- HP-PONA
- DB®-PETRO
- CP-Sil PONA CB

Restek®

- Rtx®-DHA

Supelco®

- Petrocol®-DH



The Choice for PIONA, DHA and PONA

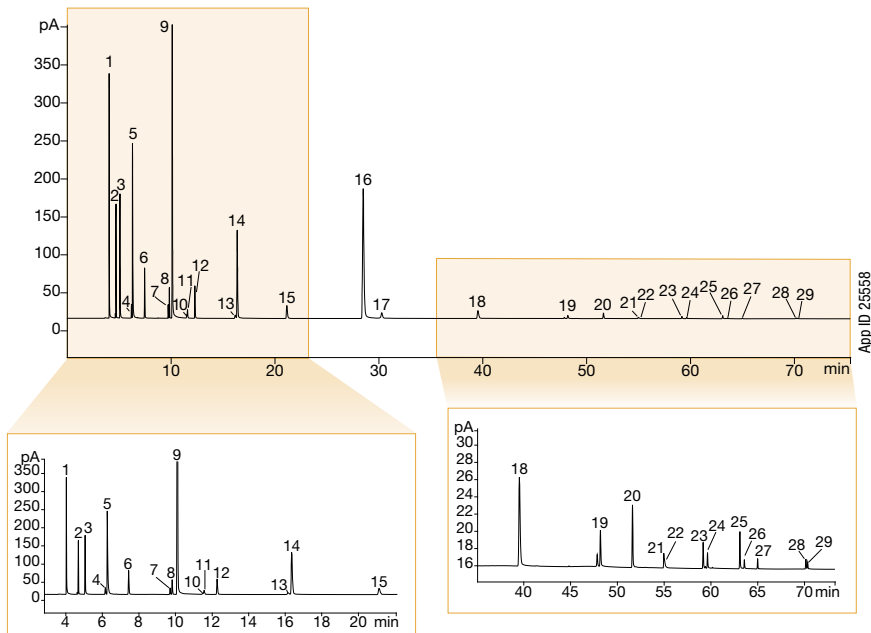
The ZB-DHA-PONA GC column is the choice for the analysis of Detailed Hydrocarbon Analysis (DHA) within the fuel industry. The Engineered Self Cross-linking™(ESC) stationary phase provides low bleed and exceptional column life for separation of DHA critical pairs with symmetric peaks. In addition, ZB-DHA-PONA GC columns provide excellent response and peak symmetry for polar oxygenates.

The ZB-DHA-PONA GC column provides excellent separation of DHA critical pairs with symmetric peaks suitable for ASTM Method D6730, see table below.

Easy ZB-DHA-PONA Selection for Your ASTM Method				
Method	Description	Recommended Column	Recommended Dimensions	Part Number
ASTM D5134	Standard Test Method for Detailed Analysis of Petroleum Naphtha's through n-Nonane by Capillary Gas Chromatography	ZB-DHA-PONA	50 m x 0.20 mm x 0.5 µm	7JE-G042-17
		ZB-DHA-PONA	100 m x 0.25 mm x 0.5 µm	7MG-G042-17
ASTM D5441	Standard Test Method for Analysis of Methyl Tert-Butyl Ether (MTBE) by GC	ZB-DHA-PONA	50 m x 0.20 mm x 0.5 µm	7JE-G042-17
		ZB-DHA-PONA	100 m x 0.25 mm x 0.5 µm	7MG-G042-17
		ZB-DHA-PONA	150 m x 0.25 mm x 1 µm	7QG-G042-22
ASTM D5501	Standard Test Method for Determination of Ethanol and Methanol Content in Fuels Containing Greater than 20 % Ethanol by Gas Chromatography	ZB-DHA-PONA	100 m x 0.25 mm x 0.5 µm	7MG-G042-17
		ZB-DHA-PONA	150 m x 0.25 mm x 1 µm	7QG-G042-22
ASTM D6729	Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100 Meter Capillary High Resolution Gas Chromatography	ZB-DHA-PONA	100 m x 0.25 mm x 0.5 µm	7MG-G042-17
ASTM D6730	Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100-Meter Capillary (with Pre-column) High-Resolution Gas Chromatography	ZB-DHA-PONA	50 m x 0.20 mm x 0.5 µm	7JE-G042-17
		ZB-DHA-PONA	100 m x 0.25 mm x 0.5 µm	7MG-G042-17
		ZB-DHA-PONA	150 m x 0.25 mm x 1 µm	7QG-G042-22
		ZB-DHA-PONA-TUNE	5 m x 0.25 mm x 1 µm	7AG-G042-22
ASTM D6733	Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 50-Meter Capillary High Resolution Gas Chromatography	ZB-DHA-PONA	50 m x 0.20 mm x 0.5 µm	7JE-G042-17

ZB-DHA-PONA (cont'd)

Analysis of ASTM D6730 Components by GC-FID on ZB-DHA-PONA & ZB-DHA-PONA-TUNE GC Column



Column 1 (Tuning): Zebtron ZB-DHA-PONA-TUNE
Phase: 5 % Phenyl 95 % Dimethylpolysiloxane
Dimensions: 5 meter x 0.25 mm x 1.00 µm
Part No.: [7AG-G042-22](#)
Column 2: Zebtron ZB-DHA-PONA
Phase: 100 % Dimethylpolysiloxane
Dimensions: 100 meter x 0.25 mm x 0.50 µm
Part No.: [7MG-G042-17](#)

Recommended Column Union: [AG0-4716](#)
Injection: Split 150:1 @ 200 °C, 0.2 µL
Recommended Liner: Zebtron PLUS Straight Z-Liner™
Part No.: [AG2-0A03-05](#)
Carrier Gas: Hydrogen @ 2 mL/min (constant flow)
Oven Program: 30 °C for 8.5 min, to 48 °C @ 22 °C/min for 27 min, to 141 °C @ 3 °C/min for 1 min, to 275 °C @ 1 °C/min for 2 min
Detection: Flame Ionization (FID) @ 275 °C

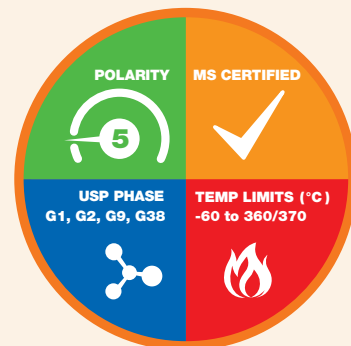
- Sample:**
- | | |
|------------------------------------|--------------------------------|
| 1. Ethanol | 16. C8 (n-octane) |
| 2. C5 (n-pentane) | 17. Ethylbenzene |
| 3. 2-Methylbutane | 18. 2,3-Dimethylheptane |
| 4. Tert-Butanol | 19. p-Xylene |
| 5. 2,3-Dimethylbutane | 20. C9 (n-nonane) |
| 6. Methyl tert-butyl ether (MTBE) | 21. 5-Methylnonane |
| 7. C6 (n-hexane) | 22. 1-Methyl-2-ethylbenzene |
| 8. 1-Methylcyclopentene | 23. C10 (n-decane) |
| 9. Benzene | 24. C11 (undecane) |
| 10. Cyclohexane | 25. 1,2,3,5-Tetramethylbenzene |
| 11. 3-Ethylpentane | 26. Naphthalene |
| 12. trans-1,2-Dimethylcyclopentane | 27. C12 (dodecane) |
| 13. C7 (n-heptane) | 28. 1-Methylnaphthalene |
| 14. 2,3,3-Trimethylpentane | 29. C13 (Tridecane) |
| 15. Toluene | |

Ordering Information

Zebtron ZB-DHA-PONA GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
5-Meter (PONA-TUNE)			
0.25	1.00	-60 to 340/360	7AG-G042-22
50-Meter			
0.20	0.50	-60 to 360/370	7GE-G042-17
100-Meter			
0.25	0.50	-60 to 360/370	7MG-G042-17
150-Meter			
0.25	1.00	-60 to 340/360	7QG-G042-22

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

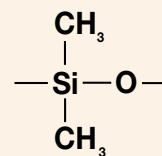
Column Profile



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

Engineered Self Cross-linking™ (ESC)

Phase Chemistry



100 % Dimethylpolysiloxane

Recommended Applications

- DHA
- PONA
- PIONA
- PIANO
- ASTM D5134, D5441, D5501, D6729, D6730 and D6733

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

△ Extend column lifetime. Add a Z-Guard™ to your Zebtron GC order.

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®

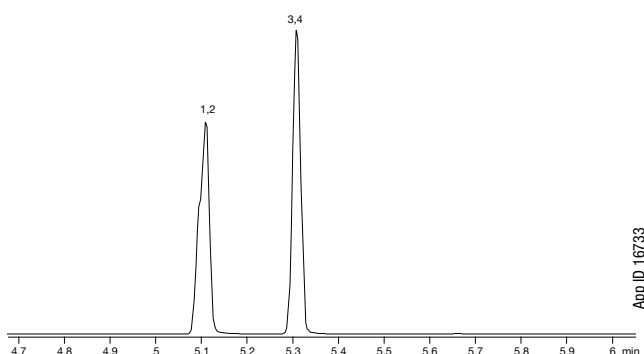
- Rxi®-1ms
- Rtx®-5
- Rtx-5ms
- Rtx-35ms

Supelco®

- SPB®-1

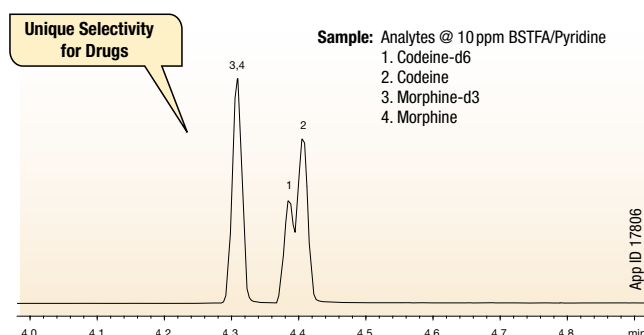
Optimized Selectivity for Multiple Drug Classes

Traditional 5% Phenyl Phase



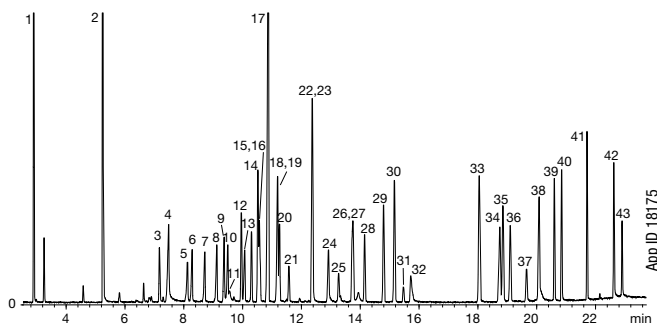
Column: As listed
Dimensions: 10 meter x 0.18 mm x 0.18 µm
Injection: Split 10:1 @ 240 °C, 1 µL
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 140 °C to 320 °C @ 20 °C for 1 min
Detector: MSD @ 230 °C

Zebron ZB-Drug-1



Column: As listed
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 @ 55 cm/sec (constant flow)
Oven Program: 180 °C to 340 °C @ 20 °C/min
Detector: MSD @ 230 °C

Common Drug Screen by GC-MS



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 @ 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

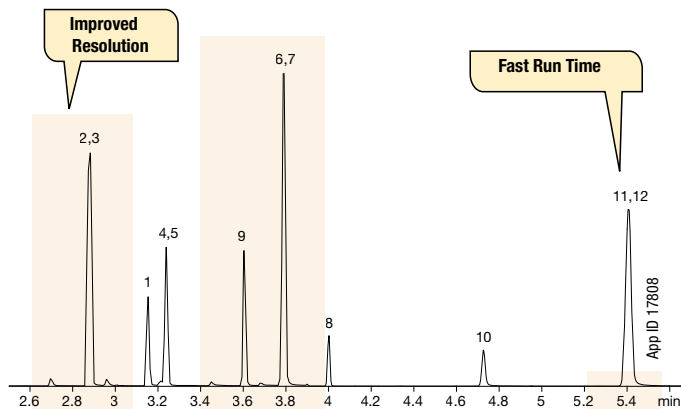
Sample: Analytes are 25 ppm in Methanol

- | | | |
|-------------------|----------------------|--------------------|
| 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. Aprobital | 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. Oxymorphone |
| 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 |

ZB-Drug-1 (cont'd)

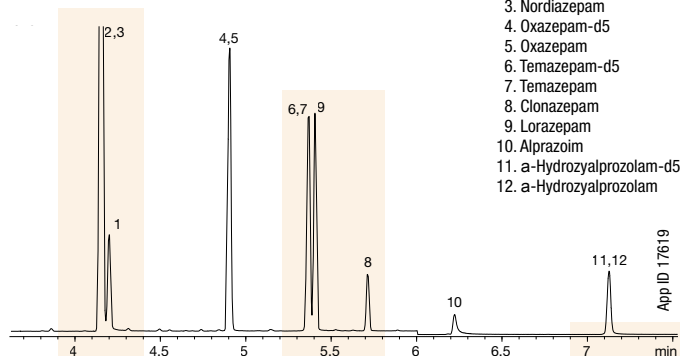
Faster Run Times and Improved Resolution

Zebron ZB-Drug-1



Column: Zebron ZB-Drug-1
Dimensions: 10 meter x 0.18 mm x 0.18 μ m
Part No.: [7CD-G023-08](#)
Injection: Split 10:1 @ 280 °C, 1 μ L
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. a-Hydroxyalprazolam-d5
12. a-Hydroxyalprazolam

Dimensions: 10 meter x 0.18 mm x 0.18 μ m
Injection: Split 10:1 @ 250 °C, 1 μ L
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

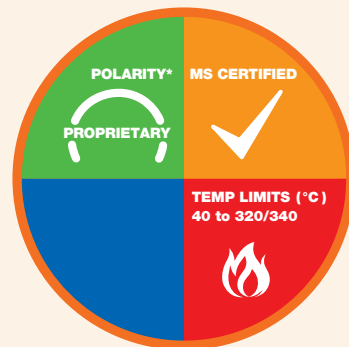
Ordering Information

Zebron ZB-Drug-1 GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
10-Meter			
0.18	0.18	40 to 320/340	7CD-G023-08
15-Meter			
0.25	0.25	40 to 320/340	7EG-G023-11
15-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.25	40 to 320/340	7EG-G023-11-GGA
30-Meter			
0.25	0.25	40 to 320/340	7HG-G023-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Comparative separations may not be representative of all applications.

Column Profile



*Similar polarity to ZB-MultiResidue™-2.

Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

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



ZB-Drug-1 Test Mix
Part No.: [AG0-8431](#)



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:

Agilent®

- DB®-ALC1
- DB-ALC2

Restek®

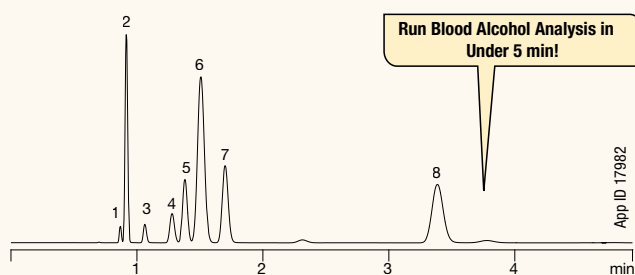
- Rtx®-BAC1
- Rtx-BAC2

*not exact equivalent, selectivity may differ

Faster, More Sensitive Blood Alcohol Analysis

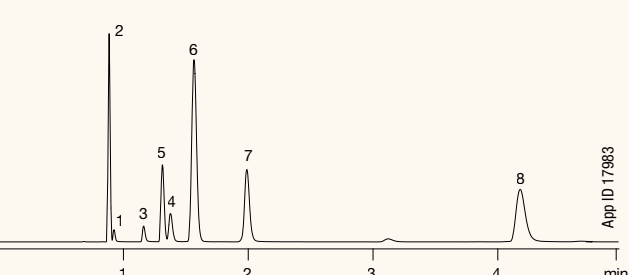
Zebron ZB-BAC-1

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:

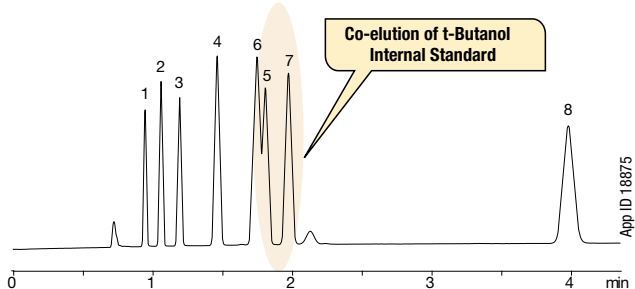
Column: As listed
Dimensions: As listed
Part No.: ZHK-G021-36 (ZB-BAC-1)
 ZHK-G022-32 (ZB-BAC-2)
Injection: Split 0.8:1 @ 150 °C, 1 mL
Carrier Gas: Helium @ 80 cm/sec (constant flow)
Oven Program: 40 °C (Isothermal)
Detector: FID @ 250 °C

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)

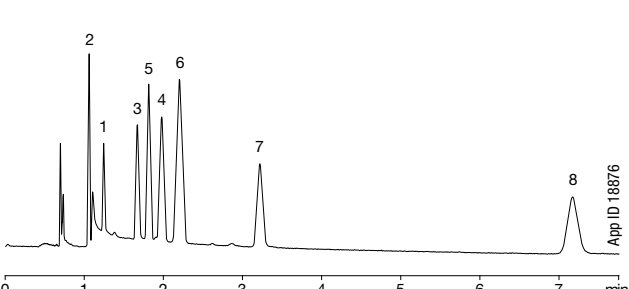
Restek Rtx-BAC1

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

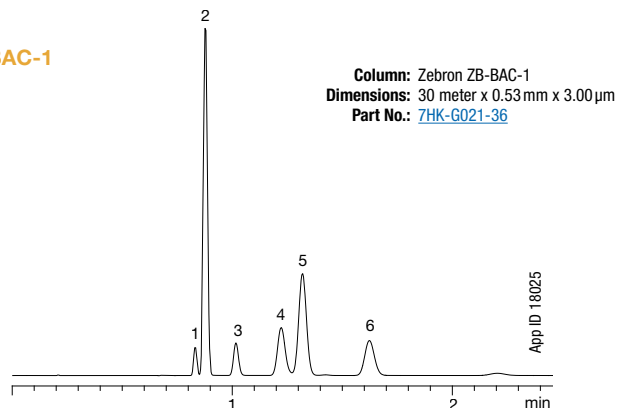
1. Methanol
2. Acetaldehyde
3. Ethanol
4. Isopropanol
5. Acetone
6. t-Butanol (IS)
7. n-Propanol (IS)
8. 2-Butanol (IS)

Comparative separations may not be representative of all applications.

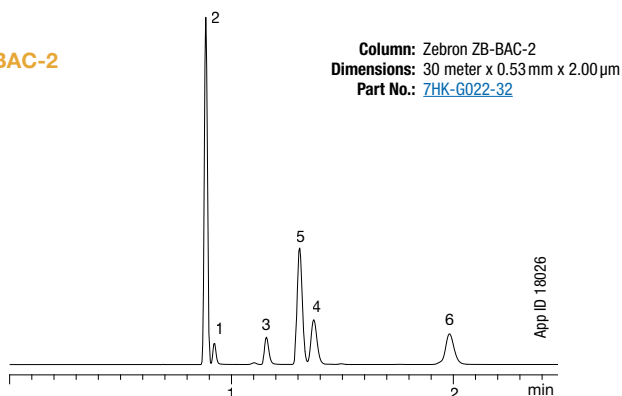
ZB-BAC-1 and -2 (cont'd)

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

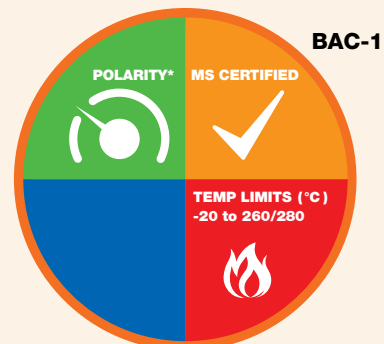
Ordering Information

Zebron ZB-BAC-1 GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
30-Meter			
0.32	1.80	-20 to 260/280	7HM-G021-31
0.53	3.00	-20 to 260/280	7HK-G021-36

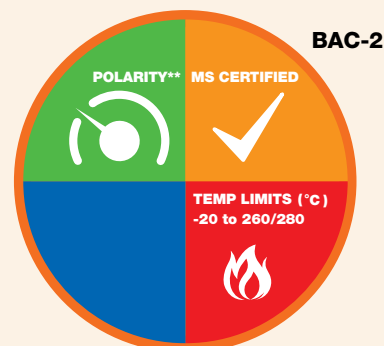
Zebron ZB-BAC-2 GC Columns			
ID (mm)	df (μ m)	Temp. Limits °C	Part No.
30-Meter			
0.32	1.20	-20 to 260/280	7HM-G022-25
0.53	2.00	-20 to 260/280	7HK-G022-32

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



*Similar polarity to ZB-35.



**Similar polarity to ZB-624.

Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

- Abused Inhalant Anesthetics
- Blood Alcohol Analysis

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

△ Extend column lifetime. Add a Z-Guard™ to your Zebron GC order.

ZB-1^{PLUS}™

MS Certified “1” Phase

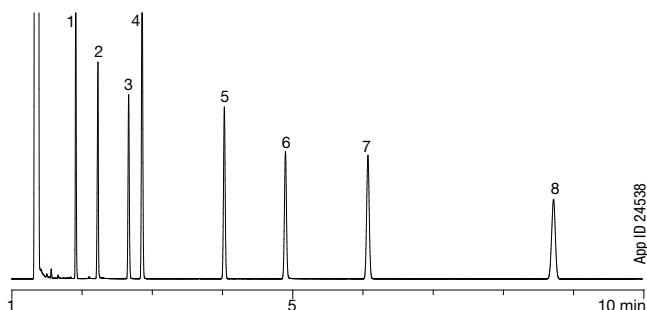
- **Very low bleed (MS Certified) phase especially suited to high sensitivity GC-MS**
- **Extremely inert for active compounds such as drugs, pesticides, or acids and bases**
- **Improved signal-to-noise ratio for better sensitivity and mass spectral integrity**
- **Identical selectivity to 100 % dimethylpolysiloxane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

Upgrade to Zebron from any 100 % dimethylpolysiloxane phase:

Agilent®	Restek®	SGE®	Supelco®
• DB®-1 • DB-1ms • DB-1ms Ultra Inert • HP-1 • HP-1ms • HP-1ms Ultra Inert • VF-1ms • CP-Sil 5 CB • Ultra 1	• Rtx®-1 • Rtx-1ms • Rxi®-1ms	• BP1 • SolGel-1ms™	• SPB®-1 • SE-30 • MET-1 • MDN-1 • Equity®-1

Lower Overall Column Activity

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

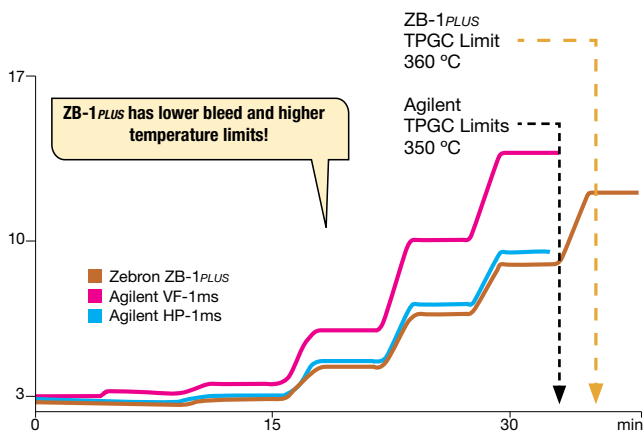


Column: Zebron ZB-1^{PLUS}
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: ZHG-G031-11
Injection: Split 100:1 @ 250 °C, 1.0 µL
Carrier Gas: Hydrogen @ 1.18 mL/min (constant flow)
Oven Program: 140 °C (Isothermal)
Detector: FID @ 325 °C
Sample:

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-1^{PLUS} GC column bleed profile against other “MS” columns on the market – ZB-1^{PLUS} 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.

