Zebron™ Inferno™

Rugged High Temperature GC Columns

ZB-1HT
ZB-5HT
NEW! ZB-35HT
NEW! ZB-XLB-HT

phenomenex®
. . . breaking with tradition℠

Manufacturing Award Winning Solutions for GC Analysis