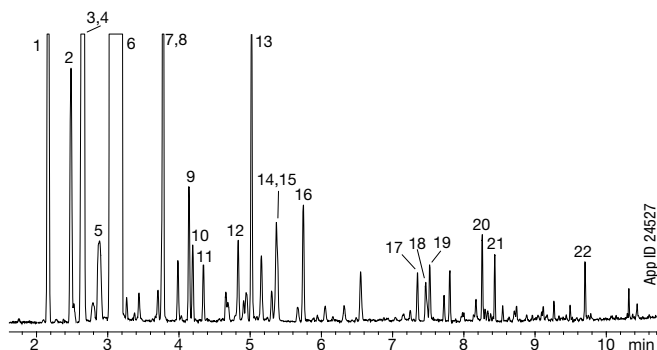
Conditions for all columns:

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

ZB-1^{PLUS}™ (cont'd)

Well-Suited for Food & Flavors

Cold Pressed Orange Oil by GC-MS



App ID 24627

Column: Zebron ZB-1^{PLUS}
Dimensions: 10 meter x 0.10 mm x 0.10 µm
Part No.: [ZCB-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

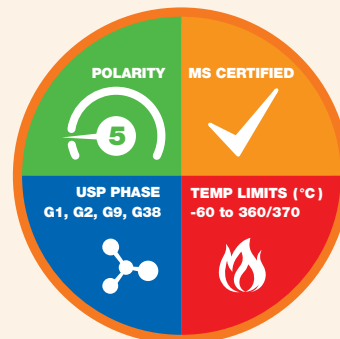
1. α-Pinene	9. cis-Limonene oxide	17. α-Cubebene
2. β-Phellandrine	10. trans-Limonene oxide	18. β-Cubebene
3. β-Myrcene	11. Citronellal	19. Dodecanal
4. Octanal	12. α-Terpineol	20. Valencene
5. 3-Carene	13. Decanal	21. Cadinene
6. Limonene	14. Carvone	22. Nootkatone
7. Nonanal	15. Neral	
8. Linalool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

Ordering Information

Zebron ZB-1 ^{PLUS} GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
5-Meter			
0.18	0.18	-60 to 360/370	7AD-G031-08
10-Meter			
0.10	0.10	-60 to 360/370	ZCB-G031-02
0.18	0.18	-60 to 360/370	ZCD-G031-08
12-Meter			
0.20	0.33	-60 to 360/370	ZDE-G031-14
15-Meter			
0.25	0.25	-60 to 360/370	ZEG-G031-11
0.32	0.25	-60 to 360/370	ZEM-G031-11
20-Meter			
0.18	0.18	-60 to 360/370	ZFD-G031-08
30-Meter			
0.25	0.10	-60 to 360/370	ZHG-G031-02
0.25	0.25	-60 to 360/370	ZHG-G031-11
0.32	0.25	-60 to 360/370	ZHM-G031-11
30-Meter with 5-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 360/370	ZHG-G031-11-GGA
30-Meter with 10-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 360/370	ZHG-G031-11-GGC
60-Meter			
0.25	0.25	-60 to 360/370	ZKG-G031-11
0.25	1.00	-60 to 360/370	ZKG-G031-22

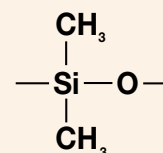
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



100 % Dimethylpolysiloxane

Recommended Applications

- Acids
- Amines
- Diesel fuel
- Drugs
- EPA Methods (1668)
- Essential oils
- Flavors & Fragrances
- Oxygenates and GROs
- PCBs
- Pesticides
- Solvent impurities
- Sulfur compounds (Light)



ZB-1^{PLUS} 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™

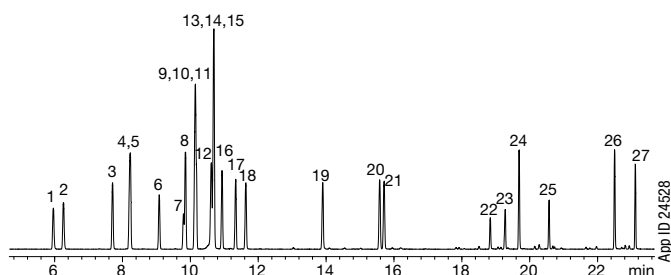
Inert 5% Phenyl Selectivity

- 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

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

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

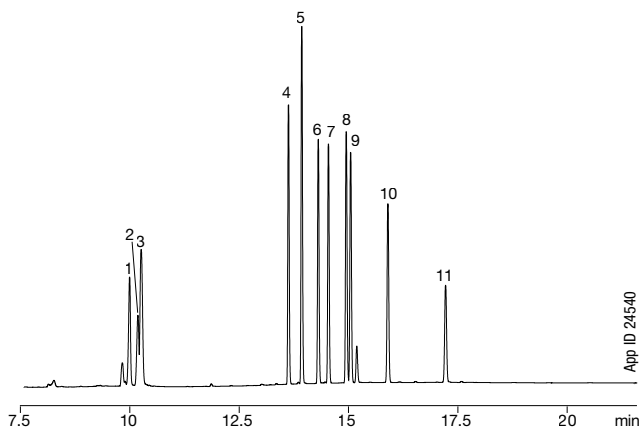
Phenols



Column: Zebron ZB-5PLUS
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-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 | |

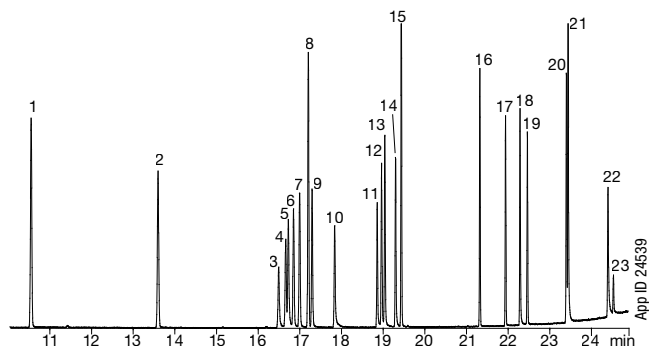
Underivatized Antihistamines by GC-FID



Column: Zebron ZB-5PLUS
Dimensions: 30 meter x 0.25 mm x 1.0 µm
Part No.: 7HG-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 | |

Endocrine Disruptors by GC-MS



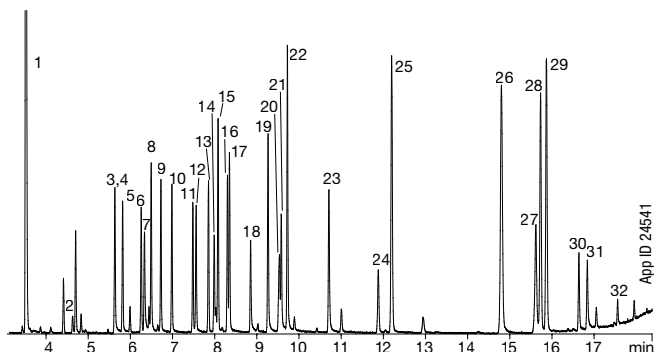
Column: Zebron ZB-5PLUS
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G032-11
Injection: Split 40:1 @ 250 °C, 1 µL
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 100 °C to 180 °C @ 5 °C/min to 320 °C @ 15 °C/min
Detector: MSD @ 180 °C, 45-450 amu

- Sample:** Analytes are 50 ppm in acetone
- | | | |
|-----------------------|-----------------------|--------------------------------|
| 1. Dimethyl phthalate | 9. Terbutylazine | 17. 4,4'-DDD |
| 2. Diethyl phthalate | 10. Secbumeton | 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 | |

ZB-5PLUS™ (cont'd)

Good Results for Drugs

Drug Screening by GC-MS



Column: Zebtron ZB-5PLUS
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [ZHG-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

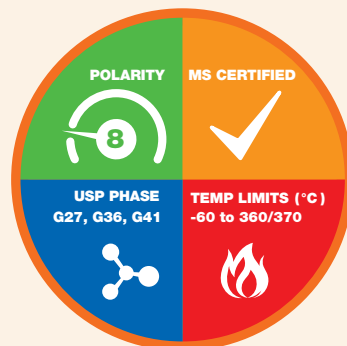
1. Nicotine	14. Caffeine	27. Morphine
2. Methylecgonine	15. Benzphetamine	28. Diazepam
3. Ibuprofen	16. Hexobarbital	29. Hydrocodone
4. Allobarbitol	17. Dimenhydrinate	30. 6-Monoacetylmorphine
5. Aprobital	18. Doxylamine	31. Oxymorphone
6. Butabarbital	19. Phenobarbital	32. Diacetylmorphine (Heroin)
7. Acetaminophen	20. 8-Chlorotheophylline	
8. Phenacetin	21. Methapyrilene	
9. Amobarbital	22. Chlorpheniramine	
10. Pentobarbital	23. Brompheniramine	
11. Secobarbital	24. Cocaine	
12. Meprobamate	25. Chlorcyclizine	
13. Methyl benzilate	26. Codeine	

Ordering Information

Zebtron ZB-5PLUS GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.25	-60 to 360/370	ZEG-G032-11
20-Meter			
0.18	0.18	-60 to 360/370	ZFD-G032-08
20-Meter with 5-Meter Guardian™ Integrated Guard			
0.18	0.18	-60 to 360/370	ZFD-G032-08-GGA
30-Meter			
0.25	0.25	-60 to 360/370	ZHG-G032-11
0.25	0.50	-60 to 360/370	ZHG-G032-17
0.25	1.00	-60 to 360/370	ZHG-G032-22
0.32	0.25	-60 to 360/370	ZHM-G032-11
30-Meter with 5-Meter Guardian Integrated Guard			
0.25	0.10	-60 to 360/370	ZHG-G032-02-GGA
0.25	0.25	-60 to 360/370	ZHG-G032-11-GGA
60-Meter			
0.25	0.25	-60 to 360/370	ZKG-G032-11

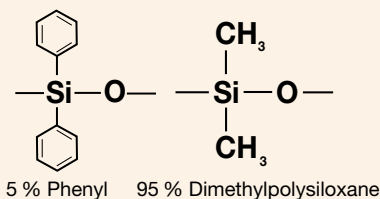
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



Recommended Applications

- Barbiturates
- Benzodiazepines
- Drugs of Abuse
- EPA Methods
- FAMES
- Nitrosamines
- Pesticides
- Phenols
- THC Metabolites



ZB-5PLUS Test Mix
Part No.: [AG0-8362](#)



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



Extend column lifetime. Add a Z-Guard™ to your next Zebtron GC order.

ZB-5MS^{PLUS}™

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 ZB-5MS^{PLUS} GC column 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

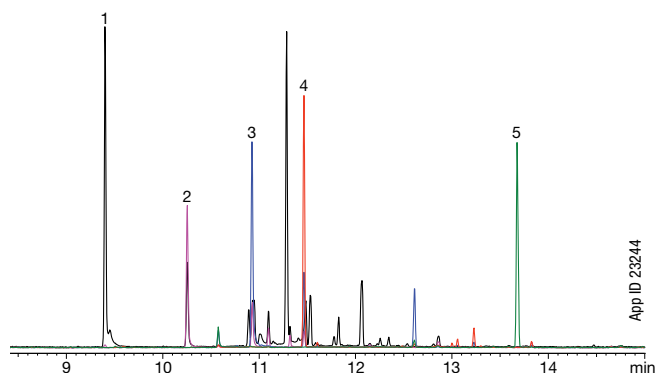
Supelco®

- 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-5MS^{PLUS} 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-5MS^{PLUS}

Dimensions: 30 meter x 0.25 mm x 0.25 µm

Part No.: ZHG-G030-11

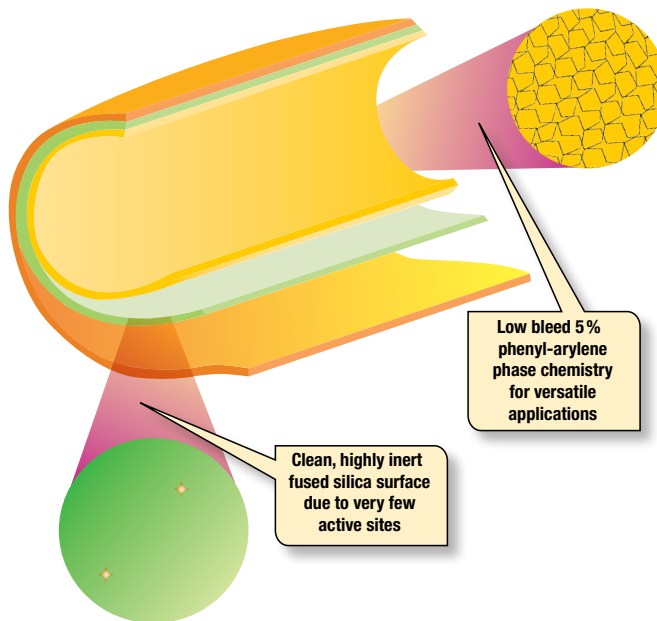
Injection: Splitless @ 280 °C, 1 µL

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

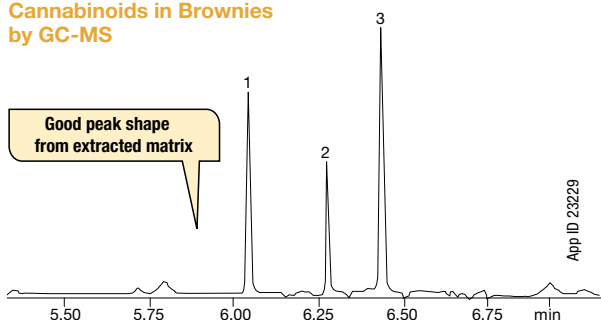
- Sample:**
1. Cyanuric acid
 2. Ammelide
 3. Ammeline
 4. Melamine
 5. Benzoguanamine



ZB-5MS^{PLUS}™ (cont'd)

Versatile Performance for Drugs and Chemicals

Cannabinoids in Brownies by GC-MS

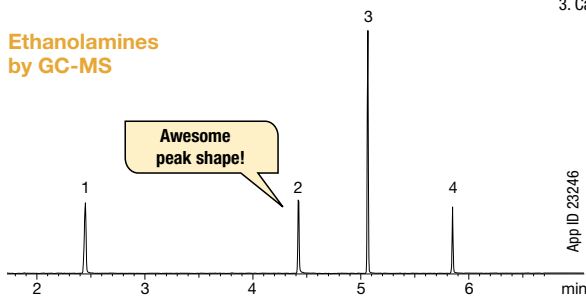


Extraction Protocol:

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: Zebtron ZB-5MS^{PLUS}
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



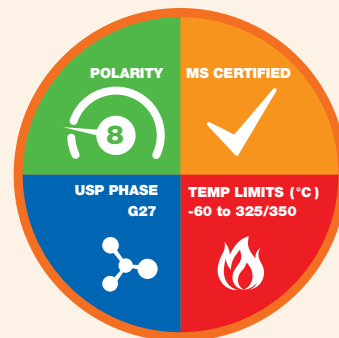
Column: Zebtron ZB-5MS^{PLUS}
Dimensions: 30 meter x 0.25 mm x 1.00 µm
Part No.: [7HG-G030-22](#)
Injection: Split 200:1 @ 250 °C, 1 µL
Carrier Gas: Helium @ 1.4 mL/min (constant flow)

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

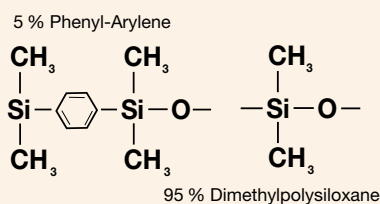
Zebtron ZB-5MS ^{PLUS} GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
1.5-Meter			
0.25	0.25	-60 to 325/350	7XG-G030-11
15-Meter			
0.25	0.25	-60 to 325/350	7EG-G030-11
20-Meter			
0.18	0.18	-60 to 325/350	7FD-G030-08
0.18	0.36	-60 to 325/350	7FD-G030-53
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G030-11
0.25	0.50	-60 to 325/350	7HG-G030-17
0.25	1.00	-60 to 325/350	7HG-G030-22
0.32	0.25	-60 to 325/350	7HM-G030-11
0.32	0.50	-60 to 325/350	7HM-G030-17
0.32	1.00	-60 to 325/350	7HM-G030-22
0.32	1.50	-60 to 325/350	7HM-G030-28
0.53	1.00	-60 to 325/350	7HK-G030-22

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



Recommended Applications

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

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

⚠ Extend column lifetime. Add a Z-Guard™ to your Zebtron GC order.

Ordering Information

Zebtron ZB-5MS ^{PLUS} GC Columns (cont'd)			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
30-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G030-11-GGA
0.25	0.50	-60 to 325/350	7HG-G030-17-GGA
30-Meter with 10-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G030-11-GGC
60-Meter			
0.25	0.25	-60 to 325/350	7KG-G030-11
0.25	1.00	-60 to 325/350	7KG-G030-22
0.32	1.00	-60 to 325/350	7KM-G030-22

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

ZB-WAX^{PLUS}

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

Upgrade to Zebron from any polyethylene glycol phase:

Agilent®

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

Restek®

- Stabilwax®

SGE®

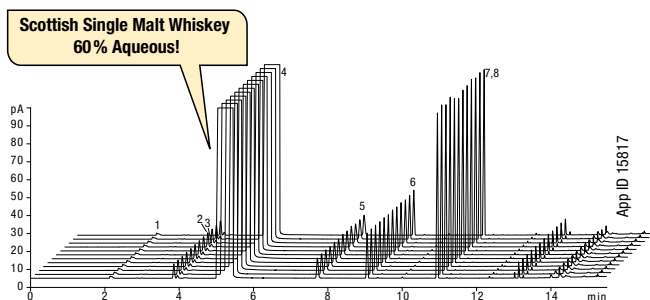
- BP20

Supelco®

- SUPELCOWAX® 10

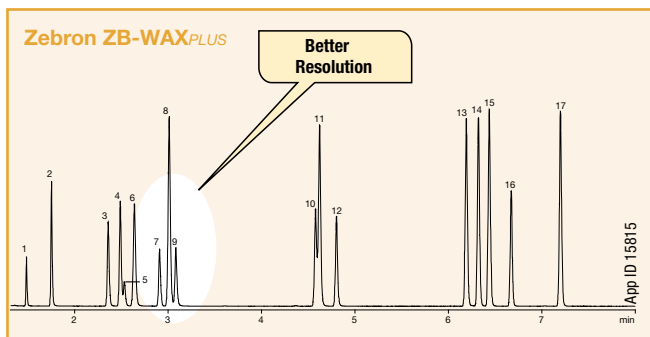
Water Reproducibility of ZB-WAX^{PLUS}

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



Column: Zebron ZB-WAX^{PLUS}
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-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

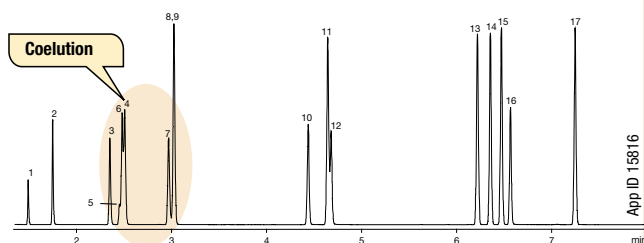
Improve Resolution for ASTM D5135-95: Stryene Impurities



Conditions same for both columns:

Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G013-11
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

Restek Stabilwax



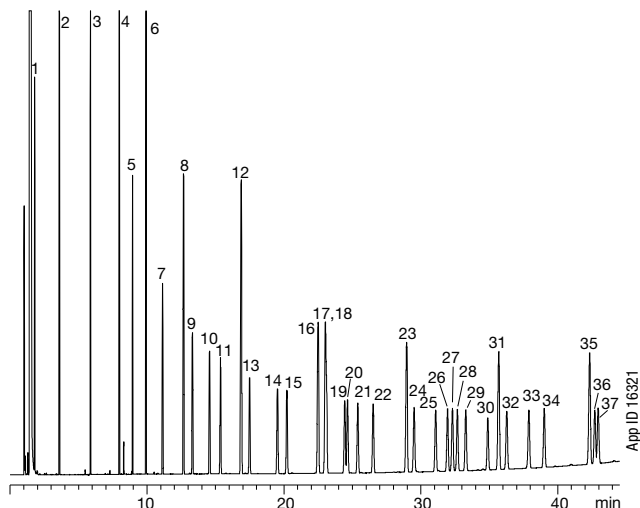
Sample: 1. Methyl Formate
 2. Acetone
 3. Ethyl Acetate
 4. Methyl Ethyl Ketone
 5. Methanol
 6. 2-Methyl-2-propanol
 7. Methylene Chloride
 8. Benzene
 9. Ethanol
 10. 2-Butanol
 11. Toluene
 12. n-Propanol
 13. Ethyl Benzene
 14. p-Xylene
 15. m-Xylene
 16. 1-Butanol
 17. o-Xylene

Comparative separations may not be representative of all applications.

ZB-WAX_{PLUS}™ (cont'd)

A Food Testing Must-Have

Food Industry FAMES



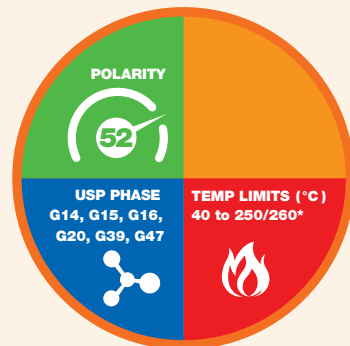
Column: Zebron ZB-WAX_{PLUS}
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [7HG-G013-11](#)
Injection: Split 5:1 @ 220 °C, 1 µL
Carrier Gas: Helium @ 3 mL/min (constant flow)
Oven Program: 60 °C for 2 min to 150 °C @ 13 °C/min to 240 °C @ 2 °C/min
Detector: FID @ 250 °C
Sample: See the full compound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

Ordering Information

Zebron ZB-WAX _{PLUS} GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	20 to 250/260	7CB-G013-02
15-Meter			
0.25	0.25	20 to 250/260	7EG-G013-11
0.53	1.00	20 to 230/240	7EK-G013-22
20-Meter			
0.18	0.18	20 to 250/260	7FD-G013-08
30-Meter			
0.25	0.25	20 to 250/260	7HG-G013-11
0.25	0.50	20 to 250/260	7HG-G013-17
0.32	0.25	20 to 250/260	7HM-G013-11
0.32	0.50	20 to 250/260	7HM-G013-17
0.32	1.00	20 to 230/240	7HM-G013-22
0.53	0.25	20 to 250/260	7HK-G013-11
0.53	1.00	20 to 230/240	7HK-G013-22
60-Meter			
0.25	0.15	20 to 250/260	7KG-G013-05
0.25	0.25	20 to 250/260	7KG-G013-11
0.25	0.50	20 to 250/260	7KG-G013-17
0.32	0.25	20 to 250/260	7KM-G013-11
0.32	0.50	20 to 250/260	7KM-G013-17
0.53	1.00	20 to 230/240	7KK-G013-22

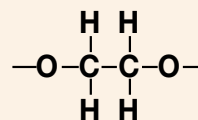
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

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-WAX_{PLUS} 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 Zebron GC order.



ZB-624PLUS™

- Enhanced peak shape with superior deactivation
- Increased sensitivity for high boiling solvents
- Extremely low bleed for GC-MS
- High temperature stability (300/320 °C)

Upgrade to Zebron from these similar* phases:

Agilent®

- CP-Select 624 CB
- DB-624UI Ultra Inert

Restek®

- Rxi®-624Sil MS

*not exact equivalent, selectivity may differ

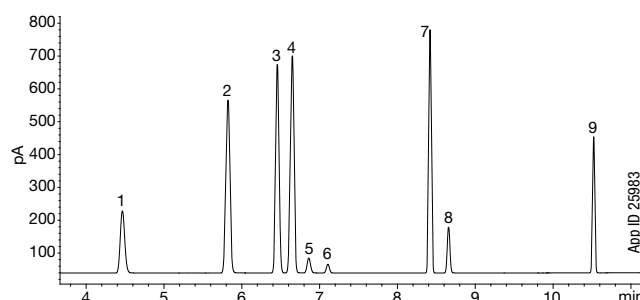
What Makes the PLUS in ZB-624PLUS?

- Enhanced Inertness**
Proprietary superior deactivation gives great peak shape for troublesome compounds.
- High Selectivity**
A G43 phase that's highly selective for polar, non-polar, low and high boiling solvents.
- Column-to-Column Reproducibility**
Excellent column-to-column reproducibility well suited for validated methods.
- Temperature Limits**
Push the temperature limits of traditional 624 and elute/bake high boiling analytes at 300/320 °C.
- MS Certified**
Low bleed characteristics makes it the right choice for GC-MS.

Shorter Residual Solvent Analysis by GC-FID

Upgrade to ZB-624PLUS and get short runtime, low bleed, high temperature resistance, and the 624 selectivity, all in one column.

Separation of Residual Solvent Critical Pairs in Less than 15 min



Column: Zebron ZB-624PLUS

Dimensions: 30 meter x 0.32 mm x 1.80 µm

Part No.: [7HM-G040-31](#)

Injection: Split 20:1 @ 200 °C, 1 µL

Recommended Liner: Zebron PLUS Straight Z-Liner™

Liner Part No.: [AG2-0A03-05](#) (for Agilent® & Thermo Scientific® systems)

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

Oven Program: 40 °C for 5 min to 260 °C @ 25 °C/min for 3 min

Detector: FID @ 250 °C

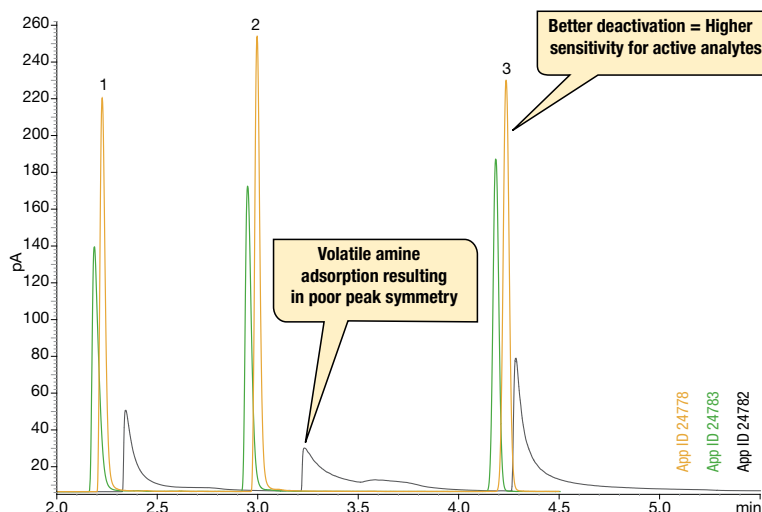
Sample:

1. Methanol	6. DCM
2. Ethanol	7. Ethyl Acetate
3. Acetone	8. THF
4. IPA	9. Toluene
5. Acetonitrile	

Improved Peak Shape of Volatile Amines

ZB-624PLUS GC column undergoes a superior deactivation process which minimizes active compound adsorption leading to gains in peak response and shape.

Comparison of Volatile Amines on Various 624 Columns



Volatile Amines on a Zebron ZB-624PLUS - 500 ppm

Volatile Amines on a Restek® Rxi®-624Sil MS - 500 ppm

Volatile Amines on a Agilent® DB®-624UI Ultra Inert - 500 ppm

Conditions for all separations:

Column: Zebron ZB-624PLUS

Restek Rxi-624Sil MS

Agilent [DB-624UI](#) Ultra Inert

Dimensions: 30 meter x 0.32 mm x 1.80 µm

Injection: Split 20:1 @ 200 °C, 1 µL

Recommended Liner: Zebron PLUS Straight Z-Liner™

Liner Part No.: [AG2-0A03-05](#) (for Agilent® & Thermo Scientific® systems)

Carrier Gas: Helium @ 1.8 mL/min (constant flow)

Oven Program: 50 °C for 1 min, to 200 °C @ 20 °C/min for 5 min

Detector: FID @ 250 °C

Sample:

- Isopropylamine
- Diethylamine
- Triethylamine

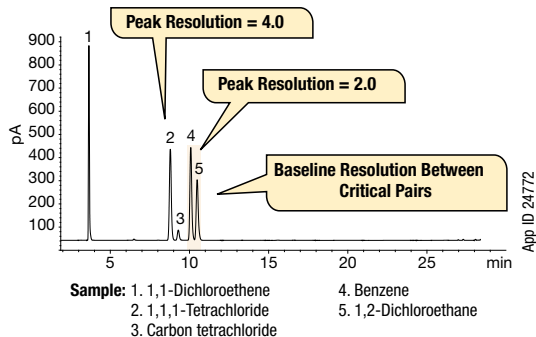




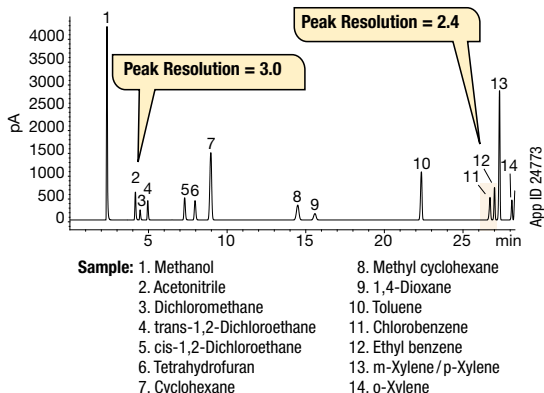
ZB-624PLUS™ (cont'd)

Exceeding USP <467> System Suitability

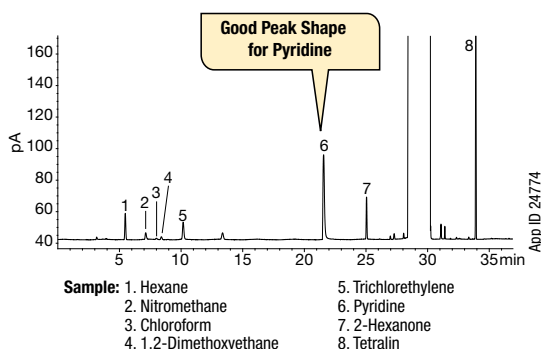
Class 1 Residual Solvents



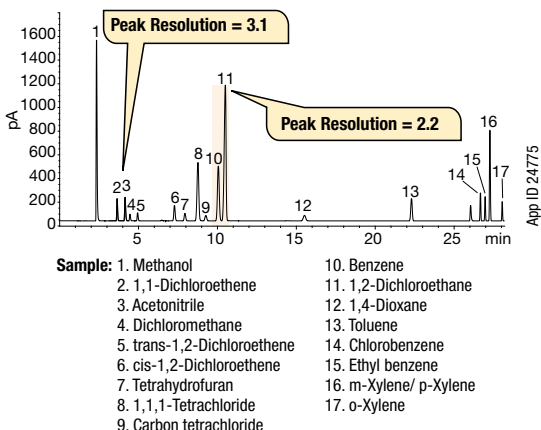
Class 2A Residual Solvents



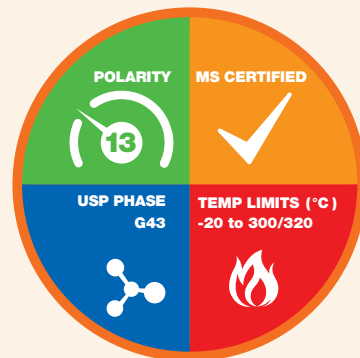
Class 2B Residual Solvents



Class 1 and 2A Residual Solvents



Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

- Cannabis
- Terpenes
- Residual solvents
- Volatile Amines
- EPA Method 8260
- EPA Method 524
- EPA Method 624
- Food
- Flavors and Fragrances
- Solvent purity
- Alcohols

Same conditions for all separations:

Column: Zebron ZB-624PLUS

Dimensions: 30 meter x 0.32 mm x 1.80 µm

Part No.: ZHM-G040-31

Injection: Split 5:1 @ 140 °C, 1 µL

Recommended Liner: Zebron PLUS Straight Z-Liner™

Liner Part No.: AG2-0A03-05 (for Agilent® & Thermo Scientific® systems)

Carrier Gas: Helium @ 2.2 mL/min (constant flow)

Oven Program: 40 °C for 20 min to 240 °C @ 10 °C/min

Detector: FID @ 250 °C

Ordering Information

Zebron ZB-624PLUS GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
20-Meter			
0.18	1.00	-20 to 300/320	7FD-G040-22
30-Meter			
0.25	1.40	-20 to 300/320	7HG-G040-27
0.32	1.80	-20 to 300/320	7HM-G040-31
0.53	3.00	-20 to 300/320	7HK-G040-36
60-Meter			
0.25	1.40	-20 to 300/320	7KG-G040-27
0.32	1.80	-20 to 300/320	7KM-G040-31
0.53	3.00	-20 to 300/320	7KK-G040-36
75-Meter			
0.53	3.00	-20 to 300/320	7LK-G040-36

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages. 0.18mm, 0.25mm, and 0.32mm IDs are MS certified.

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®

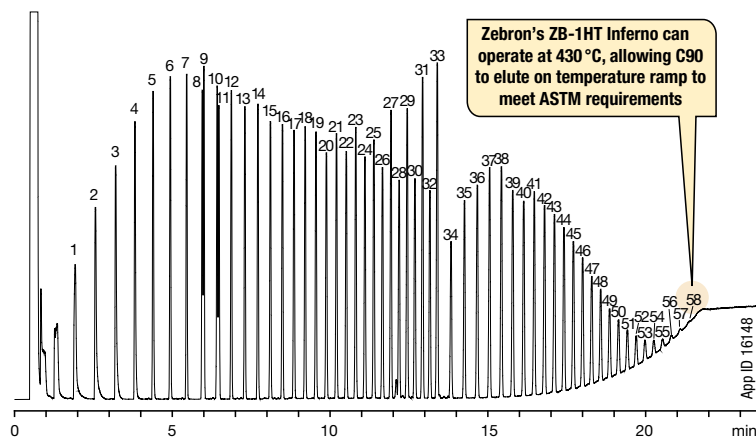
- BP1

Supelco®

- SPB®-1
- Petrocol® 2887

Rugged, High-Temperature Performance

Great Separation of High Boiling Hydrocarbons (ASTM D6352)

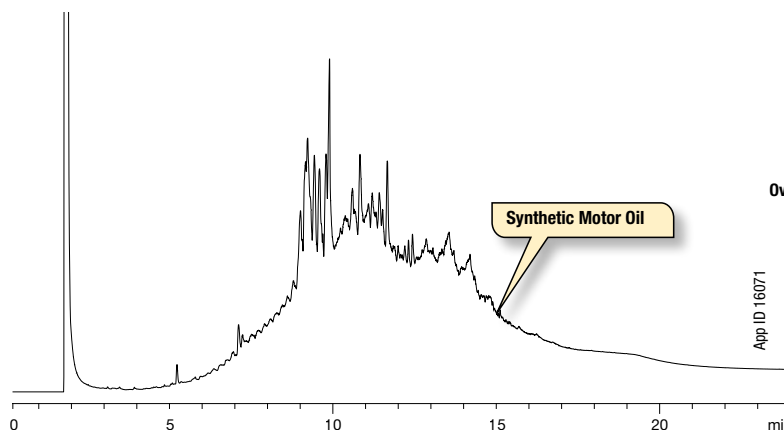


Column: Zebron ZB-1HT Inferno
Dimensions: 5 meter x 0.53 mm x 0.10 µm
Part No.: [ZAK-G014-02](#)
Injection: On-Column @ 43 °C, 0.1 µL
Carrier Gas: Helium @ 4.4 mL/min (constant flow)
Oven Program: 40 °C for 0.5 min to 430 °C @ 20 °C/min for 10 min
Detector: FID @ 430 °C
Sample:

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 CS₂/Chloroform

Bake Off Contaminants from Dirty Matrices

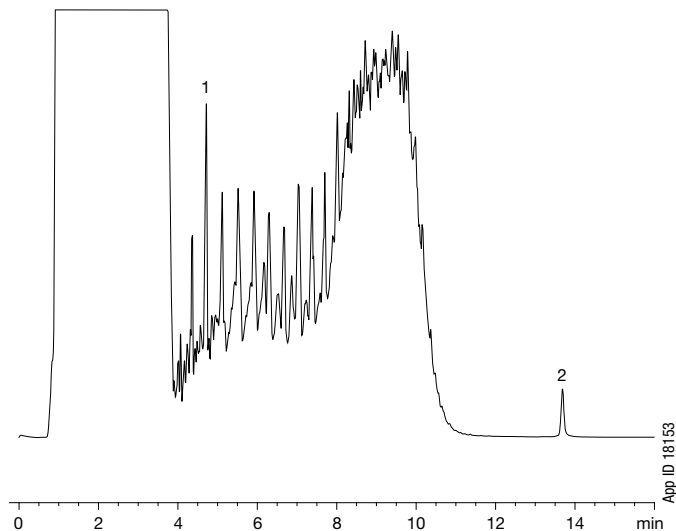


Column: Zebron ZB-1HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: [ZH-G014-02](#)
Injection: On-Column @ 153 °C, 1 µL
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 150 °C to 400 °C @ 14 °C/min for 6 min
Detector: FID @ 400 °C
Sample: Sample was 1% in dichloromethane
 Mobil®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

ZB-1HT Inferno™ (cont'd)

Run Versatile Samples

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



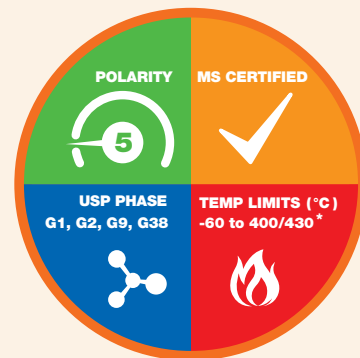
Column: Zebtron ZB-1HT Inferno
Dimensions: 15 meter x 0.32 mm x 0.25 µm
Part No.: [ZEM-G014-11](#)
Injection: Splitless @ 300 °C, 20 µL
Carrier Gas: Helium @ 2.0 mL/min (constant flow)
Oven Program: 50 °C for 2 min to 320 °C @ 30 °C/min for 5 min
Detector: FID @ 330 °C
Sample: 1. Decane (C10)
2. Tetracontane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

Ordering Information

Zebtron ZB-1HT Inferno GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
5-Meter			
0.53	0.10	-60 to 400	7AK-G014-02
10-Meter			
0.32	0.25	-60 to 400/430	ZCM-G014-11
15-Meter			
0.25	0.10	-60 to 400/430	ZEG-G014-02
0.25	0.25	-60 to 400/430	ZEG-G014-11
0.32	0.10	-60 to 400/430	ZEM-G014-02
0.32	0.25	-60 to 400/430	ZEM-G014-11
0.53	0.15	-60 to 400	ZEK-G014-05
20-Meter			
0.18	0.18	-60 to 400/430	7FD-G014-08
30-Meter			
0.25	0.10	-60 to 400/430	7HG-G014-02
0.25	0.25	-60 to 400/430	7HG-G014-11
0.32	0.10	-60 to 400/430	7HM-G014-02
0.32	0.25	-60 to 400/430	7HM-G014-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

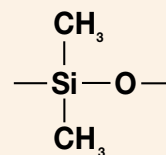
Column Profile



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

Engineered Self Cross-linking™ (ESC)

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.: [AG0-5155](#)



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



Extend column lifetime.
Add a Z-Guard™ to your Zebtron GC order.

ZB-5HT Inferno™

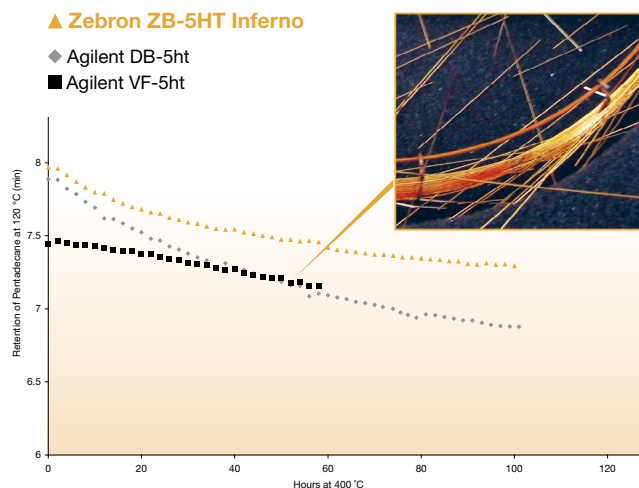
Robust Results Up to 430 °C

- 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

Zebtron 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 GC column 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 Zebtron 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 [AG0-7578](#)
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 Zebtron from any
5% phenyl / 95% dimethylpolysiloxane phase:

Agilent®

- DB®-5ht
- VF-5ht

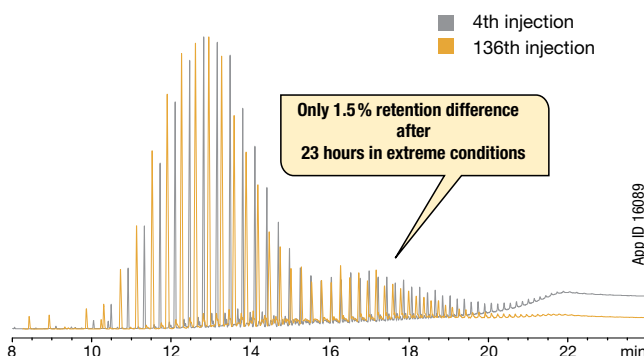
Restek®

- Rxi®-5HT
- Sbt®-5HT
- XTI®-5HT
- Rtx®-5HT

SGE®

- HT-5

Paraffin Wax

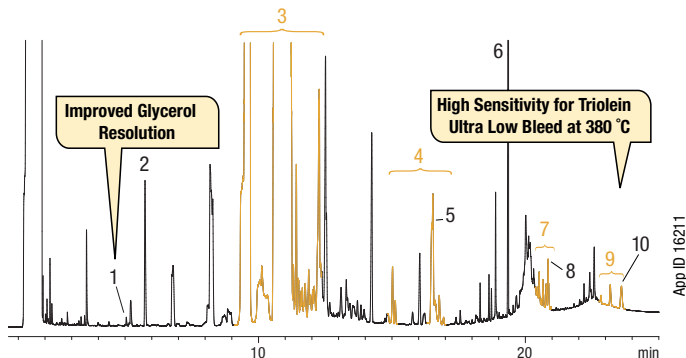


Column: Zebtron ZB-5HT Inferno
Dimensions: 15 meter x 0.32 mm x 0.10 µm
Part No.: [ZEM-G015-02](#)
Injection: On Column @ 43 °C, 0.1 µL
Carrier Gas: Helium @ 1.9 mL/min (constant flow)
Oven Program: 40 °C for 2 min to 430 °C @ 20 °C for 10 min
Detector: FID @ 430 °C
Sample: Paraffin Wax

ZB-5HT Inferno™ (cont'd)

Well-Suited for Fuels Analysis

Free Total Glycerin in B100 Biodiesel by GC-FID



App ID 16211

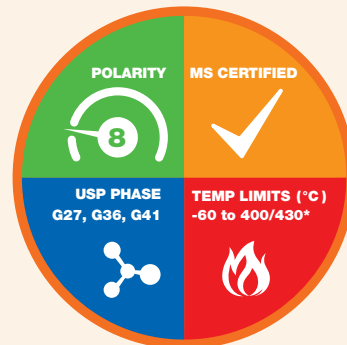
Column: Zebtron ZB-5HT Inferno
Dimensions: 15 meter x 0.32 mm x 0.10 µm
+ 2 meter x 0.53 mm Z-Guard™
Part No.: [ZEM-G015-02](#)
Injection: On-Column @ 53 °C, 1 µL
Carrier Gas: Helium @ 3.0 mL/min (constant flow)
Oven Program: 50 °C for 1 min to 180 °C @ 15 °C/min to 230 °C @ 7 °C/min to 380 °C
@ 30 °C/min 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. Tricaprin (ISTD2)
2. Butanetriol (ISTD1) 7. Diglycerides
3. Esters 8. 1,3-Diolein
4. Monoglycerides 9. Triglycerides
5. 1-Monooleoyl-rac-glycerol 10. Triolein

Ordering Information

Zebtron ZB-5HT Inferno GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
10-Meter			
0.32	0.10	-60 to 400/430	ZCM-G015-02
15-Meter			
0.25	0.10	-60 to 400/430	ZEG-G015-02
0.25	0.25	-60 to 400/430	ZEG-G015-11
0.32	0.10	-60 to 400/430	ZEM-G015-02
0.32	0.25	-60 to 400/430	ZEM-G015-11
0.53	0.15	-60 to 400	ZEK-G015-05
15-Meter with 2-Meter Spliced Guard (0.53 mm ID)			
0.32	0.10	-60 to 400/430	ZEM-G015-02-GST
20-Meter			
0.18	0.18	-60 to 400/430	ZFD-G015-08
30-Meter			
0.25	0.10	-60 to 400/430	ZHG-G015-02
0.25	0.25	-60 to 400/430	ZHG-G015-11
0.32	0.10	-60 to 400/430	ZHM-G015-02
0.32	0.25	-60 to 400/430	ZHM-G015-11
0.53	0.15	-60 to 400	ZHK-G015-05
60-Meter			
0.25	0.25	-60 to 400/430	ZKG-G015-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

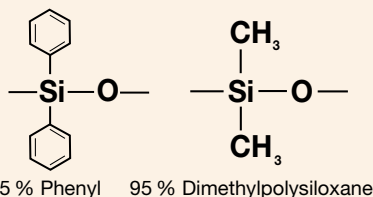
Column Profile



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

Engineered Self Cross-linking™ (ESC)

Phase Chemistry



Recommended Applications

- Diesel fuels
- High boiling petroleum products
- High molecular weight waxes
- Hydrocarbons
- Motor oils
- Polymers/Plastics
- Simulated distillation
- Surfactants
- Triglycerides



ZB-5HT Test Mix

Part No.: [AG0-5155](#)



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 Zebtron from any
35 % phenyl / 65 % dimethylpolysiloxane phase:

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

Lower Bleed Than Other Columns!

Conditions for all columns:

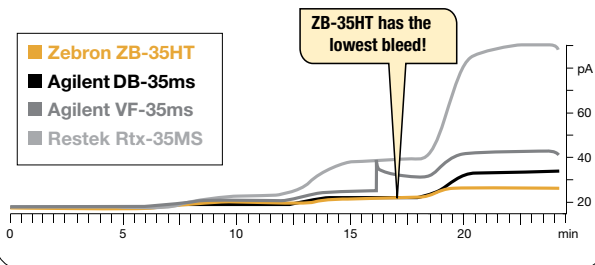
Dimensions: 30 meter x 0.25 mm x 0.25 µm

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

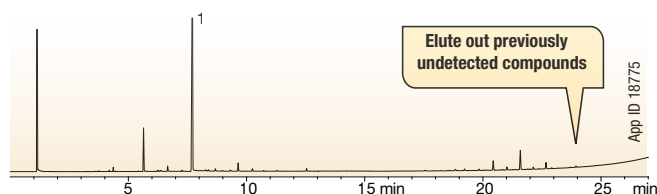
Detector: FID @ 405 °C



See What You've Been Missing

A) ZB-35HT Inferno

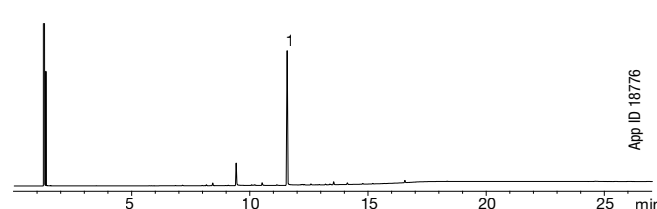
30 meter x 0.25 mm x 0.25 µm



VS.

B) Restek Rtx-35

30 meter x 0.25 mm x 1.00 µm



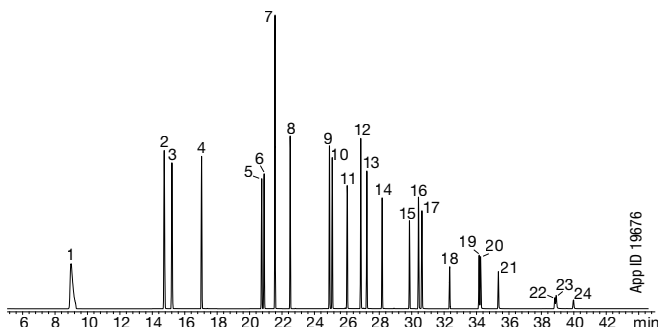
Column: As listed
Dimensions: As listed
Part No.: ZHG-G025-11 (ZB-35HT Inferno)
Injection: A) Split 50:1 @ 350 °C, 1 µL
 B) Split 50:1 @ 300 °C, 1 µL
Carrier Gas: Helium @ 2.1 mL/min (constant flow)
Oven Program: A) 140 °C to 400 °C @ 10 °C/min
 B) 140 °C to 300 °C @ 10 °C/min
Detector: A) FID @ 400 °C
 B) FID @ 320 °C
Sample: 1. Hexadecylamine

Note: Chromatogram is courtesy of Northeastern Chemical Company.

ZB-35HT Inferno™ (cont'd)

Well-Suited for Environmental Contaminants

PAHs and PCBs in a Single Run



Column: Zebtron ZB-35HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: ZHG-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

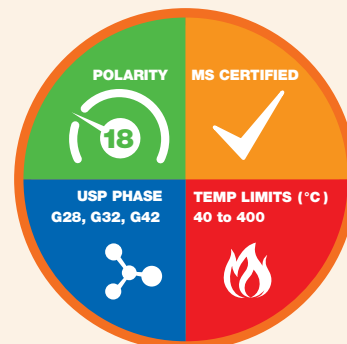
- | | | |
|-------------------|------------------------|----------------------------|
| 1. Naphthalene | 9. PCB 101 | 17. Chrysene |
| 2. Acenaphthylene | 10. Fluoranthene | 18. PCB 194 |
| 3. Acenaphthene | 11. Pyrene | 19. Benzo[b]fluoranthene |
| 4. Fluorene | 12. PCB 118 | 20. Benzo[k]fluoranthene |
| 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. Benzo[a]anthracene | 24. Benzo[g,h,i]perylene |

Ordering Information

Zebtron ZB-35HT Inferno GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.10	40 to 400	ZEG-G025-02
0.25	0.25	40 to 400	ZEG-G025-11
0.32	0.25	40 to 400	ZEM-G025-11
20-Meter			
0.18	0.18	40 to 400	ZFD-G025-08
30-Meter			
0.25	0.10	40 to 400	ZHG-G025-02
0.25	0.25	40 to 400	ZHG-G025-11
0.32	0.25	40 to 400	ZHM-G025-11

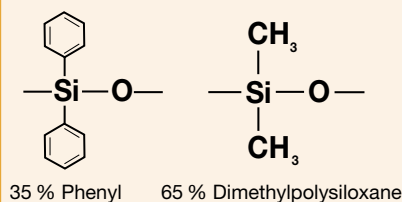
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



Recommended Applications

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



ZB-35HT Test Mix
Part No.: AG0-5156



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



Extend column lifetime.
Add a Z-Guard™ to your Zebtron GC order.

ZB-XLB-HT Inferno™

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 Zebtron from these similar* phases:

Agilent®

- DB®-XLB
- VF-XMS

Restek®

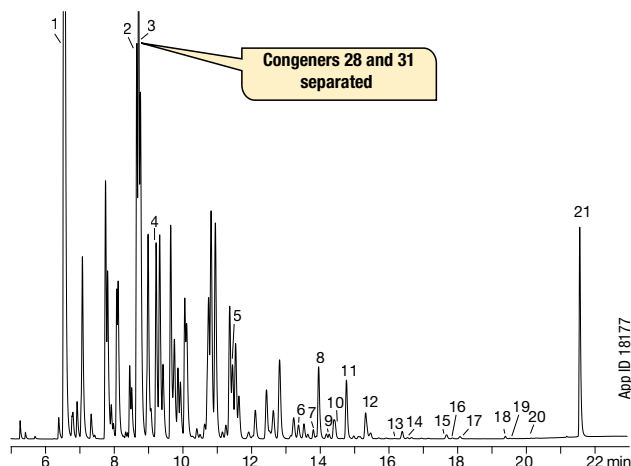
- DB®-XLB

Supelco®

- MDN-12

*not exact equivalent, selectivity may differ

Aroclor 1242: DIN Method 51527

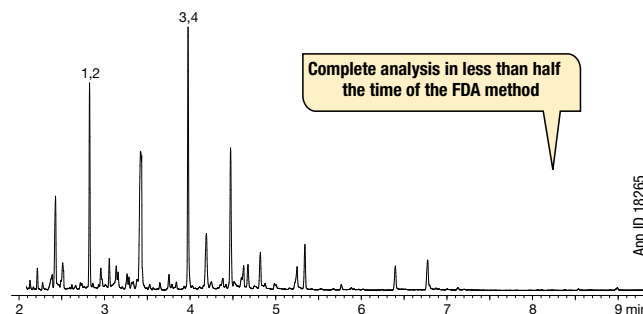


App ID 18177

Column: Zebtron 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



App ID 18265

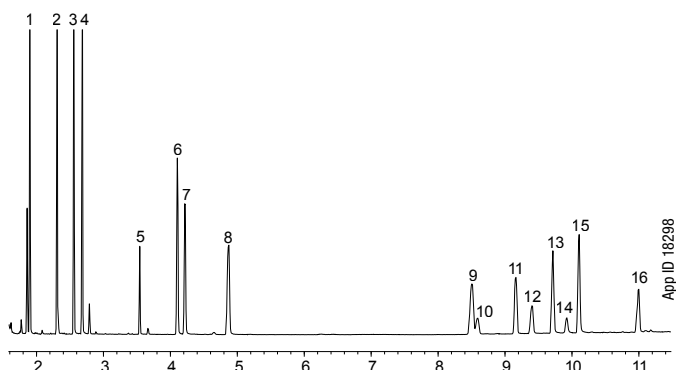
Column: Zebtron ZB-XLB-HT Inferno
Dimensions: 15 meter x 0.25 mm x 0.25 µm
Part No.: [7EG-G024-11](#)
Injection: On-Column @ 103 °C, 1 µL
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 100 °C for 0.5 min to 320 °C @ 25 °C/min
Detector: MSD @ 325 °C
Sample: Analytes are 200 ng / 100 µL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

1. Cyanuric Acid 13C3 (IS)
2. Cyanuric Acid
3. Melamine 13C3 15N3 (IS)
4. Melamine

ZB-XLB-HT Inferno™ (cont'd)

Good Results for Difficult Samples

Explosives 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 @ 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

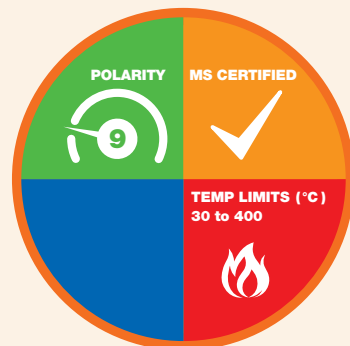
1. Nitrobenzene	9. 2,4,6-Trinitrotoluene (2,4,6-TNT)
2. 2-Nitrotoluene	10. PETN
3. 3-Nitrotoluene	11. 1,3,5-Trinitrobenzene (1,3,5-TNB)
4. 4-Nitrotoluene	12. RDX
5. Nitroglycerin	13. 4-Amino-2,6-dinitrotoluene
6. 2,6-Dinitrotoluene (2,6-DNT)	14. 3,5-Nitroaniline
7. 1,3-Dinitrobenzene (1,3-DNB)	15. 2-Amino-4,6-dinitrotoluene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

Ordering Information

Zebron ZB-XLB-HT Inferno GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.10	30 to 400	7EG-G024-02
0.25	0.25	30 to 400	7EG-G024-11
20-Meter			
0.18	0.18	30 to 400	7FD-G024-08
30-Meter			
0.25	0.10	30 to 400	7HG-G024-02
0.25	0.25	30 to 400	7HG-G024-11
0.32	0.25	30 to 400	7HM-G024-11
0.32	0.10	30 to 400	7HM-G024-02
60-Meter			
0.25	0.25	30 to 400	7KG-G024-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

- Herbicides / Insecticides
- PCBs
- Pesticides
- Unknown samples



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 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 Zebtron from any 100 % dimethylpolysiloxane phase:

Agilent®

- DB®-1
- DB-2887
- DB-1 EVDX
- HP-1
- HP-101
- HP-PONA
- Ultra 1
- CP-Sil 5 CB

Restek®

- Rtx®-1
- Rtx-1PONA
- Rtx-1 F&F

SGE®

- BP1
- BP1-PONA
- BPX1-SimD

Supelco®

- SPB®-1
- SPB-1 TG
- SE-30
- MET-1
- SPB-1 Sulfur
- SPB-HAP

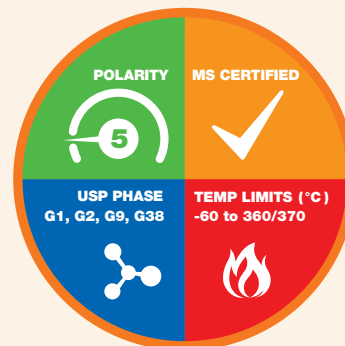
Ordering Information

Zebtron ZB-1 GC Columns

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

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

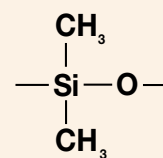
Column Profile



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

Engineered Self Cross-linking™ (ESC)

Phase Chemistry



100 % Dimethylpolysiloxane

Recommended Applications

- Ethanol
- Hydrocarbons
- Mercaptans
- MTBE
- Natural gas odorants
- Oxygenates and GROs
- Solvent impurities
- Sulfur compounds (Light)



ZB-1 Test Mix
Part No.: [AG0-5155](#)



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



Extend column lifetime.
Add a Z-Guard™ to your Zebtron 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 Zebtron from any

5 % phenyl / 95 % dimethylpolysiloxane phase:

Agilent®

- DB®-5
- HP-5
- HP-PAS-5
- CP-Sil 8 CB
- Ultra 2

Restek®

- Rtx®-5

SGE®

- BP5
- BPX5

Supelco®

- MDN-5
- SPB®-5
- PTE-5
- SE-54
- PTA-5
- Equity®-5
- Sac-5

OV®

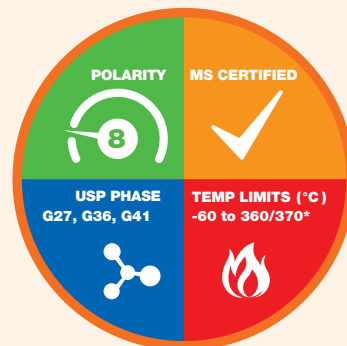
- OV-5

Ordering Information

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

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

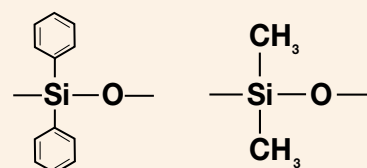
Column Profile



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

Engineered Self Cross-linking™ (ESC)

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.: [AG0-5155](#)



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



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



Extend column lifetime.
Add a Z-Guard™ to your Zebtron 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

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

Agilent®

- DB®-5ms
- DB-5.625
- DB-5ms EVDX
- CP-Sil 8 CB MS
- VF-5ms

Restek®

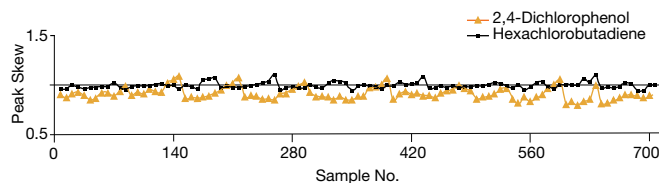
- Rtx®-5Sil MS
- Rxi®-5Sil MS

Supelco®

- SLB®-5ms

Long Lifetime

Consistent response after more than 700 samples at pH 2!

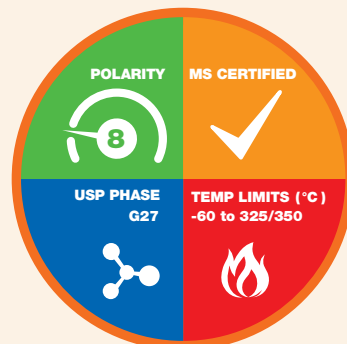


Ordering Information

Zebron ZB-5ms GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	-60 to 325/350	7CB-G010-02
0.18	0.18	-60 to 325/350	7CD-G010-08
12-Meter			
0.20	0.33	-60 to 325/350	7DE-G010-14
15-Meter			
0.25	0.25	-60 to 325/350	7EG-G010-11
25-Meter			
0.18	0.18	-60 to 325/350	7FD-G010-08
0.18	0.32	-60 to 325/350	7FD-G010-51
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G010-11
0.25	0.50	-60 to 325/350	7HG-G010-17
0.25	1.00	-60 to 325/350	7HG-G010-22
0.32	0.25	-60 to 325/350	7HM-G010-11
0.32	0.50	-60 to 325/350	7HM-G010-17
0.32	1.00	-60 to 325/350	7HM-G010-22
60-Meter			
0.25	0.10	-60 to 325/350	7KG-G010-02
0.25	0.25	-60 to 325/350	7KG-G010-11
0.32	0.25	-60 to 325/350	7KM-G010-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

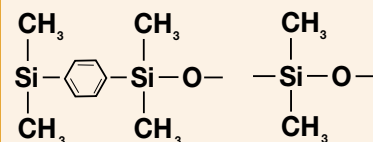
Column Profile



Engineered Self Cross-linking™ (ESC)

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 Zebron GC order.

ZB-35

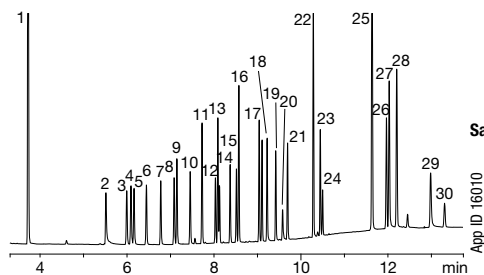
Intermediate Polarity for GC-MS

- 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 Zebtron from any
35 % phenyl / 65 % dimethylpolysiloxane phase:

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

Common Drug Screen by GC-FID



Sample: All analytes are 25 ppm except
nicotine at 100 ppm

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

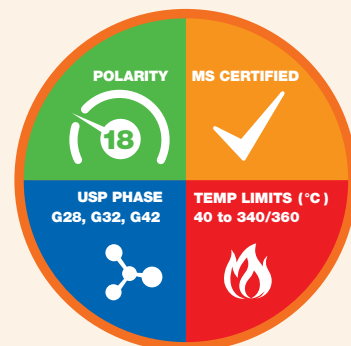
Column: Zebtron ZB-35
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: [7HG-G003-11](#)
Injection: Split 10:1 @ 225 °C, 1.5 µL
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 120 °C to 180 °C @ 25 °C/min to 200 °C @
6 °C/min to 300 °C @ 20 °C/min for 3 min
Detector: FID @ 300 °C

Ordering Information

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

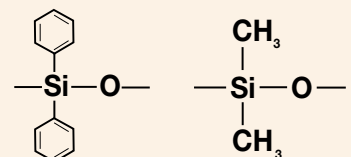
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical Consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

Phase Chemistry



35 % Phenyl 65 % Dimethylpolysiloxane

Recommended Applications

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



ZB-35 Test Mix
Part No.: [AG0-5156](#)



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



Extend column lifetime.
Add a Z-Guard™ to your Zebtron 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®

- DB®-17
- DB-17ht
- DB-17ms
- DB-17 EVDX

Restek®

- Rtx®-50

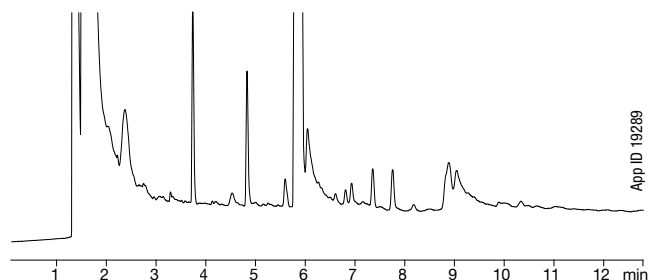
SGE®

- BPX50

Supelco®

- SP®-2250
- SPB®-17
- SPB-50

Antihistamine by GC-FID



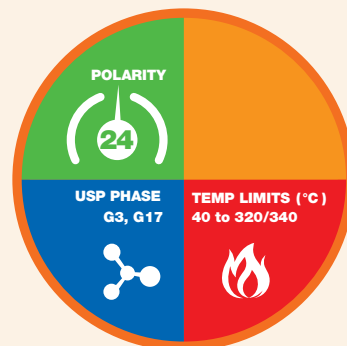
Column: Zebron ZB-50
 Dimensions: 30 meter x 0.32 mm x 0.50 µm
 Part No.: [7HM-G004-17](#)
 Injection: Split 20:1 @ 250 °C, 1 µL
 Carrier Gas: Helium @ 40 cm/sec (constant flow)
 Oven Program: 190 °C to 260 °C @ 25 °C/min for 10 min
 Detector: FID @ 270 °C
 Sample: Brompheniramine

Ordering Information

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

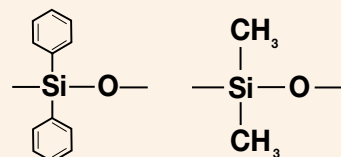
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Engineered Self Cross-linking™ (ESC)

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 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

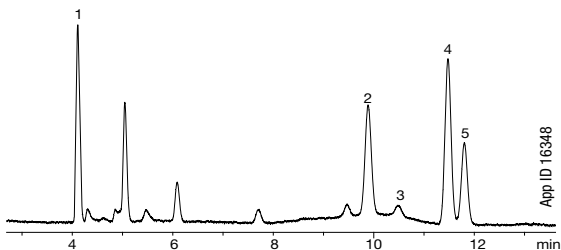
Upgrade to Zebtron from any

6 % cyanopropylphenyl / 94 % dimethylpolysiloxane phase:

Agilent®	Restek®	SGE®	Supelco®	OV®
- DB®-624 - DB-1301 - DB-VRX - HP-VOC - CP-1301 - CP-Select 624 CB	- Rtx®-624 - Rtx-1301 - Rtx-VMS	BPX624	- SPB®-624 - SPB-1301	OV-624

Good Performance for Pharmaceuticals

USP <467> Residual Solvents Procedure A — Class 1



Column: Zebtron ZB-624
Dimensions: 30 meter x 0.32 mm x 1.80 µm
Part No.: [ZHM-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

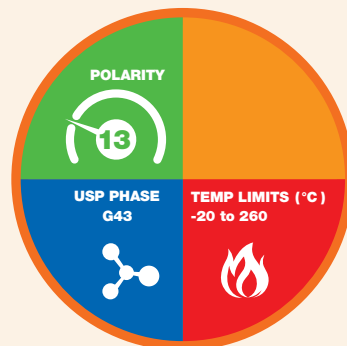
Sample: 1. 1,1-Dichloroethane
2. 1,1,1-Trichloroethane
3. Carbon tetrachloride
4. Benzene
5. 1,2-Dichloroethane

Ordering Information

Zebtron ZB-624 GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
20-Meter			
0.18	1.00	-20 to 260	7FD-G005-22
30-Meter			
0.25	1.40	-20 to 260	ZHG-G005-27
0.32	1.80	-20 to 260	ZHM-G005-31
0.53	3.00	-20 to 260	ZHK-G005-36
0.53	1.00	-20 to 260	ZHK-G005-22
60-Meter			
0.25	1.40	-20 to 260	ZKG-G005-27
0.32	1.80	-20 to 260	ZKM-G005-31
0.53	3.00	-20 to 260	ZKK-G005-36
75-Meter			
0.53	3.00	-20 to 260	ZLK-G005-36
105-Meter			
0.53	3.00	-20 to 260	ZNK-G005-36

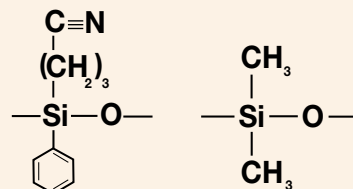
Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

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 Zebtron GC order.

ZB-1701

Alternate Selectivity for Mid-Polarity Analyses

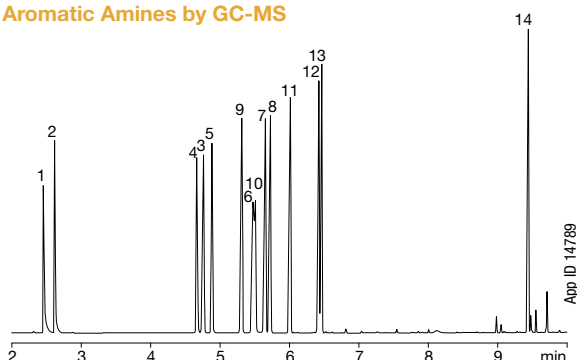
- Fast run and re-equilibration times for enhanced sample throughput and productivity
- Provides alternate selectivity to phenyl phases with similar polarity

Upgrade to Zebron 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	

Good Peak Shape for Active Analytes

Aromatic Amines by GC-MS



Column: Zebron ZB-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

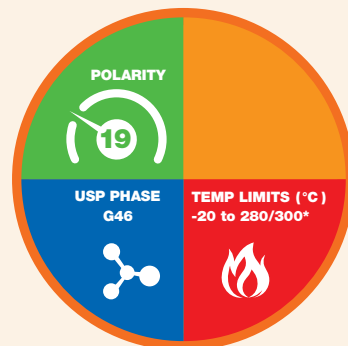
1. Piperidine	8. o-Toluidine
2. 2-Methylpiperidine	9. N,N-Dimethylaniline
3. Aniline	10. β-Phenylethylamine
4. Benzylamine	11. N-Ethylaniline
5. α-Phenylethylamine	12. 2,4-Dimethylaniline
6. N-Methylaniline	13. N,N-Diethylaniline
7. m-Toluidine	14. Dibenzylamine

Ordering Information

Zebron ZB-1701 GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
0.25	0.25	-20 to 280/300	7EG-G006-11
0.32	0.25	-20 to 280/300	7EM-G006-11
30-Meter			
0.25	0.25	-20 to 280/300	7HG-G006-11
0.25	1.00	-20 to 260/280	7HG-G006-22
0.32	0.25	-20 to 280/300	7HM-G006-11
0.32	1.00	-20 to 260/280	7HM-G006-22
0.53	1.00	-20 to 260/280	7HK-G006-22
60-Meter			
0.25	0.25	-20 to 280/300	7KG-G006-11
0.32	0.25	-20 to 280/300	7KM-G006-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

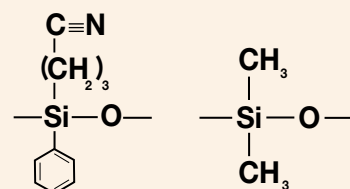
Column Profile



*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
- Tranquilizers



ZB-1701 Test Mix
Part No.: [AG0-5156](#)



For enhanced response to Endrin and DDT, consider using ZB-1701P. Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.



Extend column lifetime. Add a Z-Guard™ to your Zebron GC order.

ZB-1701P

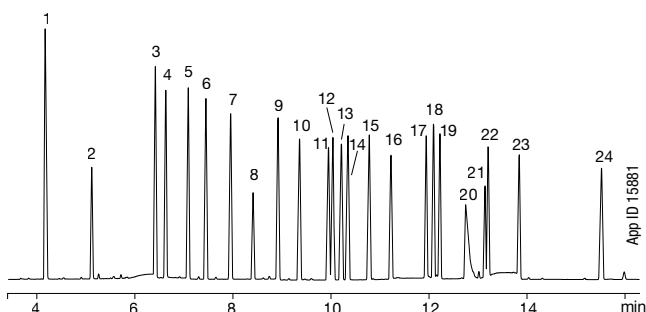
Enhanced Response for DDT and Endrin

- 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



Column: Zebron ZB-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

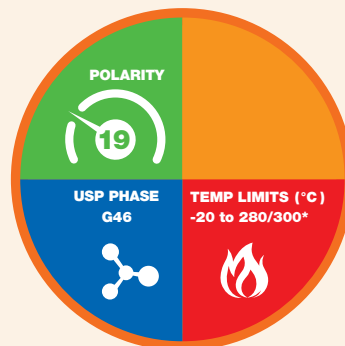
1. 1-Bromo-2-Nitrobenzene (IS)	9. δ-BHC	17. DDD
2. Tetrachloro-m-xylene (Surr)	10. Heptachlor Epoxide	18. Endosulfan II
3. α-BHC	11. Endosulfan I	19. DDT
4. Pentachloronitrobenzene (IS)	12. γ-Chlordane	20. Endrin Aldehyde
5. γ-BHC (Lindane)	13. α-Chlordane	21. Methoxychlor
6. Heptachlor	14. DDE	22. Endosulfan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

Ordering Information

Zebron ZB-1701P GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.25	-20 to 280/300	7HG-G012-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

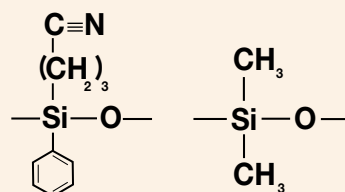
Column Profile



*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



ZB-1701 Test Mix
Part No.: [AG0-5156](#)



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



Extend column lifetime.
 Add a Z-Guard™ to your Zebron GC order.

ZB-WAX

PEG Versatility for Solvents, Acids, and Amines

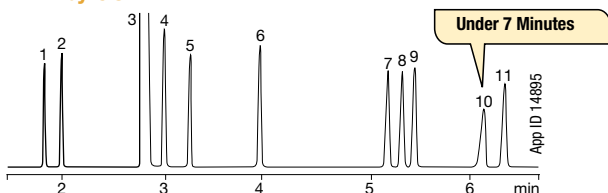
- High polarity column with low bleed (MS certified) for improved results
- Highly stable, long lifetime
- Low activity for amines
- Bonded, solvent rinsible
- Excellent chromatography of polar complex mixtures
- Widely used for profiling and “fingerprinting”

Upgrade to Zebron from any polyethylene glycol phase:

Agilent®	Restek®	SGE®	Supelco®
• DB®-WAXetr • HP-INNOWax • CP-Wax 57 CB	• Rtx®-WAX • Famewax • Stabilwax®-DB	• SolGel-WAX™	• Met-Wax • Omegawax

Performs for Industrial Chemicals

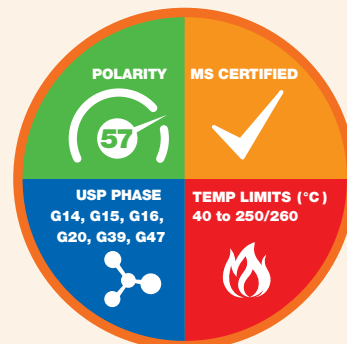
BTEX by GC-FID



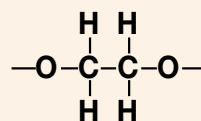
Column: Zebron ZB-WAX
Dimensions: 30 meter x 0.32 mm x 0.50 µm
Part No.: [7HM-G007-17](#)
Injection: Split 20:1 @ 250 °C, 0.2 µL
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 60 °C to 75 °C @ 15 °C/min to 90 °C @ 3 °C/min (hold 3 min)
Detector: FID @ 300 °C

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

Column Profile



Phase Chemistry



100 % Polyethylene Glycol

Recommended Applications

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

Ordering Information

Zebron ZB-WAX GC Columns			
ID (mm)	df (µm)	Temp. Limits °C	Part No.
10-Meter			
0.10	0.10	20 to 250/260	7CB-G007-02
15-Meter			
0.25	0.25	20 to 250/260	7EG-G007-11
0.32	0.25	20 to 250/260	7EM-G007-11
0.53	1.00	20 to 250/260	7EK-G007-22
20-Meter			
0.18	0.18	20 to 250/260	7FD-G007-08
30-Meter			
0.25	0.15	20 to 250/260	7HG-G007-05
0.25	0.25	20 to 250/260	7HG-G007-11
0.25	0.50	20 to 250/260	7HG-G007-17
0.25	1.00	20 to 250/260	7HG-G007-22
0.32	0.15	20 to 250/260	7HM-G007-05
0.32	0.25	20 to 250/260	7HM-G007-11
0.32	0.50	20 to 250/260	7HM-G007-17
0.53	0.50	20 to 250/260	7HK-G007-17
0.53	1.00	20 to 250/260	7HK-G007-22
60-Meter			
0.25	0.25	20 to 250/260	7KG-G007-11
0.25	0.50	20 to 250/260	7KG-G007-17
0.32	0.25	20 to 250/260	7KM-G007-11
0.32	0.50	20 to 250/260	7KM-G007-17
0.53	1.00	20 to 250/260	7KK-G007-22

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.



ZB-WAX Test Mix
Part No.: [AG0-5158](#)



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



Extend column lifetime.
 Add a Z-Guard™ to your Zebron GC order.

ZB-FFAP

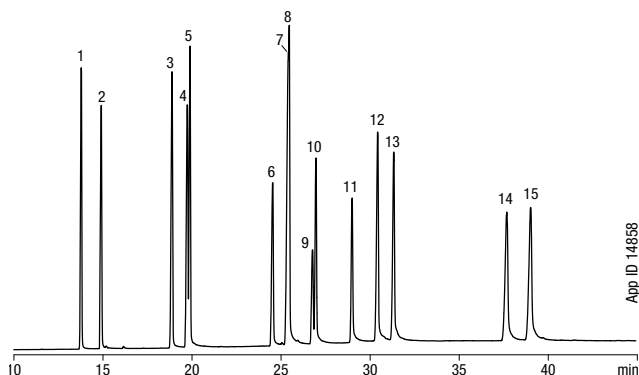
Improve Resolution for Free Fatty Acids

- 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 Zebbron from any nitroterephthalic acid modified polyethylene glycol phase:

Agilent®	Restek®	SGE®	Supelco®	OV®
• DB®-FFAP • HP-FFAP • CP-Wax 58 FFAP CB • CP-FFAP CB	• Stabilwax®-DA	• BP21	• Nukol • SPB®-1000	• OV-351

Unsaturated Free Fatty Acids by GC-FID



App ID 14858

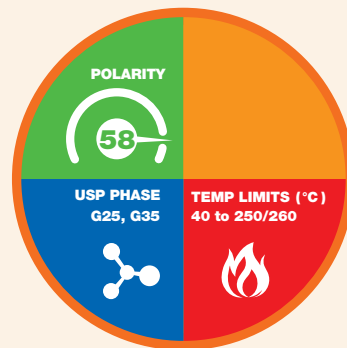
Column: Zebbron ZB-FFAP Dimensions: 60 meter x 0.25 mm x 0.25 µm Part No.: 7KG-G009-11 Injection: Split 40:1 @ 220 °C, 0.2 µL Carrier Gas: Helium @ 2.4 mL/min (constant flow) Oven Program: 200 °C to 260 °C @ 2 °C/min for 30 min Detector: FID @ 250 °C	Sample: 1. Myristic Acid (C14:0) 2. Myristoleic Acid (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. Linolelaidic Acid (C18:2t) 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)
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Ordering Information

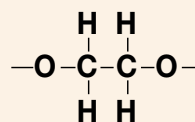
Zebbron ZB-FFAP GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
15-Meter			
0.25	0.25	40 to 250/260	7EG-G009-11
0.32	0.25	40 to 250/260	7EM-G009-11
0.53	1.00	40 to 250/260	7EK-G009-22
30-Meter			
0.25	0.25	40 to 250/260	7HG-G009-11
0.32	0.25	40 to 250/260	7HM-G009-11
0.32	0.50	40 to 250/260	7HM-G009-17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

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



Phase Chemistry



Nitroterephthalic Acid Modified Polyethylene Glycol

Recommended Applications

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



ZB-FFAP Test Mix
Part No.: [AG0-5158](#)



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



Extend column lifetime. Add a Z-Guard™ to your Zebbron GC order.

ZB-XLB

Get Extremely 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

Upgrade to Zebron from these similar* phases:

Agilent®

- DB®-XLB
- VF-XMS

Restek®

- Rtx®-XLB
- Rxi®-XLB

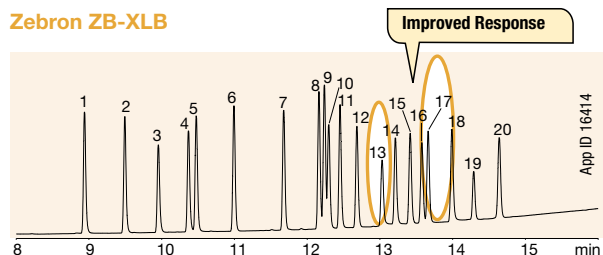
Supelco®

- MDN-12

*not exact equivalent, selectivity may differ

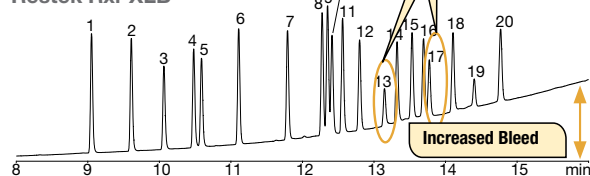
Better Performance for Chlorinated Pesticides EPA Method 8081A

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

- Sample:**
- | | |
|-----------------------|------------------------|
| 1. a-BHC | 11. 4,4'-DDE |
| 2. g-BHC | 12. Dieldrin |
| 3. b-BHC | 13. Endrin |
| 4. d-BHC | 14. 4,4'-DDD |
| 5. Heptachlor | 15. Endosulfan II |
| 6. Aldrin | 16. Endrin aldehyde |
| 7. Heptachlor epoxide | 17. 4,4'-DDT |
| 8. g-Chlordane | 18. Endosulfan sulfate |
| 9. a-Chlordane | 19. Methoxychlor |
| 10. Endosulfan I | 20. Endrin ketone |

Comparative separations may not be representative of all applications.

Ordering Information

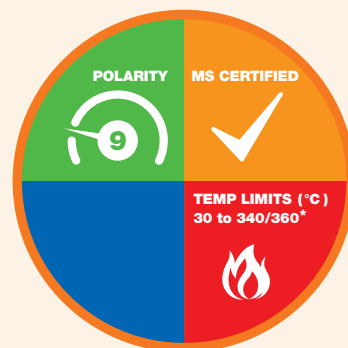
Zebron ZB-XLB GC Columns			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
20-Meter			
0.18	0.18	30 to 340/360	7FD-G019-08

Ordering Information

Zebron ZB-XLB GC Columns (cont'd)			
ID(mm)	df(µm)	Temp. Limits °C	Part No.
30-Meter			
0.25	0.25	30 to 340/360	7HG-G019-11
0.25	0.50	30 to 340/360	7HG-G019-17
0.32	0.50	30 to 340/360	7HM-G019-17
60-Meter			
0.25	0.25	30 to 340/360	7KG-G019-11

Note: If you need a 5 in. cage, contact technical support at www.phenomenex.com/chat or simply reach out to your Technical consultant. Conditions may apply. Agilent 6850, some SRI and process GC systems use only 5 in. cages.

Column Profile



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

Engineered Self Cross-linking™ (ESC)

Phase Chemistry

- Proprietary

Recommended Applications

- Herbicides / Insecticides
- PCBs
- Pesticides
- Unknown Samples



ZB-XLB 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 Zebron GC order.

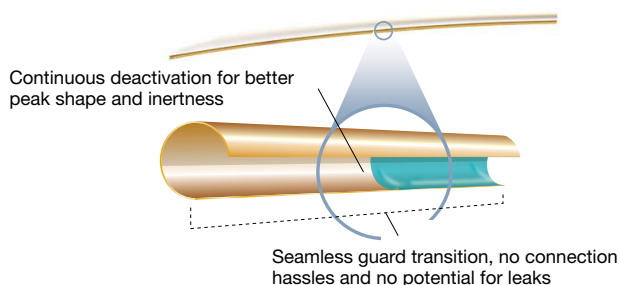
Guardian Integrated Guard Columns

Built-in Column Protection: No Leaks, No Worries!

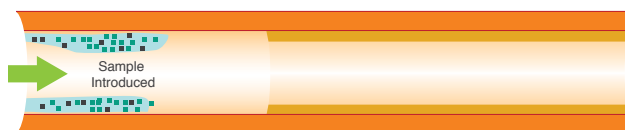
Why Choose Zebtron With Guardian?

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.

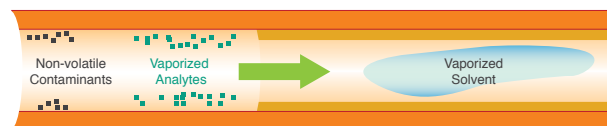
- Eliminate the potential for leaks
- Extend column life
- Improve analyte focusing for low boiling compounds
- Aggressively tested to ensure deactivation



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

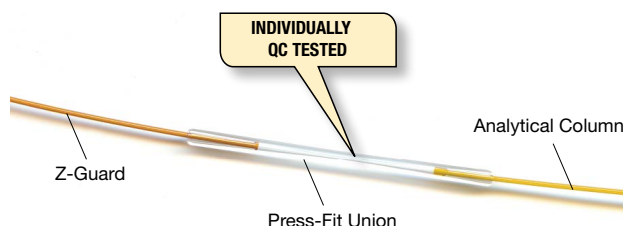
Zebtron GC Column Phase	Dimensions	2 m Guardian Part No.	5 m Guardian Part No.	10 m Guardian Part No.
ZB-1PLUS	30 meter x 0.25 mm x 0.25 µm	—	7HG-G031-11-GGA	7HG-G031-11-GGC
ZB-5ms	15 meter x 0.25 mm x 0.25 µm	—	—	7EG-G010-11-GGC
ZB-5ms	30 meter x 0.25 mm x 0.25 µm	—	7HG-G010-11-GGA	7HG-G010-11-GGC
ZB-5ms	30 meter x 0.32 mm x 0.25 µm	—	7HM-G010-11-GGA	—
ZB-5ms	30 meter x 0.32 mm x 1.00 µm	—	7HM-G010-22-GGA	—
ZB-5MSPLUS™	30 meter x 0.25 mm x 0.25 µm	—	7HG-G030-11-GGA	7HG-G030-11-GGC
ZB-5	30 meter x 0.25 mm x 0.25 µm	—	7HG-G002-11-GGA	7HG-G002-11-GGC
ZB-5	30 meter x 0.25 mm x 0.50 µm	—	—	7HG-G002-17-GGC
ZB-5HT Inferno	30 meter x 0.25 mm x 0.10 µm	—	7HG-G015-02-GGA	—
ZB-5HT Inferno	30 meter x 0.25 mm x 0.25 µm	—	7HG-G015-11-GGA	—
ZB-5PLUS™	20 meter x 0.18 mm x 0.18 µm	—	7FD-G032-08-GGA	—
ZB-5PLUS	30 meter x 0.25 mm x 0.10 µm	—	7HG-G032-02-GGA	—
ZB-5PLUS	30 meter x 0.25 mm x 0.25 µm	—	7HG-G032-11-GGA	—
ZB-50	10 meter x 0.18 mm x 0.18 µm	7CD-G004-08-GGT	—	—
ZB-MultiResidue™-1	30 meter x 0.25 mm x 0.25 µm	—	—	7HG-G016-11-GGC
ZB-SemiVolatiles	30 meter x 0.25 mm x 0.25 µm	—	7HG-G027-11-GGA	7HG-G027-11-GGC
ZB-Dioxin	60 meter x 0.25 mm x 0.20 µm	—	7KG-G045-10-GGA	—

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 eluters)
- Improve sensitivity and accuracy of quantitative results
- Available as individual guard columns or as complete kits with connectors

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



Ordering Information

Metal Z-Guard Column		
ID (mm)	Description	Part No.
5-Meter		
0.53	Guard Column	7AK-G000-00-GM0

High Temperature Z-Guard Columns and Kits			
ID (mm)	Description	Part No.	Part No.
		5-Meter	10-Meter
0.25	Guard Column	7AG-G000-00-GH0	7CG-G000-00-GH0
	Guard Column Kit	7AG-G000-00-GHK	7CG-G000-00-GHK
0.32	Guard Column	7AM-G000-00-GH0	7CM-G000-00-GH0
	Guard Column Kit	7AM-G000-00-GHK	—
0.53	Guard Column	7AK-G000-00-GH0	7CK-G000-00-GH0
	Guard Column Kit	7AK-G000-00-GHK	7CK-G000-00-GHK

Standard Z-Guard Columns and Kits			
ID (mm)	Description	Part No.	Part No.
		5-Meter	10-Meter
0.10	Guard Column	7AB-G000-00-GZ0	7CB-G000-00-GZ0
0.18	Guard Column	7AD-G000-00-GZ0	7CD-G000-00-GZ0
	Guard Column Kit	7AD-G000-00-GZK	—
0.25	Guard Column	7AG-G000-00-GZ0	7CG-G000-00-GZ0
	Guard Column Kit	7AG-G000-00-GZK	7CG-G000-00-GZK
0.32	Guard Column	7AM-G000-00-GZ0	7CM-G000-00-GZ0
	Guard Column Kit	7AM-G000-00-GZK	7CM-G000-00-GZK
0.53	Guard Column	7AK-G000-00-GZ0	7CK-G000-00-GZ0
	Guard Column Kit	7AK-G000-00-GZK	7CK-G000-00-GZK

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

ZB-5 Z-Guard Column Multi-Pak			
ID (mm)	Description	Part No.	Unit
2-Meter			
0.25	Zebtron ZB-5 Z-Guard Column	KG0-7868	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.

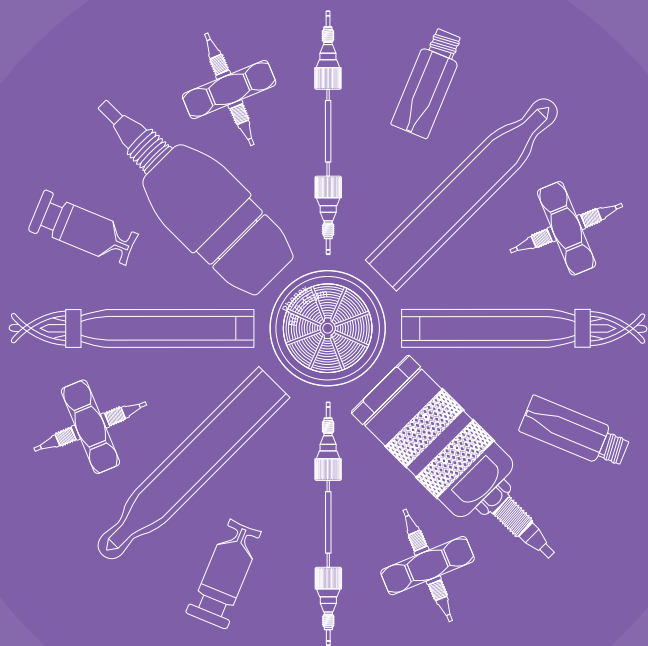
i Z-Guard Column Kits include 5 or 10 meters of deactivated fused silica tubing, 5 universal connectors and 0.5 mL of high-temperature polyimide resin.

Replacement Parts for Z-Guard Kits		
Description	Part No.	Unit
Universal Capillary Column Union, Borosilicate	AG0-4716	5/pk
High Temperature Polyimide Resin, 0.5 mL	AG0-8514	ea

- GC specialty columns for the separation of complex matrices
- High-performance LC columns
- Wide selection of sample preparation products to fit your needs
- Complete portfolio for low background PFAS Analysis



GC Accessories Contents



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GC Accessories

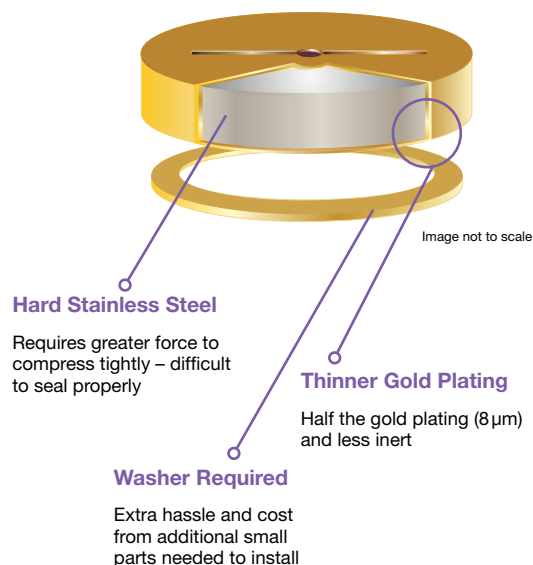
Inlet Base Seals

Easy Seals™ Compatible with Agilent® GC Systems

Phenomenex Easy Seals



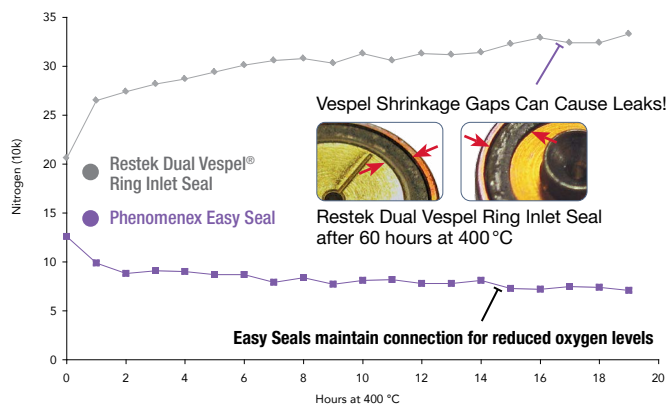
Traditional Gold Plated Seals



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	AG0-8619	AG0-8620



GC Accessories

Inlet Base Seals (cont'd)

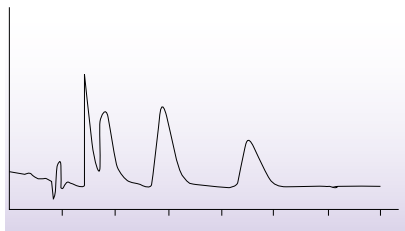
Standard Inlet Base Seals & Washers

- 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:

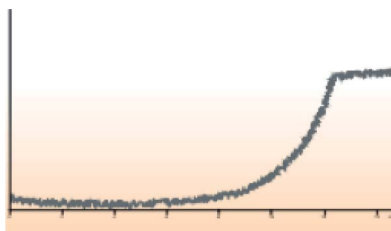
Difficult Quantitation

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

Ordering Information

Standard Inlet Base Seal Replacement Washers			12/pk
Description		Similar to Mfr No.*	Part No.
Standard Gold Inlet Seal Washer		—	AG0-8397
Stainless Steel Inlet Seal Washer		5061-5869	AG0-7522

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

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

→ For Sealing O-Rings, see page 73.

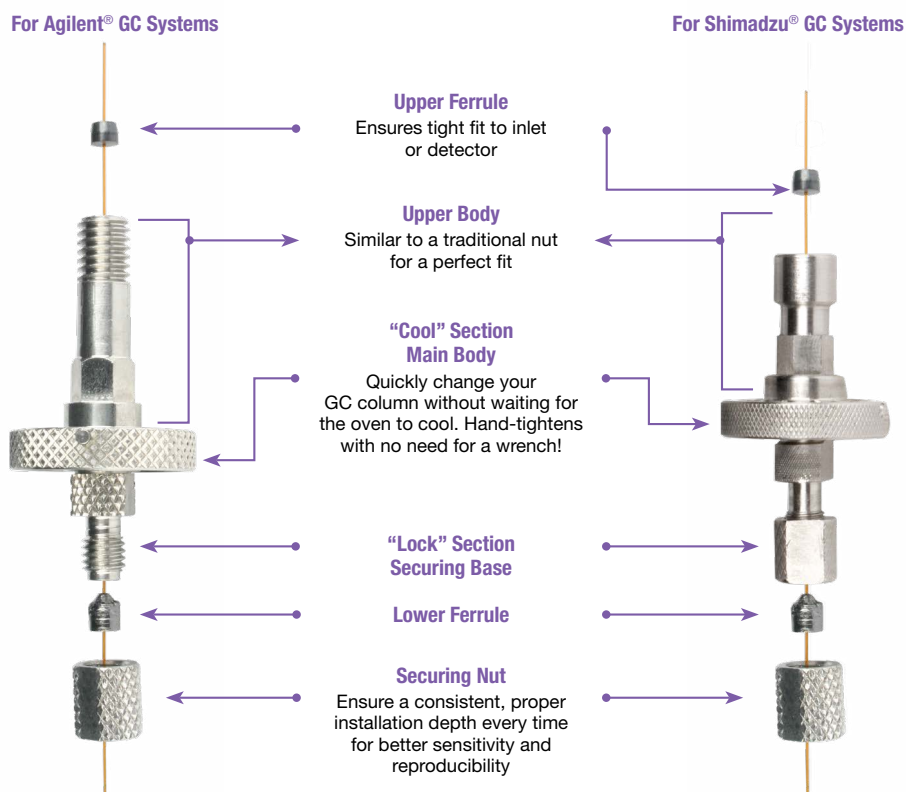
GC Accessories

Installation Nuts

Cool-Lock™ Nut

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

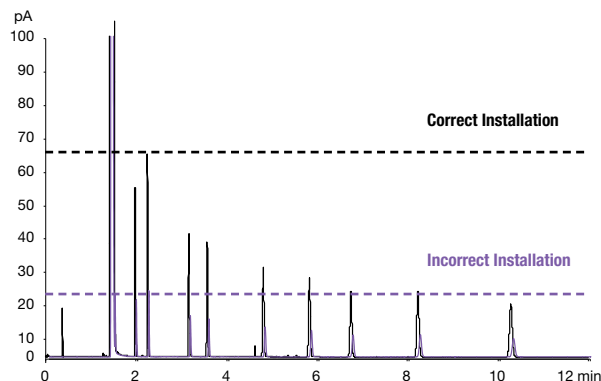
Fast GC Column Installation Without the Burn



Consistent, Accurate Installation Every Time

The red trace below is installed at 2 mm, rather than the manufacturer's recommended 6 mm 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: Zebtron™ ZB-WAX
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: ZHG-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	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	

GC Accessories

Installation Nuts (*cont'd*)

Cool-Lock™ Nut Selection Guide

Agilent® Systems			
1 Decide On The Style of Cool-Lock Nut Needed		2 Determine How Many Cool-Lock Nuts Needed Per System	
Short Style (AG0-8319) Recommended for use with standard short style ferrules.	Long Style (AG0-8320) Recommend for use with standard long style ferrules.	Detector MS	Number of Nuts
Also, use for both the inlet and detector configurations on Agilent 6890, 5890, and 7890 GC systems		FID, ECD, Other	1 2

Ordering Information

Cool-Lock Installation Nuts and Gauges

Description	Fits Model No.	For Use With Ferrule Style	Part No.	Unit
For Agilent Systems				
Cool-Lock Installation Nut		Short (1.65 mm)	AG0-8319	ea
		Long (2.4 mm)	AG0-8320	ea
Cool-Lock Installation Gauge		—	AG0-8349	ea

Ordering Information

Standard Installation Nut

Description	Similar to Mfr No.*	For Use With Ferrule Style	Part No.	Unit
For GC-MS Systems				
Brass Installation Nut, Nickel Plated	—	—	AG0-9076	5/pk
For Other Systems				
Agilent Installation Nut, Standard (¹ / ₁₆ in. Hex Stainless Steel)	5181-8830	Short (1.65 mm)	AG0-5152	2/pk
Agilent Installation Nut, Deep Well (¹ / ₁₆ in. Hex Stainless Steel)	5020-8292	Long (2.4 mm)	AG0-5153	2/pk

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



For Ferrule Selection Guide for Cool-Lock Nuts, see next page.



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	- Easy to use - Tight, stable seal - Rated to 450 °C	- Porous to oxygen - Not for MS or other oxygen sensitive detectors - Easily deformed - Potential to contaminate system	- General use - FID and NPD - High temperature analysis - Cool on-column
85/15 % Vespel®/Graphite	- Durable for long lifetime - Not porous to oxygen - Rated to 350 °C	- Non-reusable - Need to re-tighten frequently - Flows at high temperatures	- Good for MS or other oxygen sensitive detectors - Most leak free
60/40 % Vespel/Graphite	- Easier to use than 85/15 - Not porous to oxygen - Rated to 400 °C	- Non-reusable - Easier to deform than 85/15	- Good for MS or other oxygen sensitive detectors - Best balance between tight seal and ease of use
SilTite™	- No need to re-tighten - Reliable seal - No contamination - Rated > 450 °C	Easily deforms	High temperature MS analysis

Ferrule Selection Guide by Length

Length	Advantage	Disadvantage	Recommended for
Short	Robust seal	Not recommended for MS detector connection	Standard detectors and inlet
Long	Good nut and interface design	Not recommended for inlet connection	MS detector connection

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	AGO-4698	AGO-4698	AGO-8929	AGO-4698	AGO-8881	AGO-4698
0.28-0.35	0.5	AGO-4701	AGO-4701	AGO-7513	AGO-4701	AGO-8881	AGO-4701
0.45-0.53	0.8	AGO-4704	AGO-4704	AGO-8676	AGO-4704	AGO-8882	AGO-4704



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
Short 	100 % Graphite	0.10-0.25	0.4	500-2114	N	AG0-8929	10/pk
		0.28-0.35	0.5	072635 5080-8853	Y	AG0-7513	10/pk
		0.45-0.53	0.8	072636 500-2118	Y	AG0-8676	10/pk
		0.10-0.25	0.4	5181-3323 5181-3322	N Y	AG0-7318 AG0-7321	10/pk 10/pk
	85 % Vespel® / 15 % Graphite	0.28-0.35	0.5	5062-3514 5062-3513	N Y	AG0-7319 AG0-7322	10/pk 10/pk
		0.40-0.53	0.8	5062-3512 5062-3511	N Y	AG0-7320 AG0-7323	10/pk 10/pk
	100 % Graphite	0.10-0.25	0.4	20200 20227	N	AG0-4698 AG0-4699	10/pk 50/pk
		0.28-0.35	0.5	72635	N	AG0-4701 AG0-4702	10/pk 50/pk
		0.45-0.53	0.8	82636	N	AG0-4704 AG0-4705	10/pk 50/pk
		0.10-0.25	0.4	072663 5062-3508	Y	AG0-8677	10/pk
Long 	100 % Graphite	0.28-0.35	0.5	72635	N	AG0-4701 AG0-4702	10/pk 50/pk
		0.45-0.53	0.8	82636	N	AG0-4704 AG0-4705	10/pk 50/pk
	85 % Vespel / 15 % Graphite	0.28-0.35	0.5	072654 5062-3506	Y	AG0-8678	10/pk
		0.45-0.53	0.8	072655 5062-3538	Y	AG0-8679	10/pk
	60 % Vespel / 40 % Graphite	0.10-0.25	0.4	20211 20229	Y	AG0-4707 AG0-4708	10/pk 50/pk
		0.28-0.35	0.5	20212 20231	Y	AG0-4710 AG0-4711	10/pk 50/pk
		0.45-0.53	0.8	20213 20230	Y	AG0-4713 AG0-4714	10/pk 50/pk
	85 % Vespel / 15 % Graphite	0.10-0.25	0.4	072662 5062-3580	Y	AG0-8680	10/pk
		0.28-0.35	0.5	212222 5062-3581	N	AG0-8681 **	10/pk
		0.45-0.53	0.8	072674	Y	AG0-8682 **	10/pk
Two Hole 	85 % Vespel / 15 % Graphite	0.10-0.25	0.4	072662 5062-3580	Y	AG0-8680	10/pk
		0.28-0.35	0.5	212222 5062-3581	N	AG0-8681 **	10/pk
		0.45-0.53	0.8	072674	Y	AG0-8682 **	10/pk
SilTite 	SilTite™	0.10-0.25	0.4	073220	Y	AG0-8762	10/pk
		0.28-0.35	0.5	073221	Y	AG0-8757	10/pk
		0.45-0.53	0.8	073222	Y	AG0-8758	10/pk
Metal Encapsulated 	100 % Graphite for Shimadzu GCs	0.10-0.25	0.4	221-32126-05	Y	AG0-8881	10/pk
		0.25-0.35	0.5	221-32126-05	Y	AG0-8881	10/pk
		0.45-0.53	0.8	221-32126-08	Y	AG0-8882	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.

i All ferrules are 1/16 in. (except SilTite™) and ** ferrules are 1/8 in. Preconditioned ferrules provide 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	AG0-7326	10/pk
		Graphite, rated to 450 °C	5180-4168	AG0-7327	10/pk
PerkinElmer®		Viton for 6.2 mm OD inlet liners	N9302783	AG0-8674	10/pk
Shimadzu® (Model 2010)		Viton	036-11203-84	AG0-8675	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 (³ / ₈ in.)	11 mm (⁷ / ₁₆ 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		
			(mm)	(in.)	GuideRight Hole	Part No.	
						Unit	
Silicone Rubber Septa		- Our most popular choice for low-bleed septa, rated to 400 °C - Designed and conditioned for high sensitivity - Durometer rating of 50 with typical injection life of 150 punctures	9.5	3/8	✓	AG0-7916	50/pk
			9.5	3/8		AG0-4690	50/pk
			9.5	3/8		AG0-4691	100/pk
			11	7/16	✓	AG0-7917	50/pk
			11	7/16		AG0-4696	50/pk
			11	7/16		AG0-4697	100/pk
	PhenoGreen™ -400	Long-life, high temperature septa for use up to 400 °C	9.5	3/8		AG0-8572	50/pk
			11	7/16	✓	AG0-7875	50/pk
			11	7/16		AG0-8573	50/pk
	PhenoBlue™ -300	- Low-bleed septum heat stable to 350 °C - Durometer rating of 50 - 60 for easy puncture up to 100 injections at 300 °C	9.5	3/8		AG0-4688	50/pk
			9.5	3/8		AG0-4689	100/pk
			11	7/16		AG0-4694	50/pk
			11	7/16		AG0-4695	100/pk
	PhenoGrey™ -250	- General purpose silicone rubber septum rated to 250 °C - Durometer rating of 40 - 45 for easy puncture up to 100 injections	9.5	3/8		AG0-4686	50/pk
			11	7/16		AG0-4692	50/pk
11			7/16		AG0-4693	100/pk	
Injector Septa Plugs	BT0® Silicone Septa Plug	- Fits Shimadzu (9A, 14, 15A, 17A, 2010) and SRI injectors - Rated to 400 °C				AG0-7517	50/pk



For additional parts and accessories contact Phenomenex or visit:
www.phenomenex.com/GC

GC Accessories

Merlin Microseal™ Septum

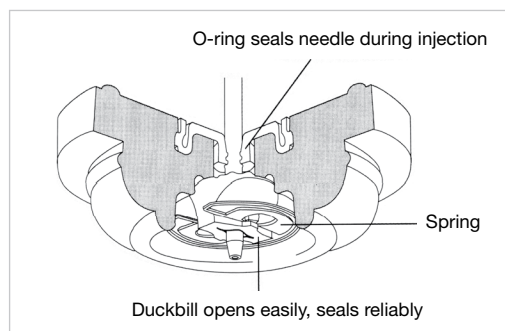
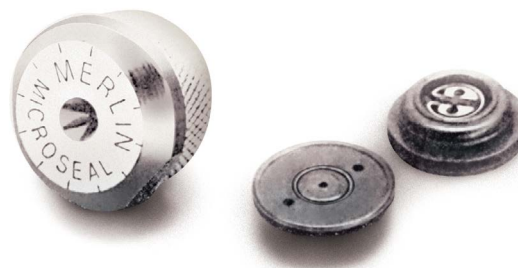
- Improves chromatographic performance and quantitative results by reducing bleed and ghost peaks
- Improves reliability and performance during extended automated runs
- Thousands of injections before seal replacement
- Save time changing septa, instrument downtime and troubleshooting

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 life-time 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.



- i** (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
AG0-5985	Merlin Microseal High Pressure Septum Standard Kit, includes nut and 2 septa	ea
AG0-5986	Merlin Microseal High Pressure Septum Starter Kit, includes nut and 1 septum	ea
Replacement Parts		
AG0-5987	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
For Agilent 7673 Autosamplers					
AS0-4386	87987	9301-0892	75ASN (23s/1.71in./HP)	5	ea
AS0-4387	80387	9301-0713	701ASN (23s/1.71in./HP)	10	ea
AS0-4388	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.

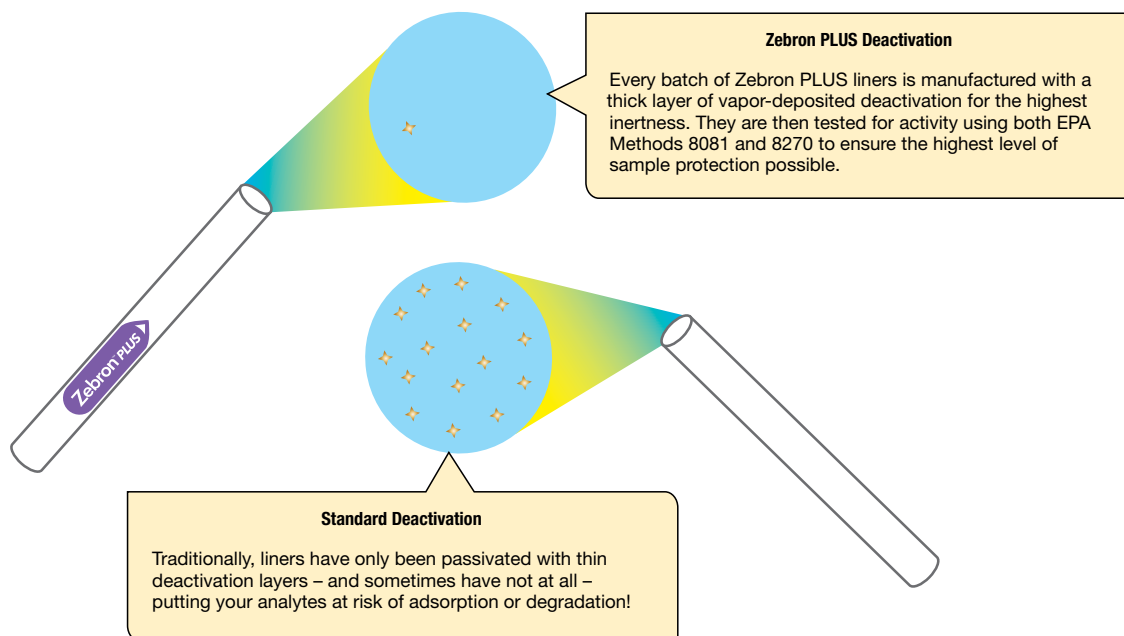
- i** Contact Phenomenex or your local Phenomenex distributor for additional GC products and applications.

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?

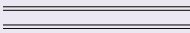
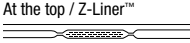
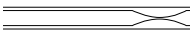
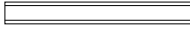
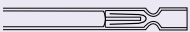
Though the upfront cost of self-packing your liner may seem attractive, the time and headaches caused by resulting tailing or irreproducible peaks can be sizeable! Self-packed wool fibers commonly break during installation and any existing deactivation on the liner can also be scratched or damaged. Pre-packed 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.



Have questions or need help with your GC analysis? Chat with our chromatography experts www.phenomenex.com/chat

Inlet Liners (cont'd)

Liner Geometry Selection Guide

Liner Style*	Function	Advantages	Disadvantages	Recommended For
Straight				
	Low surface area for less activity	- Simple to use - Least expensive - Low activity	- Possible inlet discrimination - More frequent gold seal maintenance from exposure to sample contamination - Possible inconsistency if sample injection bypasses split ratio	Volatiles
Glass Wool				
In the middle 	Traps non-volatiles; mixes sample; vaporizes sample above the column	- Reduces gold seal/column contamination and maintenance - More reproducible results - Can help focus analytes - Extends column life	- Higher surface area that can become active - Glass wool can become dislodged	Dirty samples, volatiles, high initial oven temperatures
At the bottom 	Traps non-volatiles; mixes sample; vaporizes sample above the column	- Reduces gold seal/column contamination and maintenance - More reproducible results - Can provide higher responses than wool in middle	- Higher surface area that can become active - Glass wool can become dislodged	Dirty samples
At the top / Z-Liner™ 	Keeps glass wool in place; wipes syringe needle clean	- Reduces gold seal/column contamination and maintenance - More reproducible results - Can help focus analytes - Extends column life	Higher surface area that can become active	Pressure pulsed injections, dirty samples, volatiles, high initial oven temperatures
Taper / Gooseneck				
At the top 	Limits the expansion of the solvent to the inlet	- Allows for larger injection volumes - Decrease backflash	- Higher risk of needle breakage - Increased cost - Cannot self-pack with glass wool	Water injections
At the bottom 	Directs flow onto column; low surface area	- Reduces gold seal/column contamination and maintenance - Improved sensitivity - Lower activity	Increased cost	Pesticides (without wool), semi-volatiles (with wool)
Direct Connect				
	Connects directly to column to aid transfer of analytes	- Better sensitivity for splitless injections - Decreases inlet discrimination	- Only used for splitless injections - Increased cost - One-time use	Trace analysis, splitless injections, separation from solvent peak (with top hole), aqueous samples (with bottom hole)
Internal Diameter (ID)				
Small 	Small internal volume and surface area; restricts sample diffusion	- Better peak shape of gaseous samples - Less activity for small injections of active compounds	Very small internal volume is easy to overload with normal injection volumes	Headspace, purge and trap, or gas injections; active samples with low expansion solvents
Outer Diameter (OD) / Splitless				
Large OD / Splitless 	Fits tightly inside the inlet and limits sample contact with inlet components	Better sensitivity for long splitless hold times	Not very amenable for changing to large split ratios	Splitless injections of active compounds
Cup Liner				
	Cup traps non-volatiles but has lower surface area than wool; vaporizes sample above the column	- Good sample mixing - Reduces gold seal/column contamination and maintenance - More reproducible results - Improves results for active compounds - Provides receptacle for multiple injections	- Increased cost - Higher surface area than straight liner can result in increased activity for very active compounds	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.

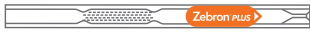
What's a Z-Liner?

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

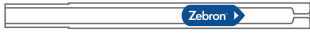
remains in the correct position for injection, wipes the needle tip completely clean, and properly volatilizes the sample.

Liners Compatible with Agilent® GC Systems

Ordering Information

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

Ordering Information

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

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

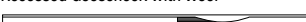
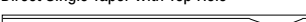
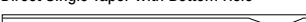
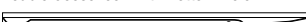
i Zebron Essential Liners
 Zebron Essential liners undergo a vapor deposited deactivation process resulting in a thin film liner that is ideal for routine analysis.

i Zebron PLUS Liners
 Optimized for trace and active compound analysis, Zebron PLUS GC liners undergo a unique chemical deactivation treatment resulting in a remarkably inert GC inlet liner.

GC Accessories

Liners Compatible with Agilent® GC Systems (cont'd)

Ordering Information

GC Liners						
Description	Application	Inlet Style	Dimensions ID x L (mm)	Deactivation	Part No.	Unit
For 5890, 6890, and 7890 Models						
Straight with Wool 	Large injection, Trace analysis	S/SL	4 x 78.5	Standard	AG0-4655 AG0-4656	5/pk 25/pk
Single Taper with Wool 	Large injection, Trace analysis	S/SL	4 x 78.5	Standard	AG0-4657 AG0-4658	5/pk 25/pk
Cup 	High and low MW compounds, Large volume injections	S/SL	4 x 78.5	Not Deactivated	AG0-4647 AG0-4648	5/pk 25/pk
Cup with Wool 	Large volume injection of dirty samples	S/SL	4 x 78.5	Not Deactivated	AG0-7853	5/pk
Straight 	Large injection, Trace analysis	S/SL	2 x 78.5	Not Deactivated	AG0-4649 AG0-4650	5/pk 25/pk
Straight 	Large injection, Trace analysis	S/SL	4 x 78.5	Standard	AG0-4651 AG0-4652	5/pk 25/pk
Single Taper 	Small injection, Trace analysis	S/SL	2 x 78.5	Standard	AG0-4653	5/pk
Direct 	Injection < 1 µL, Purge and Trap/Headspace	S/SL	1.5 x 78.5	Standard	AG0-4659	5/pk
Recessed Gooseneck with Wool 	Large injection of dirty samples	S/SL	4 x 78.5	Standard	AG0-4661 AG0-4662	5/pk 25/pk
Direct Single Taper with Top Hole 	Trace analysis of active compounds	S/SL	4 x 78.5	Standard	AG0-7850	5/pk
Direct Single Taper with Bottom Hole 	Trace analysis of active compounds	S/SL	4 x 78.5	Standard	AG0-7851	5/pk
Single Taper with Wool 	General use, Dirty samples	S/SL	4 x 78.5	Standard	AG0-8172	5/pk
Double Taper 	Large injection, Trace analysis of active compounds	S/SL	4 x 78.5	Standard	AG0-8173	5/pk
Double Gooseneck with Bottom Hole 	Trace analysis of active compounds	S/SL	4 x 78.5	Standard	AG0-8430	5/pk
Straight with Wool 	Large injection Trace analysis,	S/SL	4 x 78.5	Standard	AG0-8653 AG0-8654	5/pk 25/pk
Straight with Stabilized Wool 	Small injection, Trace analysis of dirty samples	S/SL	2.3 x 78.5	Standard	AG0-8379	5/pk



Inlet Styles Key

S/SL: Split/Spitless

PTV: Programmed-Temperature Vaporization

PSS: Programmed-Temperature Split/Spitless

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



Liners Compatible with PerkinElmer® GC Systems

Ordering Information

Zebron™ PLUS Liners

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

Ordering Information

Zebron Essentials Liners

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

Ordering Information

GC Liners

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



Inlet Styles Key

S/SL: Split/Splitless

PTV: Programmed-Temperature Vaporization

PSS: Programmed-Temperature Split/Splitless

SPI: Single Point Injection

Liners Compatible with Shimadzu® GC Systems

Ordering Information

Zebron™ PLUS Liners

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

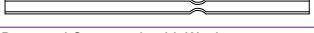
Ordering Information

Zebron Essentials Liners

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

Ordering Information

GC Liners

Description	Application	Inlet Style	Dimensions ID x L (mm)	Deactivation	Part No.	Unit
For 17A, 2014, and 2025 Models						
Straight 	Small injection, Trace analysis	S/SL	2.6 x 95	Standard	AG0-4667	5/pk
For 14A Models						
Straight 	Trace analysis	WBC	3.4 x 139	Standard	AG0-4669	5/pk
Single Taper FocusLiner™ 	General use, Dirty samples	S/SL	3.4 x 99	Standard	AG0-4682	5/pk
Middle Gooseneck 	General use, Dirty samples	S/SL	3.4 x 95	Standard	AG0-8661	5/pk
Recessed Gooseneck with Wool 	General use, Dirty samples	S/SL	3.4 x 95	Standard	AG0-8663	5/pk

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

Liners Compatible with Thermo Scientific® GC Systems

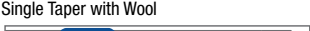
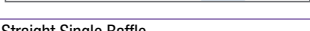
Ordering Information

Zebron™ PLUS Liners

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

Ordering Information

Zebron Essentials Liners

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



Inlet Styles Key

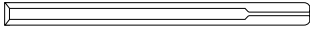
S/SL: Split/Splitless
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GC Accessories

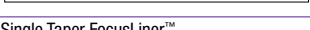
Liners Compatible with Thermo Scientific® GC Systems (cont'd)

Ordering Information

GC Liners						
Description	Application	Inlet Style	Dimensions ID x L (mm)	Deactivation	Part No.	Unit
For TRACE 8000 and FOCUS Models						
Double Taper FocusLiner™ 	Trace analysis of dirty samples	S/SL	5 x 105	Standard	AG0-4679 AG0-7863	5/pk 25/pk
Straight 	General use	S/SL	3 x 105	Standard	AG0-4645	5/pk
Single Taper 	Trace analysis	S/SL	5 x 105	Standard	AG0-7852	5/pk
Straight 	General use	S/SL	5 x 105	Standard	AG0-8669	5/pk
Single Taper FocusLiner 	General use, Dirty samples	S/SL	5 x 105	Standard	AG0-8671	5/pk
Single Taper 	Small injection, Trace analysis	S/SL	3 x 105	Standard	AG0-8672	5/pk
Straight FocusLiner 	General use, Dirty samples	S/SL	5 x 105	Standard	AG0-8673	5/pk

Liners Compatible with Bruker/Varian® GC Systems

Ordering Information

GC Liners						
Description	Application	Inlet Style	Dimensions ID x L (mm)	Deactivation	Part No.	Unit
For 1093 / 1094 Models						
Straight 	Large injection, Trace analysis	S/SL	4 x 75	Standard	AG0-4673	5/pk
For 1078 / 1079 Models						
Straight 	Trace analysis	S/SL	0.5 x 54	Standard	AG0-8665	5/pk
Single Taper FocusLiner™ 	General use or Dirty samples	S/SL	3.4 x 54	Standard	AG0-8666	5/pk
Single Taper 	Small injection, Trace analysis	S/SL	2 x 54	Standard	AG0-8668	5/pk
For 1075 / 1077 Models						
Straight 	For 0.25 and 0.32 mm ID Column	SPI	0.5 x 54	Standard	AG0-4675	5/pk
Straight 	For 0.53 mm ID Column	SPI	0.8 x 54	Standard	AG0-4677	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



GC Accessories

Column Unions, Mini-Unions, and Splitters

Selection Guide

Use the Union or Mini-Union for:	Use the Y-Connector (splitter) for:
- Connecting a guard column to an analytical column - Connecting columns of different selectivities - Connecting transfer lines to, e.g., mass spec - Repairing a broken column	- Splitting a sample onto two columns (perform confirmational analysis in a single injection) - Splitting the column eluent to two detectors

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	AGO-5160	ea
0.28-0.35	0.32-0.53	0.5	103432	AGO-5161	ea
0.45-0.53	0.45-0.53	0.8	103433	AGO-5162	ea

Replacement Ferrules				
Column ID (mm)	Ferrule ID (mm)	Similar to Mfr. No.*	Part No.	Unit
0.10-0.25	0.4	072696	AGO-7033	10/pk
0.28-0.35	0.5	072697	AGO-7034	10/pk
0.45-0.53	0.8	072698	AGO-7035	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	AGO-8763	ea
0.28-0.35	0.32-0.53	0.5	073551	AGO-8764	ea
0.45-0.53	0.45-0.53	0.8	073554	AGO-8825	ea

Replacement Ferrules				
Column ID (mm)	Ferrule ID (mm)	Similar to Mfr. No.*	Part No.	Unit
0.10-0.25	0.4	073470	AGO-8759	10/pk
0.28-0.35	0.5	073471	AGO-8760	10/pk
0.45-0.53	0.8	073473	AGO-8824	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
AGO-4716	Universal Capillary Column Union, Fused Quartz	5/pk
AGO-4717	GC Column Y-Splitter, Borosilicate for 0.10 to 0.32 mm ID columns	ea
AGO-9193	GC Column Y-Splitter, Borosilicate for 0.53 mm ID columns	ea

Polyimide Resins

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



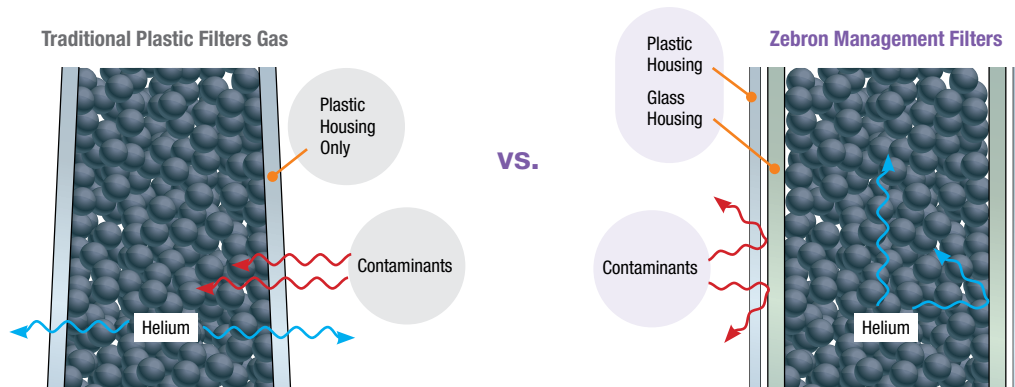
Ordering Information

Polyimide Resins		
Part No.	Description	Unit
AGO-5722	Polyimide Resin, 350 °C, 0.5 mL	ea
AGO-8514	High Temperature, 400 °C, Polyimide Resin, 0.5 mL	ea

Zebtron™ Gas Management

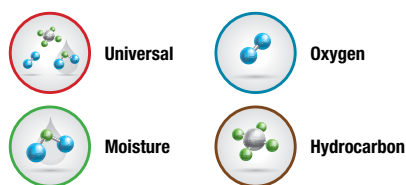
Upgrade Your Gas Filter System!

Improved design with a dual wall housing (plastic outside and glass inside).
Glass prevents diffusion, ensuring a leak and contaminant free system.



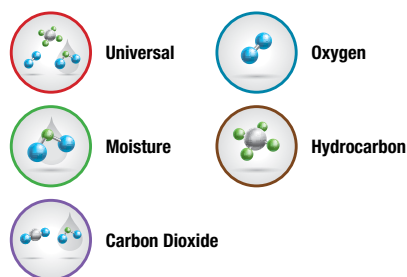
Plug-in GC and LC-MS Gas Filters

- Easy to use
- Dual filter housing prevents diffusion and increases safety
- Incredible high capacity
- Ensures high gas purity (99.9999% pure)
- 4 filter types



Click-on GC Gas Traps

- Easy to use, Click-on GC Gas Traps
- Serves multiple GC instruments at once
- Incredible high capacity
- Ensures high gas purity (99.9999% pure)
- 5 trap types



Protect Your LC-MS using Zebtron LC-MS Gas Filters

- Removes water, organic compounds, and other foreign material from LC-MS nebulizer gas
- Dual filter: Moisture and Hydrocarbon
- To be used in combination with a high flow 2-position connecting unit (Part No.: [AG6-2204](#)) and Particle Filter (Part No.: [AG6-2205](#))



Save Time and Money!

Zebtron Electronic Indicator

Easily know when to replace the Gas Filter and Trap by using the NEW Zebtron Electronic Indicator.

Zebtron Gas Management *(cont'd)*

Ordering Information

Zebtron Gas Management Filters

Part No.	Description	Unit
AG6-1010	Gas Filter Oxygen	ea
AG6-1020	Gas Filter Moisture	ea
AG6-1030	Gas Filter Hydrocarbon	ea
AG6-1040	Gas Filter Universal	ea
AG6-1070	Gas Filter Universal (Helium specific)	ea
AG6-1050	Gas Filter Hydrocarbon/moisture for LC-MS	2/pk
AG6-1060	Ring nut for Gas Filter	ea



Ordering Information

Zebtron Gas Management Traps

Part No.	Description	Unit
AG6-3110	Click-On Oxygen Trap	ea
AG6-3120	Click-On Moisture Trap	ea
AG6-3130	Click-On Hydrocarbon Trap	ea
AG6-3140	Click-On Universal Trap	ea
AG6-3150	Click-On Carbon Dioxide Trap	ea



Ordering Information

Zebtron Connecting Units

Part No.	Description	Unit
AG6-2101	1-position Connecting Unit ¼ in. Brass	ea
AG6-2102	2-position Connecting Unit ¼ in. Brass	ea
AG6-2103	4-position Connecting Unit ¼ in. Brass	ea
AG6-2201	1-position Connecting Unit ⅜ in. Brass	ea
AG6-2202	2-position Connecting Unit ⅜ in. Brass	ea
AG6-2203	4-position Connecting Unit ⅜ in. Brass	ea
AG6-2204	High flow 2-position connecting unit for LC-MS	ea
AG6-2205	Particle Filter for LC-MS	ea
AG6-2206	O-ring replacement for gas filter baseplate	20/pk
AG6-2301	1-position Connecting Unit ¼ in. Stainless Steel	ea
AG6-2302	2-position Connecting Unit ¼ in. Stainless Steel	ea
AG6-2303	4-position Connecting Unit ¼ in. Stainless Steel	ea
AG6-2304	1-position Connecting Unit ⅜ in. Stainless Steel	ea
AG6-2305	2-position Connecting Unit ⅜ in. Stainless Steel	ea
AG6-2306	4-position Connecting Unit ⅜ in. Stainless Steel	ea



[AG6-2206](#)



[AG6-2205](#)



[AG6-2203](#)



[AG6-2204](#)



[AG6-2202](#)



[AG6-2201](#)

GC Accessories

Zebron Base Electronic Indicator and Other Accessories

Ordering Information

Zebron Base Electronic Indicator and Other Accessories

Part No.	Description	Unit
AG6-3160	1/8 in. Brass Click-On Connector Set	2/pk
AG6-3170	1/4 in. Brass Click-On Connector Set	2/pk
AG6-4150	1/8 in. Stainless Steel Click-On Connector Set	2/pk
AG6-4160	1/4 in. Stainless Steel Click-On Connector Set	2/pk
AG6-3180	Wall-mounting Clamp Set for Gas Traps	2/pk
AG6-3190	O-ring replacement set for Gas Trap	20/pk
AG6-4110	Electronic Indicator for Gas Trap	ea
AG6-4120	Electronic Indicator for Gas Filter	ea
AG6-4130	Electronic Indicator for LC-MS Filter	ea



Electronic Indicator



Wall-mounting Clamp Set



Brass Click-On Connector

First time ordering Zebron Click-On Gas Traps?

Be sure to order the brass or stainless steel connector with your first trap.



[AG6-3160](#)
(1/8 in. Brass)



[AG6-3170](#)
(1/4 in. Brass)

[AG6-4150](#)
(1/8 in. Stainless Steel)

[AG6-4160](#)
(1/4 in. Stainless Steel)

Tools and Maintenance

Ordering Information

Tools and Maintenance

Description	Part No.	Unit
Ceramic Scoring Wafers High-quality ceramic cutting tool for fused silica columns	AG0-4718	2/pk



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www.phenomenex.com/GasManagement



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 Zebtron™ 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^{PLUS}

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 16439

Zebtron ZB-5^{PLUS}

Part No.: AGO-8362

250 µg/mL each in acetone:

1. Decane	6. 1,8-Octanediol
2. Methyl Caprylate	7. Diethylamine
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 5161, App ID 5162

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 5167

Zebtron ZB-624^{PLUS}

Part No.: AGO-9203

250 µg/mL each in hexane:

1. Dodecane	5. 1-Methylnaphthalene
2. 2,4-Dimethylphenol	6. 1-Undecanol
3. 2,6-Dimethylaniline	7. Pentadecane
4. Tridecane	

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^{PLUS}

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 5164, 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

i Test mix components are shown in order of elution.

GC Syringes

Technical Information

Needle Gauge Dimensions

Gauge	OD		ID	
26	0.018 in.	0.46 mm	0.0102 in.	0.26 mm
26s	0.019 in.	0.47 mm	0.0050 in.	0.13 mm
25	0.021 in.	0.51 mm	0.0102 in.	0.26 mm
23s	0.025 in.	0.64 mm	0.0060 in.	0.15 mm
23	0.025 in.	0.64 mm	0.0132 in.	0.34 mm
22s	0.028 in.	0.72 mm	0.0060 in.	0.15 mm
22	0.028 in.	0.72 mm	0.0162 in.	0.41 mm

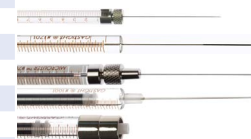


Needle Point Styles

Style	Description	Advantage
	AS/Cone	Exclusively for Agilent® autosamplers
	2, BV (Beveled tip)	Optimal septum piercing for reduced septum coring
	3, LD (Blunt tip)	General sample pipetting and HPLC injectors
	5 (Conical with side hole)	Side hole for sample filling and dispensing, headspace
	H (Dome with side hole)	Side hole for sample filling and dispensing. Dome tip minimizes septum coring.

Needle / Needle Connection Styles

Style	Description	Manufacturer	Advantage
ASN	Autosampler Needle	Hamilton®	For use with autosamplers
ASRN	Autosampler Removable Needle	Hamilton	For use with autosamplers
RN	Removable Needle	Hamilton	Allows freedom to change needle style or replace broken needles
N	Cemented Needle	Hamilton	Low dead volume, for low-volume syringes
KH	Knurled Hub	Hamilton	Able to handle pressure up to 6000 psig
LTN	Luer Tip Cemented Needle	Hamilton	Fixed needle with Luer Tip, for mid-volume syringes
TLL	PTFE (Teflon®) Luer Lock	Hamilton	Luer Lock with locking hub for use with syringe filters
F	Fixed Needle	SGE®	Economical and more reproducible
R	Removable Needle	SGE	Allows freedom to change needle style or replace broken needles
FLL	Fixed Luer Lock	SGE	Allows use with syringe filters
LL	Luer Lock	SGE	Allows use with syringe filters



GC Autosampler Syringes

for Agilent® GC 7673, 7683, 7693, and 6850 Autosampler Systems

Ordering Information

Hamilton Syringes										
Volume (μL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*		Unit	Part No.
Microliter Syringes										
5	ASN	23s	1.71 in.	Agilent	75	87987	9301-0892	20168	ea	ASO-4386
5	ASN	23s	1.71 in.	Agilent	75	87990	20170		6/pk	ASO-7641
5	ASN	26s	1.71 in.	Agilent	75	87989	21230		6/pk	ASO-8683
5	ASN	23s-26s	1.71 in.	Agilent	75	87993	24593		ea	ASO-8380
10	ASRN	23s	1.71 in.	Agilent	701	80357	24795		ea	ASO-8836
10	ASN	23s	1.71 in.	Agilent	701	80387	9301-0713	20167	ea	ASO-4387
10	ASN	23s	1.71 in.	Agilent	701	80390	9301-0725	20169	6/pk	ASO-4388
10	ASN	26s	1.71 in.	Agilent	701	80389	24599		6/pk	ASO-4389
10	ASN	23s-26s	1.71 in.	Agilent	701	80393	24596		ea	ASO-8684
10	ASN	23s-26s	1.71 in.	Agilent	701	80391	24600		6/pk	ASO-8685
Teflon Tip Gastight® Syringes										
10	ASN	23s-26s	1.71 in.	Agilent	1701	80079	n/a		ea	ASO-8837
10	ASN	23s	1.71 in.	Agilent	1701	80080	n/a		ea	ASO-9079



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



GC Syringes

GC Autosampler Syringes (cont'd)

for Agilent® GC 7673, 7683, 7693, and 6850 Autosampler Systems (cont'd)

SGE® Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
5	F	23	42 mm	Cone	SK-5F-HP-0.63	001814	24783	6/pk	AS0-8687
5	F	26	42 mm	Cone	SK-5F-HP-0.47	001804	24782	6/pk	AS0-8688
5	F	23s-26s	42 mm	Cone	SK-5F-HP-0.63/0.47	001822	21214	6/pk	AS0-8689
5	F	23-26	42 mm	Cone	5F-HP-0.63*0.47	001821	5181-1273	ea	AS0-5208
10	F	26	42 mm	Cone	SK-10F-HP-47	002804	24786	6/pk	AS0-7637
10	R	23	42 mm	Cone	10RHP-0.63	002815	24795	ea	AS0-8690
10	F	23	42 mm	Cone	10F-HP-0.63	002810	24785	ea	AS0-8691
10	F	26	42 mm	Cone	SK-10F-HP-0.47	002804	24786	6/pk	AS0-7637
10	F	23	42 mm	Cone	SK-10F-HP-0.63	002814	24787	6/pk	AS0-8692
10	F	23s-26s	42 mm	Cone	10F-HP-0.63/0.47	002821	21212	ea	AS0-8693
10	F	23s-26s	42 mm	Cone	SK-10F-HP-0.63/0.47	002822	21215	6/pk	AS0-8694
Teflon® Tip Gastight® Syringes									
10	F	23	42 mm	Cone	HF-HP-GT-0.63	002812	24789	ea	AS0-8695
10	F	23-26	42 mm	Cone	10F-HP-GT-0.63/0.47	002826	5181-1267	ea	AS0-5209
10	F	23-26	42 mm	Cone	SK10F-HP-FT-0.63/0.47	002827	5181-3361	6/pk	AS0-5210

for PerkinElmer® AutoSystem™ and Clarus® 500 GC Systems

Ordering Information

SGE Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
0.5	R	23	70 mm	Cone	0.5BR-PE-0.63	000478	24811	ea	AS0-8697
5	F	23	70 mm	Cone	5F-PE-0.63	001954	24813	ea	AS0-8698

for Varian® 8000 Series GC Systems

Ordering Information

SGE Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
10	R	25	53 mm	Side Hole	10R-VA8X-II	002924	24852	ea	AS0-8699
10	F	26	50 mm	Cone	10F-C/F-5/0.47C	002980	24922	ea	AS0-8700
10	F	26	50 mm	Bevel	10F-VA8400-5/0.47	002950	21202	ea	AS0-8701

for Shimadzu® AOC 9GC Systems

Ordering Information

Hamilton Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
5	RN	26s	2 in. /51 mm	2	75RN	87930	24617	ea	AS0-8702
5	N	26s	2 in. /51 mm	2	75N	87900	24938	ea	AS0-4390
10	RN	26s	2 in. /51 mm	2	701RN	80330	24530	ea	AS0-0100

Ordering Information

SGE Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
10	R	23	42 mm	Cone	10R-S-0.63	002898	24845	ea	AS0-8703



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



GC Syringes

GC Autosampler Syringes (cont'd) for Thermo Scientific® GC Systems

Ordering Information

SGE® Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
10	F	26	80 mm	Cone	10F-C/F-8/0.47C	002992	24924	ea	AS0-8704
10	R	26	80 mm	Cone	10R-C/F-8/0-0.47C	002993	24934	ea	AS0-8705

for CTC/LEAP GC Systems

Ordering Information

Hamilton® Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
1.2	N	26	2 in./51 mm	Cone	7701.2N	203185	22755	ea	AS0-8706

Ordering Information

SGE Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microliter Syringes									
10	F	23	50 mm	Cone	10F-C/F-5/0.63	002981	24923	ea	AS0-7638
10	R	23	50 mm	Cone	10R-C/F-5/0.63	002984	24932	ea	AS0-8709
10	F	26	50 mm	Cone	10F-C/F-5/0.47C	002980	24922	ea	AS0-8700
10	F	26	50 mm	Cone	SK10F-C/F-5/0.47C	002986	24925	6/pk	AS0-8711
10	R	26	50 mm	Cone	10R-C/F-5/0.47C	002982	24930	ea	AS0-8712

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

GC Manual Syringes

Ordering Information

Hamilton Syringes									
Volume (µL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microvolume Syringes									
5	N	26s	2 in./51 mm	2	75N	87900	24938	ea	AS0-4390
5	RN	26s	2 in./51 mm	2	75RN	87930	24617	ea	AS0-8702
10	N	26s	2 in./51 mm	2	701N	80300	20174	ea	AS0-0077
10	N	26s	2 in./51 mm	2	701N	80366	20175	6/pk	AS0-0016
10	RN	26s	2 in./51 mm	2	701RN	80330	24530	ea	AS0-0100
25	N	22s	2 in./51 mm	2	702N	80400	24531	ea	AS0-0078
10	N	26s	2 in./51 mm	5	701NPT5	80339	24967	ea	AS0-0094
Positive Displacement Syringes									
0.5	KH	25	2.75 in./70 mm	2	7000.5	86259	24545	ea	AS0-8715
1.0	KH	22	2.75 in./70 mm	2	7101	86211	24549	ea	AS0-8716
1.0	KH	25s	2.75 in./70 mm	2	7001	80135	24547	ea	AS0-1918
1.0	KH	25s	2.75 in./70 mm	3	7001	80100	24548	ea	AS0-8717
2.0	KH	25	2.75 in./70 mm	2	7002	88411	24551	ea	AS0-8718
5.0	KH	24	2.75 in./70 mm	2	7105	88011	24555	ea	AS0-8719
Teflon Tip Gastight Syringes									
10	N	26s	2 in./51 mm	2	1701	80000	24557	ea	AS0-4391
10	RN	26s	2 in./51 mm	2	1701	80030	24558	ea	AS0-1898
25	N	22s	2 in./51 mm	2	1702	80200	24559	ea	AS0-8720
25	RN	22s	2 in./51 mm	2	1702	80230	24560	ea	AS0-1899
50	N	22s	2 in./51 mm	2	1705	80900	24561	ea	AS0-0061
50	RN	22s	2 in./51 mm	2	1705	80930	24562	ea	AS0-1900
100	N	22s	2 in./51 mm	2	1710	81000	24563	ea	AS0-0062
100	RN	22s	2 in./51 mm	2	1710	81030	24564	ea	AS0-1901
250	N	22s	2 in./51 mm	2	1725	81100	24567	ea	AS0-0063



GC Syringes

GC Manual Syringes (cont'd)

Ordering Information

Hamilton® Syringes (continued)

Volume (μL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Teflon® Tip Gastight® Syringes (continued)									
250	RN	22s	2 in./51 mm	2	1725	81130	24568	ea	AS0-1902
500	LTN	22	2 in./51 mm	2	1750	81217	24571	ea	AS0-0064
500	RN	22	2 in./51 mm	2	1750	81230	24572	ea	AS0-1903
1 mL	LTN	22	2 in./51 mm	2	1001	81317	24575	ea	AS0-0065
1 mL	RN	22	2 in./51 mm	2	1001	81330	24576	ea	AS0-8721
1 mL	TLL	—	—	w/o slots	1001	81320	24578	ea	AS0-1907
2.5 mL	TLL	—	—	w/o slots	1002	81420	24584	ea	AS0-1908
2.5 mL	RN	22	2 in./51 mm	2	1002	81430	24582	ea	AS0-8722
2.5 mL	N	22	2 in./51 mm	2	1002	81417	24581	ea	AS0-8723
10 mL	TLL	—	—	w/o slots	1010	81620	20179	ea	AS0-1910

Ordering Information

SGE® Syringes

Volume (μL)	Needle/Needle Connection	Gauge	Needle Length	Needle Style	Model	Mfr. No	Similar to Mfr. No.*	Unit	Part No.
Microvolume Syringes									
5	F	26	50 mm	2	5F	001000	24700	ea	AS0-8725
5	R	26	50 mm	2	5R	001050	24701	ea	AS0-8726
10	F	26	50 mm	2	10F	002000	24702	ea	AS0-8727
10	F	26	50 mm	2	SK-10F	002030	24715	6/pk	AS0-8728
10	R	26	50 mm	2	10R	002050	24703	ea	AS0-8729
Positive Displacement Syringes									
1.0	R	23	70 mm	2	1BR-7BV	000506	24775	ea	AS0-8738
1.0	R	26	70 mm	Cone	1BR-7/0.47	000570	24776	ea	AS0-8739
Teflon Tip Gastight Syringes									
10	F	26	50 mm	2	10F-GT	002200	24725	ea	AS0-8741
25	F	25	50 mm	2	25F-GT	003200	24727	ea	AS0-8743
50	F	25	50 mm	2	50F-GT	004200	24729	ea	AS0-8744
50	R	25	50 mm	2	50R-GT	004250	24730	ea	AS0-8745
100	F	25	50 mm	2	100F-GT	005200	24734	ea	AS0-8746
100	R	25	50 mm	2	100R-GT	005250	24735	ea	AS0-8747
250	F	25	50 mm	2	250F-GT	006200	24738	ea	AS0-8748
250	R	25	50 mm	2	250R-GT	006250	24739	ea	AS0-8749
500	F	25	50 mm	2	500F-GT	007200	24742	ea	AS0-8750
1 mL	RN	23	50 mm	Bevel	1MDR-GT	008100	24750	ea	AS0-8845
1 mL	LL	—	—	—	1MDF-LL-GT	008025	24752	ea	AS0-0120
2.5 mL	R	23	50 mm	Bevel	MDR-GT	008500	—	ea	AS0-8752
5 mL	LL	—	—	—	5MDR-LL-GT	008760	24757	ea	AS0-0121
10 mL	LL	—	—	—	10MDR-LL-GT	008960	24759	ea	AS0-0122



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

GC Syringes

VICI® Series A-2 Gas Syringes

- Push-button valve and smaller volumes
- Pressure-Lok® design offers gas-tight injections
- Inject without carrier backflushing to sharpen peaks and improve separations
- Leak-tight to 250 psi - liquids and gases
- No plunger "blow out" at elevated pressures

The A-2 features a push-button valve, which allows sample storage up to 250 psi in syringes as small as 25 µL. This is useful with small liquid samples containing low-boiling components that would be lost through evaporation using ordinary syringes.

The positive rear stop (in 100 µL and larger sizes) prevents plunger blowout at elevated pressures, protecting against sample loss or operator injury. Like the Series A gas syringe, the A-2 has all the standard Pressure-Lok features such as a PTFE plunger tip, PTFE-sealed needle and ultra-smooth bore. Replacement components are available for easy repair.



Ordering Information

VICI Precision Sampling Syringes

Part No.	Mfr. No.	Description	Capacity (µL)	Unit
AS0-4739	050023	Series A-2 Syringe	25	ea
AS0-4740	050024	Series A-2 Syringe	50	ea
AS0-4741	050025	Series A-2 Syringe	100	ea
AS0-4742	050031	Series A-2 Syringe	250	ea
AS0-4743	050032	Series A-2 Syringe	500	ea
AS0-4744	050033	Series A-2 Syringe	1000 (1 mL)	ea
AS0-4745	050034	Series A-2 Syringe	2000 (2 mL)	ea
AS0-4746	050035	Series A-2 Syringe	5000 (5 mL)	ea

Notes: (1) All other VICI Precision Sampling products not listed are available.

(2) Removable needle: 0.028 in. x 0.005 in. x 2.00 in., bevel, open end on 25, 50 and 100 µL (p/n 943050, 3/pk); 0.029 in. x 0.012 in. x 2.00 in., bevel, open end on all others (p/n 943051, 3/pk).

Phenex™ Syringe Filters

- Increase column lifetime and save money!
- Ensure more accurate, consistent results
- Eliminate damaging microparticulates



Particulates can damage expensive equipment, valves, columns and pumps. They can also lead to erratic analytical results. Pre-filtering samples prior to analysis is critical in preventing column and frit blockage, undue wear on valve seals, and abnormally high operating pressures.

Sample or Mobile Phase Volume (mL)	Filter Membrane (diameter, mm)	Format
≤ 2	4	Syringe filter
2 to 10	15	Syringe filter
10 to 100	25-28	Syringe filter
> 100	47	Membrane disk
> 1000	90	Membrane disk

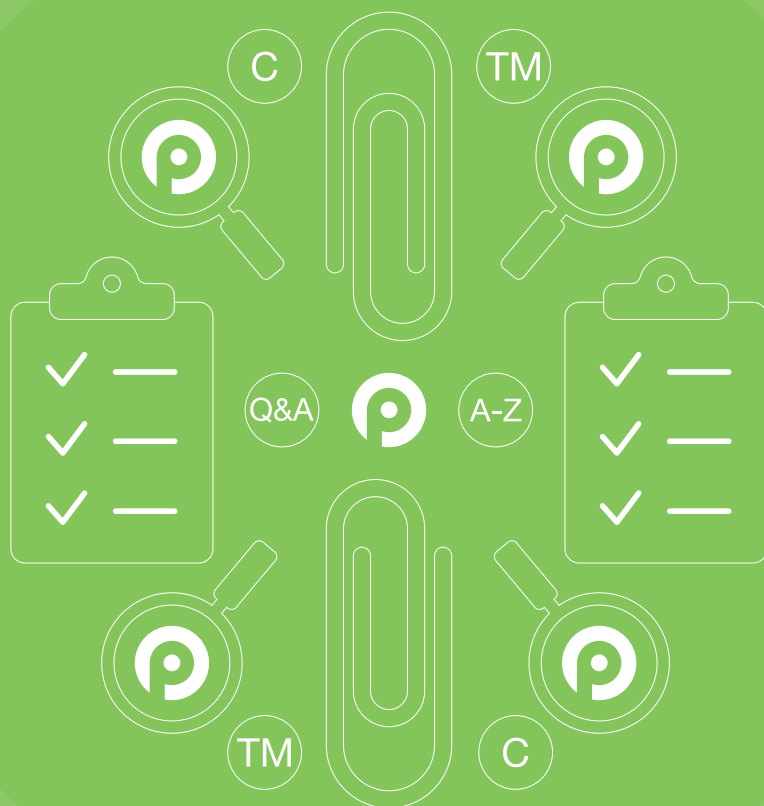
Ordering Information¹

Part No.	Pore Size (µm)	Phenex Membrane
4 mm Diameter (500/pk)		
AF0-3103-52	0.45	RC
AF0-3102-52	0.45	PTFE ⁶
AF3-3107-52	0.45	NY
AF0-3203-52	0.20	RC
AF0-3202-52	0.20	PTFE ⁶
AF3-3207-52	0.20	NY
15 mm Diameter (500/pk)		
AF0-2103-52	0.45	RC
AF0-2102-52	0.45	PTFE ⁶
AF0-2107-52	0.45	NY
AF0-2203-52	0.20	RC
AF0-2202-52	0.20	PTFE ⁶
AF0-2207-52	0.20	NY
17 mm Diameter (500/pk)		
AF6-5106-52	0.45	PVDF
25-28 mm Diameter (500/pk)		
AF0-8103-52 ⁵	0.45	RC
AF0-8108-52 ⁷	0.45	PES ³
AF0-1102-52	0.45	PTFE ⁶
AF0-1107-52	0.45	NY
AF0-8B09-52 ⁷	0.45	GF/CA ^{2,3,4}
AF0-8203-52 ⁵	0.20	RC
AF0-8208-52 ⁷	0.20	PES ³
AF0-1202-52	0.20	PTFE ⁶
AF0-1207-52	0.20	NY
AF0-8A09-52 ⁷	0.20	GF/CA ^{2,3,4,7}
AF0-8515-52 ⁷	1.20	GF ^{2,3}
30 mm Diameter (500/pk)		
AF6-6106-52	0.45	PVDF

Housing is made of medical-grade polypropylene (PP), unless otherwise indicated. Above syringe filters are non-sterile.

1. Additional membrane types available.
2. Glass fiber filters are 28 mm diameter and made of borosilicate. They will remove 90% of all particles >1.2 µm.
3. Housing material is methacrylate butadiene styrene (MBS) polymerisate. Also known as Cyrolite®.
4. Cellulose acetate is surfactant-free.
5. 26 mm diameter.
6. Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.
7. 28 mm diameter.

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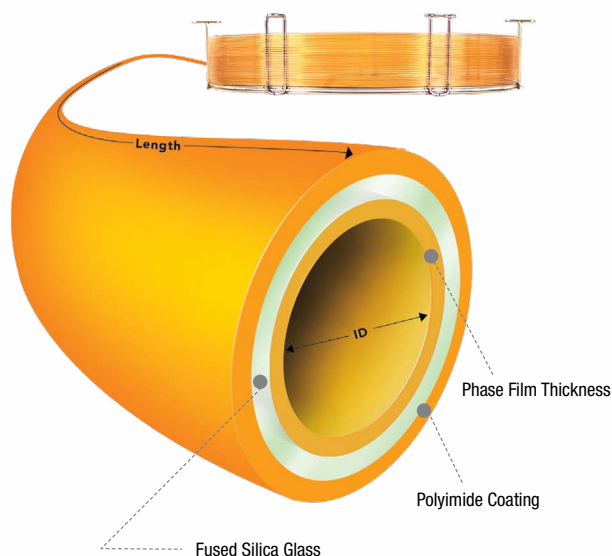
The Master Resolution Equation

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

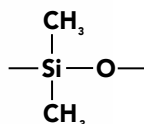
Resolution between two analytes is mainly determined by the selectivity of the stationary phase. By increasing the resolution between two compounds, the total analysis time can often be reduced significantly!

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.

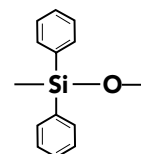
ZB-35

Polarity: 18



65 %

Dimethylpolysiloxane

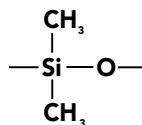


35 %

Phenyl

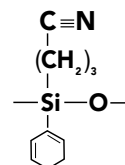
ZB-1701

Polarity: 19



86 %

Dimethylpolysiloxane



14 %

Cyanopropylphenyl

Choosing Your Selectivity (cont'd)

The 3 Most Prevalent GC Interactions

The following selection guidelines can be a starting point for choosing Zebron™ 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)

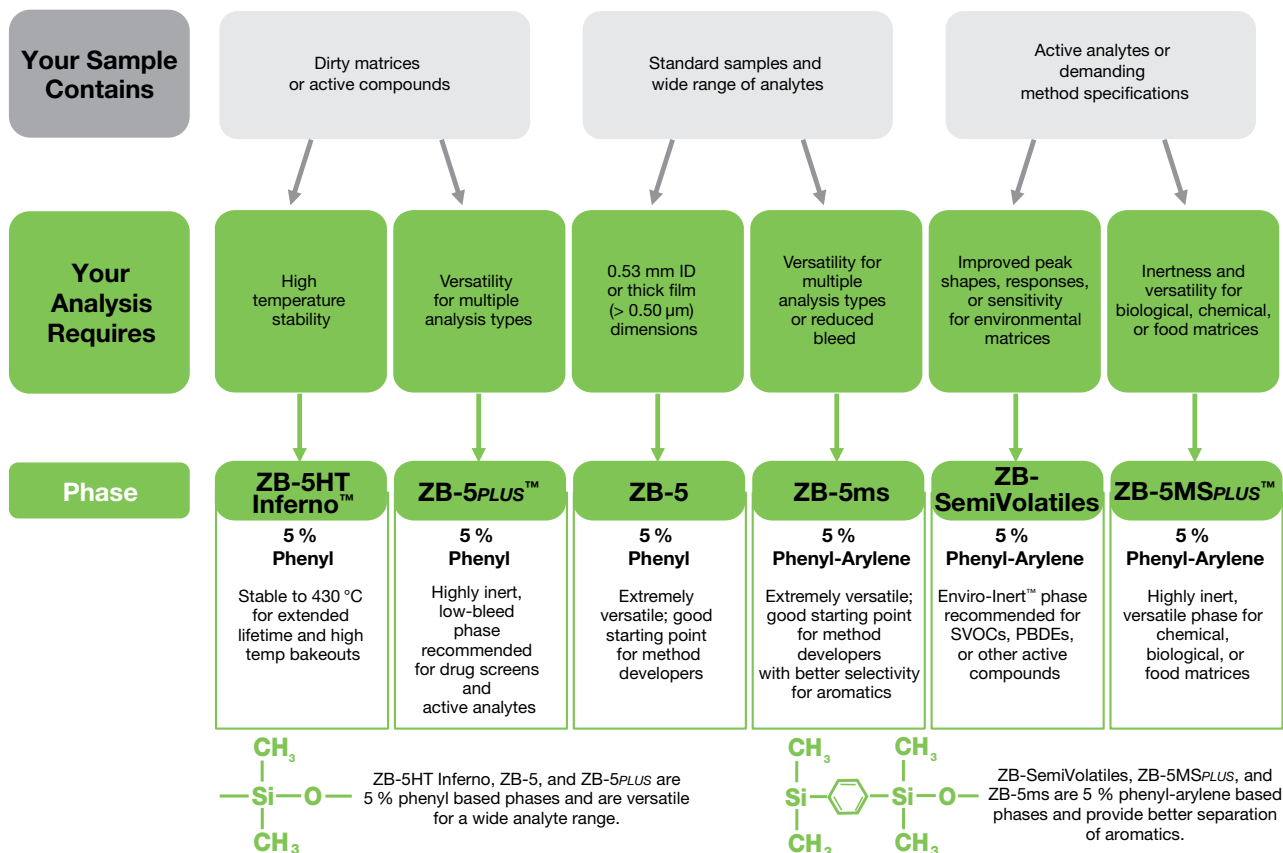
Dipole-Dipole Interactions

- 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)

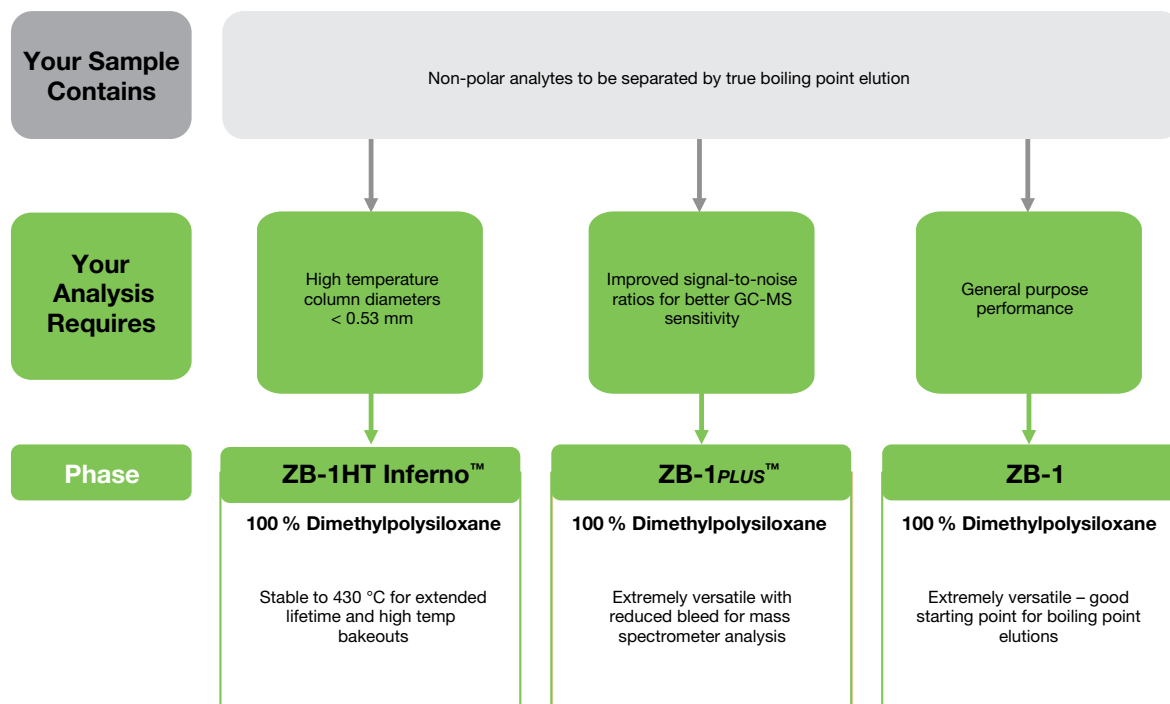
- Can cause poor peak shape or irreversible binding to the inlet liner or to the column itself
- Zebron columns are specially deactivated to minimize these interactions

Choosing A “5” Phase

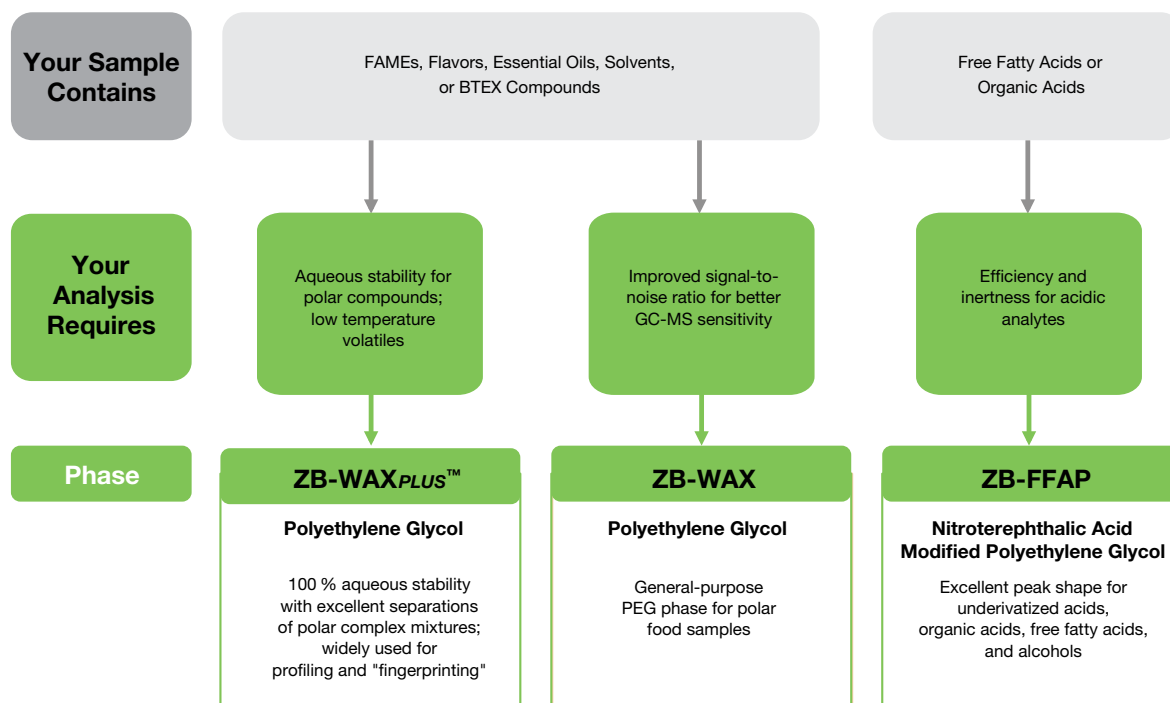


Choosing Your Selectivity *(cont'd)*

Choosing A “1” Phase



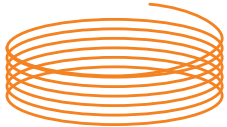
Choosing A “PEG” Phase



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		Long
15 m or less	Good Starting Length	60 m or more
Applications • High boilers • GC-MS applications Advantages • Faster run times • Higher temp. limits • Lower bleed • Higher efficiency Disadvantages • Less inert • Limited retention	30 m 	Applications • Complex samples with closely eluting peaks • Low boilers • Less active samples • Complex temperature ramps Advantages • Better resolution Disadvantages • Slow run times

Try The GC Column Finder!

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

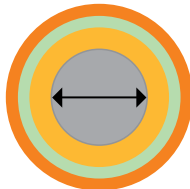


www.phenomenex.com/FindGC

Choosing Your Dimensions *(cont'd)*

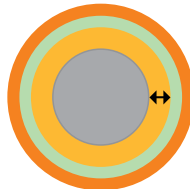
Internal Diameter

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		Wide	
0.10, 0.18, 0.20 mm	Good Starting ID	0.32, 0.53 mm	
Applications - Complex samples Advantages - Faster run times - Better resolution Disadvantages - Lower sample capacity - Easily overloaded	0.25 mm 	Applications - Dirty samples - Highly concentrated samples Advantages - Increased sample capacity - Good for on-column injections Disadvantages - Decreased efficiency - May need higher flow rates - Not compatible with most GC-MS	

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		Thick	
0.10, 0.18 μ m	Good Starting Film	0.50 μ m or more	
Applications - High boilers - GC-MS applications Advantages - Faster run times - Higher temp. limits - Lower bleed - Higher efficiency Disadvantages - Less inert - Limited retention	0.25 μm 	Applications - Low boilers - Gases, solvents, purgeables, volatiles - Purity testing Advantages - Better inertness - Higher capacity Disadvantages - Slow run times - Lower temp. limits - Higher bleed	

Cross-Reference by Manufacturer



Upgrade to Zebtron!

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

Zebtron Phase	Zebtron 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-DHA-PONA	100 % Dimethylpolysiloxane	Rtx-DHA	HP-PONA, DB-PETRO, CP-Sil PONA CB	Petrocol®-DH		
ZB-1PLUS™	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-PS1, DB-HT SimDis, DB-PS2887			
ZB-5	5 % Phenyl 95 % Dimethylpolysiloxane	Rtx-5	DB-5, HP-5, Ultra 2, HP-PAS-5, CP-Sil 8 CB, HP-5ms Ultra Inert	MDN-5, SPB-5, PTE-5, SE-54, PTA-5, Equity-5, Sac-5	BP5, BPX5	OV-5
ZB-5PLUS™	5 % Phenyl 95 % Dimethylpolysiloxane	Rtx-5ms, Rxi-5ms, Rtx-5Amine	DB-5, HP-5ms, HP-5msi	MDN-5S		
ZB-5HT Inferno	5 % Phenyl 95 % Dimethylpolysiloxane	Rxi-5HT, Rtx-5HT Stx®-5HT, XTI®-5HT	DB-5ht, VF-5ht	HT-5		
ZB-5ms	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Rtx-5Sil MS, Rxi-5Sil MS	DB-5ms, DB-5.625, VF-5ms, DB-5ms EVDX, CP-Sil 8 CB MS			
ZB-5MSPLUS™	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Rxi-5Sil MS	DB-5ms Ultra Inert, HP-5ms Ultra Inert, DB-5ms, VF-5ms	SLB®-5ms		
ZB-SemiVolatiles	5 % Phenyl-Arylene 95 % Dimethylpolysiloxane	Rxi-5Sil MS, Rxi-5ms	DB-5ms Ultra Inert	SLB-5ms		
ZB-35	35 % Phenyl 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 65 % Dimethylpolysiloxane			Phenomenex Exclusive		
ZB-50	50 % Phenyl 50 % Dimethylpolysiloxane	Rtx-50	DB-17, DB-17HT, DB-17ms, HP-50+, DB-17 EVDX, CP-Sil 24 CB	SP-2250, SPB-17, SPB-50	BPX50	OV-17
ZB-624	6 % Cyanopropylphenyl 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-624PLUS™	Proprietary	Rxi-624Sil MS	CP-Select 624 CB, DB-624UI Ultra Inert			
ZB-1701	14 % Cyanopropylphenyl 86 % Dimethylpolysiloxane	Rtx-1701	DB-1701, CP-Sil 19 CB	SPB-1701, Equity-1701	BP10	OV-1701
ZB-1701P	14 % Cyanopropylphenyl 86 % Dimethylpolysiloxane		DB-1701P			
ZB-FAME	High Cyanopropyl		CP-Sil 88, HP-88, DB-23	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-WAXPLUS™	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-FFAP CB CP-Wax 58 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-XLB	Proprietary	Rtx-XLB, Rxi-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		
ZB-PAH-EU	Proprietary	Rxi-PAH	DB-PAH EU			
ZB-PAH-CT	Proprietary		PAH-Select			
ZB-Dioxin	Proprietary	Rtx-Dioxin 2	DB-Dioxin, DB-225, DB-5MSUI	SP-2330		

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
	501.3	Trihalomethanes by GC-MS with Selected Ion Monitoring (SIM)	ZB-624, ZB-624 ^{PLUS} [™]	
	502.2	Volatile Halogenated Organics by Purge & Trap GC/PID/ELCD	ZB-624, ZB-624 ^{PLUS}	
	503.1	Volatile Aromatics and Unsaturated Organics by Purge & Trap GC	ZB-624, ZB-624 ^{PLUS}	
	504.1	1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP) by GC	ZB-CLPesticides-1 ZB-MultiResidue [™] -1	ZB-CLPesticides-2 ZB-MultiResidue-2
	505	Organohalide Pesticides & Aroclors by GC-ECD	ZB-CLPesticides-1 ZB-MultiResidue-1	ZB-CLPesticides-2 ZB-MultiResidue-2
	507	Nitrogen & Phosphorus Containing Pesticides by GC-NPD	ZB-MultiResidue-1 ZB-CLPesticides-2	ZB-MultiResidue-2 ZB-CLPesticides-2
	508	Chlorinated Pesticides by GC-ECD	ZB-CLPesticides-1 ZB-MultiResidue-1	ZB-CLPesticides-2 ZB-MultiResidue-2
	509	Ethylene Thiourea (ETU) by GC-NPD	ZB-WAX ^{PLUS} [™]	ZB-1701
	513	2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin by GC-HRMS	ZB-SemiVolatiles	
	515.3	Chlorinated Acids by Liquid-Liquid Extraction, Derivatization and GC-ECD	ZB-XLB	ZB-35
	521	Nitrosamines by Solid Phase Extraction (SPE) and GC-MS/MS with Large Volume Injection	ZB-SemiVolatiles	
	522	1,4-Dioxane by Solid Phase Extraction (SPE) and GC-MS with Selected Ion Monitoring (SIM)	ZB-SemiVolatiles	
	523	Triazine Pesticides and their Degradates by GC-MS	ZB-50	
	524.3	Purgeable Organic Compounds by GC-MS	ZB-624, ZB-624 ^{PLUS}	
	525.2	Semi-volatile Organic Chemicals by Solid Phase Extraction (SPE) and GC-MS	ZB-SemiVolatiles	
	526	Selected Semi-volatile Organic Compounds by Solid Phase Extraction (SPE) and GC-MS	ZB-SemiVolatiles	
	527	Selected Pesticides and Flame Retardants by Solid Phase Extraction (SPE) and GC-MS	ZB-5 ^{PLUS} [™]	
	528	Phenols by Solid Phase Extraction (SPE) and GC-MS	ZB-SemiVolatiles	ZB-35
	529	Explosives and Related Compounds by Solid Phase Extraction (SPE) and GC-MS	ZB-5 ^{PLUS} [™]	
	548	Endothall by Aqueous Derivatization, Liquid-Solid Extraction, and GC-ECD	ZB-SemiVolatiles	ZB-35
	551.1	Chlorinated Solvents & Disinfection Byproducts by Liquid-Liquid Extraction and GC-ECD	ZB-35	
	552.3	Haloacetic Acids and Dalapon by Liquid-Liquid Extraction, Derivatization, and GC-ECD	ZB-CLPesticides-1 ZB-XLB	ZB-CLPesticides-2 ZB-35
	556	Carbonyl Compounds by Pentafluorobenzylhydroxylamine Derivatization and GC-ECD	ZB-SemiVolatiles	ZB-1701

Waste Water	Method #	Description	Primary Column	Confirmation Column
	601	Purgeable Halocarbons by Purge & Trap GC	ZB-624, ZB-624 ^{PLUS}	
	602	Purgeable Aromatics by Purge & Trap GC	ZB-624, ZB-624 ^{PLUS}	
	603	Acrolein & Acrylonitrile Purge & Trap GC	ZB-624, ZB-624 ^{PLUS}	
	604	Phenols by GC-ECD	ZB-SemiVolatiles	
	606	Phthalate Esters by GC-ECD	ZB-5 ^{PLUS} [™]	
	607	Nitrosamines by GC-NPD	ZB-SemiVolatiles	
	608	Organochlorine Pesticides and PCBs by GC-ECD	ZB-MultiResidue-1	ZB-MultiResidue-2
	609	Nitroaromatics & Isophorone by GC-FID and GC-ECD	ZB-SemiVolatiles	
	610	Polynuclear Aromatic Hydrocarbons by GC-FID	ZB-PAH-EU ZB-PAH-CT	
	611	Haloethers by GC-ECD	ZB-SemiVolatiles	ZB-SemiVolatiles
	612	Chlorinated Hydrocarbons by GC-ECD	ZB-SemiVolatiles	
	613	2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC-MS	ZB-SemiVolatiles	
	615	Chlorinated Herbicides by GC-ECD	ZB-CLPesticides-1 ZB-XLB	ZB-CLPesticides-2 ZB-35
	619	Triazine Herbicides by GC-MS	ZB-50	
	622	Organophosphorus Pesticides by GC-MS	ZB-MultiResidue-1	
	624	Purgeable Volatiles by Purge & Trap GC-MS	ZB-624	
	625	Base/Neutral and Acids by GC-MS	ZB-SemiVolatiles	
	1613	Tetra- through Octa-Chlorinated Dioxins & Furans by Isotope Dilution HRGC/HRMS	ZB-Dioxin	ZB-SemiVolatiles
	1614	Polybrominated Diphenyl Esters (PBDEs) by HRGC/HRMS	ZB-5HT Inferno [™] ZB-SemiVolatiles	
	1618	Organohalide Pesticides, Organophosphorus Pesticides, and Phenoxy-Acid Herbicides by GC	ZB-MultiResidue-1	ZB-MultiResidue-2
	1624	Volatile Organic Compounds by Isotope Dilution GC-MS	ZB-624, ZB-624 ^{PLUS}	
	1625	Semi-volatile Organic Compounds by Isotope Dilution GC-MS	ZB-SemiVolatiles	
	1653	Chlorinated Phenols by In-Situ Acetylation and GC-MS	ZB-SemiVolatiles	
	1657	Organophosphorous Pesticides by GC-FPD	ZB-MultiResidue-1	ZB-MultiResidue-2
	1658	Phenoxy-Acid Herbicides by GC-ECD	ZB-MultiResidue-1	ZB-MultiResidue-2
	1659	Dazomet by GC-NPD	ZB-MultiResidue-1	ZB-MultiResidue-2
	1666	Pharmaceutical Volatile Organic Compounds by Purge & Trap GC or Isotope Dilution GC-MS	ZB-SemiVolatiles (Direct Injection) ZB-624 (Purge & Trap), ZB-624 ^{PLUS}	
	1668	Polychlorinated Biphenyl (PCB) Congeners by HRGC/HRMS	ZB-MultiResidue-1	ZB-1
	1671	Pharmaceutical Manufacturing Volatile Organic Compounds by GC-FID	ZB-1	
	7850	White Phosphorus (P4) by Solvent Extraction and GC-NPD	ZB-1	



Environmental Selection Chart (cont'd)



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
	8010B	Halogenated Volatile Organics by GC-ELCD	ZB-624, ZB-624 ^{PLUS} [™]	
	8015C	Nonhalogenated Organics by GC	ZB-5HT Inferno [™]	
	8020A	Aromatic Volatile Organics by GC-PID	ZB-WAX, ZB-WAX ^{PLUS} [™]	
	8021B	Aromatic and Halogenated Volatiles by GC-PID or GC-ELCD	ZB-624, ZB-624 ^{PLUS}	ZB-1 (thick phase)
	8030A	Acrolein and Acrylonitrile by GC-FID	ZB-624, ZB-624 ^{PLUS}	
	8032A	Acrylamide by GC-ECD	ZB-5HT Inferno	
	8041	Phenols by GC-ECD or GC-FID	ZB-SemiVolatiles	
	8061A	Phthalate Esters by GC-ECD	ZB-SemiVolatiles	ZB-1701
	8081B	Organochlorine Pesticides by GC-ECD	ZB-MultiResidue [™] -1 ZB-CLPesticides-1	ZB-MultiResidue-2 ZB-CLPesticides-2
	8082A	Polychlorinated Biphenyls (PCBs) by GC-ECD	ZB-MultiResidue-1 ZB-CLPesticides-1	ZB-MultiResidue-2 ZB-CLPesticides-2
	8091	Nitroaromatics and Cyclic Ketones by GC-ECD or GC-NPD	ZB-SemiVolatiles	ZB-1701
	8095	Explosives by GC-ECD	ZB-50	
	8100	Polynuclear Aromatic Hydrocarbons by GC-FID	ZB-SemiVolatiles ZB-35	
	8121	Chlorinated Hydrocarbons by GC-ECD	ZB-MultiResidue-1	ZB-MultiResidue-2
	8131	Aniline and Selected Derivatives by GC-NPD	ZB-SemiVolatiles	ZB-1
	8141B	Organophosphorus Pesticides by GC-FPD or GC-NPD	ZB-MultiResidue-1 ZB-CLPesticides-1	ZB-MultiResidue-2 ZB-CLPesticides-2
	8151A	Chlorinated Herbicides by GC-ECD	ZB-CLPesticides-1 ZB-XLB	ZB-CLPesticides-2 ZB-35
	8260B	Volatile Organic Compounds by GC-MS	ZB-624, ZB-624 ^{PLUS}	
	8270D	Semi-volatile Organic Compounds by GC-MS	ZB-SemiVolatiles	
	8272	Polynuclear Aromatic Hydrocarbons (PAHs) by SPME and GC-MS with Selected Ion Monitoring (SIM)	ZB-SemiVolatiles, ZB-35	
	8280B	Polychlorinated Dibenzo-P-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) By HRGC-LRMS	ZB-SemiVolatiles	
	8290A	Polychlorinated Dibenzo-P-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) By HRGC/HRMS	ZB-SemiVolatiles	
	8410	Semi-Volatile Organic Compounds by GC-FTIR	ZB-SemiVolatiles	
	8430	Bis(2-chloroethyl) Ether and Hydrolysis Products by Direct Aqueous Injection GC-FTIR	ZB-WAX ^{PLUS}	

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

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
	Pesticides & Antimicrobials	Multi-Residue Pesticide Screening	ZB-MultiResidue™-1 and -2
		Organochlorine Pesticides in Water	ZB-MultiResidue-1 and -2
		Organochlorine Pesticides in Foods of Plant Origin	ZB-MultiResidue-1 and -2
		Organophosphorus Pesticides in Foods of Plant Origin	ZB-MultiResidue-1 and -2
		Triazine Pesticides in Water	ZB-50
		Triazine Pesticides in Foods of Plant Origin	ZB-50
		Chloramphenicol in Foods of Animal Origin	ZB-1 PLUS™
	Environmental Contaminants	Polybrominated Diphenyl Ethers (PBDEs) in Food	ZB-5MS PLUS™, ZB-SemiVolatiles, ZB-35
		Polychlorinated Biphenyls (PCBs) in Water	ZB-MultiResidue-1, ZB-XLB-HT Inferno™
		Polychlorinated Dibenzo-dioxins (PCDDs) in Food	ZB-5MS PLUS, ZB-SemiVolatiles
		Polychlorinated Dibenzo-furans (PCDFs) in Food	ZB-5MS PLUS, ZB-SemiVolatiles
		Polycyclic Aromatic Hydrocarbons (PAHs) in Water	ZB-PAH-EU, ZB-PAH-CT, ZB-5MS PLUS, ZB-SemiVolatiles, ZB-35
	Food Contact Materials	Food Packaging Volatiles	ZB-624, ZB-624 PLUS™
		Dioxins and Furans in Food	ZB-Dioxin
		Melamine in Food	ZB-XLB-HT Inferno
		Cyanuric Acid in Food	ZB-XLB-HT Inferno
		Phthalates in Food	ZB-5MS PLUS
		Residual Solvents in Food	ZB-624, ZB-624 PLUS, ZB-WAX PLUS
		Bisphenol A & F (BPA/BPF) in Food	ZB-5MS PLUS
	Additives & Preservatives	Parabens in Food	ZB-5MS PLUS
		Chloropropanols (3-MCPD) in Food	ZB-5MS PLUS
		Flavor Additives (Borneol)	ZB-MultiResidue-1
		Phenolic Antioxidants (BHA & BHT) in Food	ZB-50
		Tocopherols in Food	ZB-5MS PLUS
	Process Contaminants	Acrylamide in Foods	ZB-5HT Inferno
		Acrylamide, Acrylonitrile, and Acrolein in Water	ZB-624, ZB-624 PLUS
		Benzene in Food	ZB-WAX PLUS
		Glycols in Food	ZB-WAX PLUS
	Hormones	Steroid Hormones in Food	ZB-5MS PLUS, ZB-1 PLUS

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Food & Flavors Selection Chart *(cont'd)*



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
	Fatty Acids & FAMES	Food Industry Fatty Acid Methyl Esters (FAMES)	ZB-FAME
		Marine Oil Fatty Acid Methyl Esters (FAMES)	ZB-FAME
		Saw Palmetto Fatty Acid Methyl Esters (FAMES)	ZB-FAME
		Free Fatty Acids	ZB-FFAP
		Essential Fatty Acids (EFAs) Omega-3 and Omega-6	ZB-FAME
	Triglycerides	Butter, Canola Oil, Olive Oil, and Peanut Oil Triglycerides	ZB-5HT Inferno™
	Alcoholic Beverages	Cognac Compounds	ZB-WAX ^{PLUS} ™
		Distilled Liquor Screen	ZB-FFAP
		Ethanol in Beer	ZB-Bioethanol
		Sulfur in Beer	ZB-1 ^{PLUS} ™
		Whiskey Compounds	ZB-WAX ^{PLUS}
		Wine Compounds	ZB-WAX, ZB-WAX ^{PLUS}
	Other Acids	Organic Acids	ZB-FFAP
		Amino Acids	ZB-50
	Sterols	Sterols in Lard, Margarine, Peanut Butter, or Olive Oil	ZB-5HT Inferno
	Sugars	Alditol Acetates	ZB-5MS ^{PLUS} ™
		Trimethylsilyl (TMS) Sugars	ZB-MultiResidue™-1

Flavors & Fragrances	Compound Class	Analysis	Recommended Columns
	Essential Oils	Cold-Pressed Orange Oil	ZB-WAX ^{PLUS}
		Ginkgo Biloba Oil, Lavender Oil, and Ylang Ylang Oil	ZB-1 ^{PLUS}
		Peppermint Oil	ZB-WAX
		Rose Oil	ZB-XLB
		Spearmint Oil	ZB-5MS ^{PLUS}
	Flavors	Flavors Screening	ZB-FFAP
		Flavor Allergens	ZB-5MS ^{PLUS}
		Flavor Volatiles	ZB-1 ^{PLUS} , ZB-WAX ^{PLUS} , ZB-624
		Alcoholic Beverage Profile	ZB-FFAP
		Honey Profile	ZB-WAX ^{PLUS}
	Fragrances	Fragrance Screening	ZB-WAX ^{PLUS} , ZB-624
		Fragrance Allergens	ZB-1 ^{PLUS}

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
	G1 Dimethylpolysiloxane Oil	ZB-1, ZB-1 ^{PLUS} ™, ZB-1HT Inferno™
	G2 Dimethylpolysiloxane Gum	ZB-1, ZB-1 ^{PLUS} , ZB-1HT Inferno
	G3 50 % Phenyl 50 % Methylpolysiloxane	ZB-50
	G5 Not less than 70 % of 3-Cyanopropylpolysiloxane	ZB-FAME
	G8 80 % Bis (3-Cyanopropyl-20 % 3-Cyanopropylphenylpolysiloxane)	ZB-FAME
	G9 Methylvinylpolysiloxane	ZB-1 ^{PLUS} , ZB-1HT Inferno, ZB-1
	G14 Polyethylene Glycol (Average MW 950-1,050)	ZB-WAX, ZB-WAX ^{PLUS} ™
	G15 Polyethylene Glycol (Average MW 3,000-3,700)	ZB-WAX, ZB-WAX ^{PLUS}
	G16 Polyethylene Glycol (Average MW 15,000)	ZB-WAX, ZB-WAX ^{PLUS}
	G17 75 % Phenyl 25 % Methylpolysiloxane	ZB-50
	G20 Polyethylene Glycol (Average MW of 380-420)	ZB-WAX, ZB-WAX ^{PLUS}
	G25 Polyethylene Glycol TPA (Carbowax 20M Terephthalic Acid)	ZB-FFAP
	G27 5 % Phenyl 95 % Methylpolysiloxane	ZB-5, ZB-5 ^{PLUS} ™, ZB-5HT Inferno
	5 % Phenyl-Arylene 95 % Methylpolysiloxane	ZB-5ms, ZB-5MS ^{PLUS} ™, ZB-SemiVolatiles
	G28 25 % Phenyl 75 % Methylpolysiloxane	ZB-35, ZB-35HT Inferno
	G32 20 % Phenylmethyl 80 % Dimethylpolysiloxane	ZB-35, ZB-35HT Inferno
	G35 Polyethylene Glycol & Diepoxide Esterified with Nitroterephthalic Acid	ZB-FFAP
	G36 1 % Vinyl 5 % Phenylmethylpolysiloxane	ZB-5, ZB-5 ^{PLUS} , ZB-5HT Inferno
	G38 Phase G1 Plus A Tailing Inhibitor	ZB-1, ZB-1 ^{PLUS} , ZB-1HT Inferno
	G39 Polyethylene Glycol (Average MW 1,500)	ZB-WAX, ZB-WAX ^{PLUS} ™
	G41 Phenylmethyldimethylsilicone (10 % Phenyl Substituted)	ZB-5, ZB-5 ^{PLUS} , ZB-5HT Inferno
	G42 35 % Phenyl 65 % Dimethylpolysiloxane	ZB-35, ZB-35HT Inferno
	G43 6 % Cyanopropylphenyl 94 % Dimethylpolysiloxane	ZB-624, ZB-624 ^{PLUS} ™
	G46 14 % Cyanopropylphenyl 86 % Methylpolysiloxane	ZB-1701, ZB-1701P
	G47 Polyethylene glycol (average MW 8,000)	ZB-WAX ^{PLUS} , ZB-WAX
	G48 Highly polar, partially cross-linked cyanopolysiloxane	ZB-FAME
	G51 50 % Phenyl - 50 % Dimethylpolysiloxane phase which is modified with an aromatic selector for optimized separation of polycyclic aromatic hydrocarbons (PAH)	ZB-PAH-CT, ZB-PAH-EU

Residual Solvents	USP <467> Procedure	USP Phase for Residual Solvents	Recommended Columns
	Procedure A	G43 (6 % Cyanopropyl 94 % Dimethylpolysiloxane)	ZB-624, ZB-624 ^{PLUS}
	Procedure B	G16 (Polyethylene Glycol)	ZB-WAX ^{PLUS}
	Procedure C	G43 or G16	ZB-624 ^{PLUS} or ZB-WAX ^{PLUS}

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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
	D 1946	Reformed gas	ZB-1
	D 2268	Analysis of n-heptane and iso-octane (high purity)	ZB-1
	D 2306-96	Xylene isomers	ZB-WAX, ZB-WAX ^{PLUS} [™]
	D 2426	Butadiene and styrene in butadiene concentrates	ZB-1
	D 2504	Non-condensable gases in C1-C3 hydrocarbons	ZB-1 (thick phase)
	D 2580	Phenols in water	ZB-WAX ^{PLUS}
	D 2600	Aromatic traces in light saturated hydrocarbons	ZB-WAX
	D 2804	Purity of methyl ethyl ketone	ZB-WAX
	D 2887	SimDist analysis of petroleum fractions	ZB-1, ZB-1XT SimDist
	D 2908	Volatile organics in water	ZB-WAX, ZB-WAX ^{PLUS}
	D 2998	Polyhydric alcohols in alkyd resins	ZB-1
	D 2999	Monopentaerythritol in commercial pentaerythritol	ZB-1
	D 3009	Composition of turpentine	ZB-WAX ^{PLUS}
	D 3054	Purity and benzene content of cyclohexane	ZB-1
	D 3086	Organochlorine pesticides in water	ZB-CLPesticides-1 or -2, ZB-MultiResidue [™] -1 or -2
	D 3168	Polymers in emulsion paints	ZB-1
	D 3271	Solvent analysis in paints	ZB-WAX ^{PLUS}
	D 3304	PCBs in environmental materials	ZB-MultiResidue-1 or -2
	D 3328	Comparison of waterborne petroleum oils	ZB-1
	D 3329	Purity of methyl isobutyl ketone	ZB-WAX ^{PLUS}
	D 3432	Toluene diisocyanates in urethane prepolymers	ZB-1
	D 3447	Purity of trichlorotrifluoroethane (CFC-113)	ZB-1, ZB-624
	D 3452	Identification of rubber	ZB-1HT Inferno [™]
	D 3465	Purity of monomeric plasticizers	ZB-1
	D 3524	Diesel fuel in lubricating oil (SAE 30)	ZB-1HT Inferno
	D 3534	PCBs in water	ZB-5, ZB-5 ^{PLUS} [™]
	D 3606	Benzene and toluene in gasoline	ZB-1
	D 3687	Volatile organic compounds	ZB-WAX, ZB-WAX ^{PLUS}
	D 3710	Gasoline fractions	ZB-1XT SimDist
	D 3725	Fatty acids in drying oils	ZB-FFAP
	D 3760	Analysis of cumene	ZB-WAX, ZB-WAX ^{PLUS}
	D 3797	Analysis of o-xylene	ZB-WAX, ZB-WAX ^{PLUS}
	D 3798	Analysis of p-xylene impurities	ZB-WAX, ZB-WAX ^{PLUS}
	D 3876	Methoxyl and hydroxypropyl substitution in cellulose ether products	ZB-1
	D 3962	Impurities in styrene	ZB-FFAP
	D 4059	PCBs in insulating liquids	ZB-5 ^{PLUS} , ZB-5HT Inferno
	D 4275	Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymers	ZB-1
	D 4367	Benzene in hydrocarbon solvent	ZB-1
	D 4420	Aromatics in gasoline	ZB-1
	D 4735	Thiophene impurities in benzene	ZB-FFAP
	D 4768	Phenol and cresol inhibitors in insulating oils	ZB-FFAP
	D 5060	Impurities in ethylbenzene	ZB-FFAP, ZB-WAX, ZB-WAX ^{PLUS}
	D 5134	Petroleum naphthas through n-nonane	ZB-1, ZB-DHA-PONA
	D 5135-95	Analysis of styrene	ZB-WAX, ZB-WAX ^{PLUS}
	D 5441	Analysis of Methyl Tert-Butyl Ether (MTBE)	ZB-DHA-PONA
	D 5501	Determination of denaturated bioethanol	ZB-1, ZB-Bioethanol, ZB-DHA-PONA
	D 5580	Aromatics in finished gasoline	ZB-1
	D 6352	Extended SimDist	ZB-1HT Inferno, ZB-1XT SimDist
	D 6584	Determination of glycerine in biodiesel	ZB-5HT Inferno
	D 6729-30, D 6733	Components in spark ignition fuels	ZB-DHA-PONA
	D 7169	Crude Oil; Vacuum distillates	ZB-1XT SimDist
	E 0202	Analysis of glycols	ZB-WAX ^{PLUS} , ZB-1
	E 1100	Analysis of denaturated ethanol	ZB-WAX ^{PLUS} , ZB-Bioethanol

GC Column Installation Instructions

The following is a brief reminder of the general precautions required in handling and installing any organic-coated fused silica capillary column. Consult your GC manual for more details.

Fused silica capillary columns become brittle if the polyimide coating applied during manufacture is damaged. Avoid temperatures above 370°C, and excessive bending, twisting, and abrasion of columns, which will damage this protective coating. Remember, even if the column does not break immediately, when the protective coating is damaged the column may break spontaneously later.

All foreign material including debris from the septa or ferrules must be kept out of the column.

The stationary phase, which coats the inside of the column, must also be protected. The ends of the column will be sealed or protected by a septum when you receive the column. Once the ends are open in preparation for installation, the column should be installed in a chromatograph as soon as practical and a flow of dry, oxygen-free carrier gas maintained until the column is removed and resealed.

Installing the Column

A. Instrument and Capillary Column Preparation

1. Turn off all heated zones and allow them to cool.
2. Make sure you have carrier gas of sufficient purity; replace carrier gas purifiers, if appropriate.
3. Clean and deactivate injector and detector sleeves as necessary.
4. Replace seals and septum, and deactivate liner if necessary.
5. Inspect the column for damage.
6. Cut a centimeter or two off an end of the column. Use a sapphire scribe or a ceramic scoring-wafer to score the tubing before breaking it.
7. While pointing the end of the column down, install a nut and ferrule on it. Make sure the ferrule is the right size and pointed in the correct direction.
8. Cut an additional centimeter or two from the end of the column to remove ferrule fragments. Check the end. A 20-power magnifying glass is recommended. If the break is not clean and the end square, cut the column again.
9. Mount the column in the GC oven without damaging the column coating. It should not have sharp bends or touch the walls of the oven.
10. Insert the column into the injector exactly the correct distance specified in the instrument manual. Use correction fluid to mark the exact insertion distance.
11. Tighten the ferrule nut until the column resists movement. One-quarter turn past finger tight is about right. Do not connect the column to the detector at this time.
12. Adjust the head pressure to obtain the flow rate listed on the test chromatogram.
13. Check the inlet connections for leaks.
14. Confirm gas flow through the column by observing bubbles when the column outlet end is immersed in a vial of nontoxic solvent such as acetone.
15. Set gas flow rates for the detector including the make up rate.



Warning: It is advisable to wear safety glasses.



Warning: Cyano columns are susceptible to oxidation and hydrolysis. Care must be taken to avoid leaks, water, strong acids and high temperatures.

Figure 1: Proper and Improperly Cut Capillary End

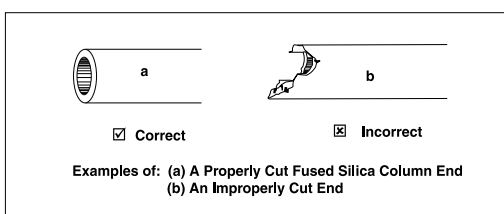


Figure 2: Cutting Fused Silica Tubing

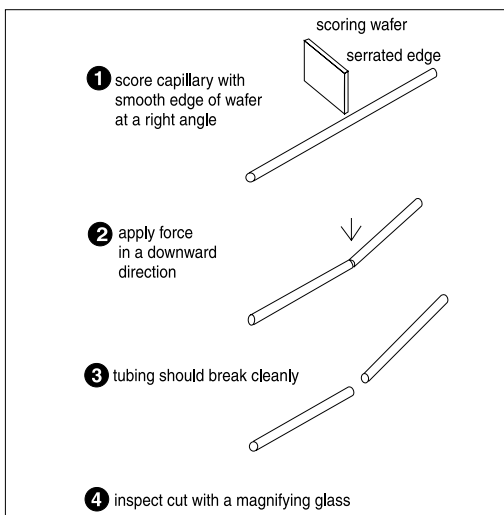
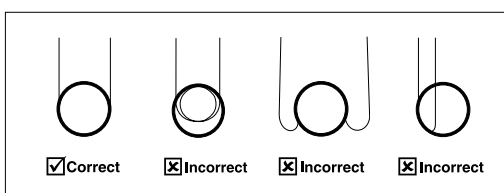


Figure 3: Column Hanging Diagrams



Warning: Avoid sharp bends when installing columns.

GC Column Installation Instructions *(cont'd)*

B. Conditioning and Testing the Capillary Column

1. Purge the column with carrier gas for approximately 15 minutes. Further conditioning may be desirable.
2. Insert the outlet end of the column into the detector exactly the distance prescribed in the instrument manual, repeating steps 7 through 9. Use correction fluid to mark the exact insertion distance.
3. Set gas-flow rates to instrument specifications. Warning! Some detectors may be damaged by heating without proper gas flow.
4. Check the system for leaks. It is preferable to use a thermal-conductivity-type leak detector. Do not use soaps or liquid-based leak detectors with capillary columns. Never heat the column without checking thoroughly for leaks first.
5. Set injector and detector temperatures. Turn the detector on when steady state temperatures are achieved.
6. Increase the oven temperature to the maximum continuous operating temperature for the column. Warning! Do not exceed the maximum operating temperature of the column. Maintain that temperature until a flat baseline is observed. If this takes more than half an hour, it could indicate a problem.
7. Inject a detectable unretained sample such as methane to determine dead volume time and linear gas velocity. Adjust gas pressure to obtain proper values for your analytical method.
8. Set oven to starting temperature. Inject another sample of a detectable unretained substance. Reset the carrier gas velocity to desired value.
9. Check the performance of the GC and the column by injecting a known sample or performance test mix. If all peaks tail, it could indicate loose fittings, improper column installation, or broken liner. See the Section on Troubleshooting Installation Problems.
10. Calibrate the instrument.
11. Inject a sample, ensuring that the vaporized sample volume does not exceed the inlet sleeve's buffer volume
12. For short-term standby operation of the GC instrument continue carrier gas flow at 100-200°C. Long term standby conditions require that the column be removed from the instrument, flame-sealed or end-capped with septa, and stored away from light in its original box.

Troubleshooting Installation Problems

More often than not, GC column problems are traceable to something improperly done during installation. For a more complete treatment of the subject, ask for your *FREE* guidebook "GC Troubleshooting".



High Performance Operation Recommendation Before Use:
This column should be conditioned for at least 4 hours at its "maximum" isothermal temperature *OR* at 20°C above the maximum temperature of the method, whichever is less.

Zebron GC Columns MS Certification

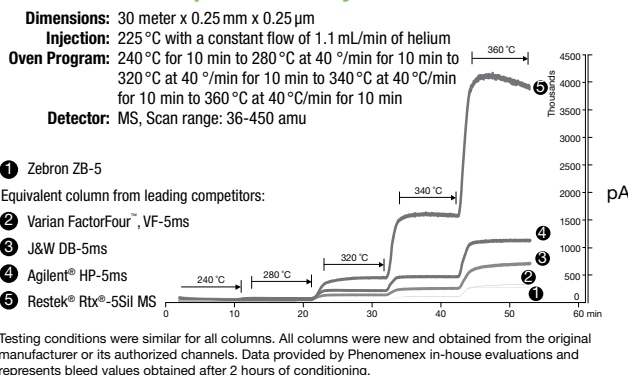
Simply because GC-MS is one of the most important and rapidly growing techniques, many manufacturers have designated these columns "MS Certified" in order to draw attention to them. Designed to bleed less at higher temperatures, these columns can analyze a broad range of compounds at lower levels than ever before.

To provide such columns, some manufacturers "high-grade" or select the best-performing capillary columns from batches of their standard columns and label these "MS grade". Other manufacturers modify the chemistry of the polymer backbone (with, e.g., silphenylene) in order to make lower bleed at higher temperature limits possible. This last approach can change selectivity, however, which then leads to problems when the method is upgraded from a traditional to the new "MS-certified" column.

Phenomenex MS-certified Zebron columns, however, are neither hand-selected nor will they change selectivity. Instead, they offer excellent thermal performance with identical selectivity compared to traditional "non-MS columns". Every column is manufactured to provide very high levels of batch-to-batch and column-to-column reproducibility, along side some of the most exacting bleed specifications in the industry — your assurance of a quality column that will perform for demanding applications.

Now anyone doing trace analysis can directly transfer their method to a true low bleed, high-temperature column without virtually any selectivity changes. Zebron is the clear choice.

Column Bleed Comparison Test by MS Detection



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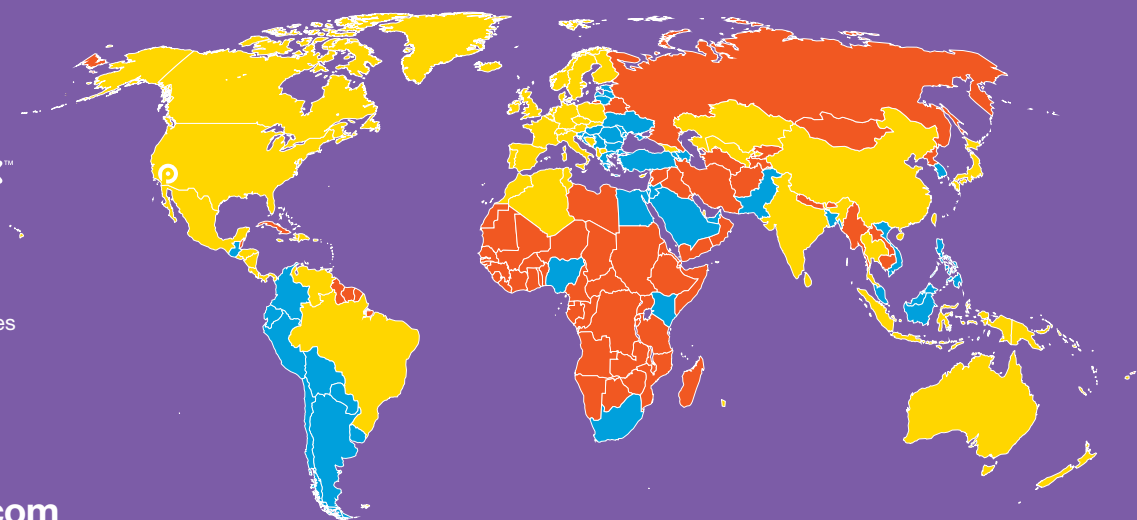
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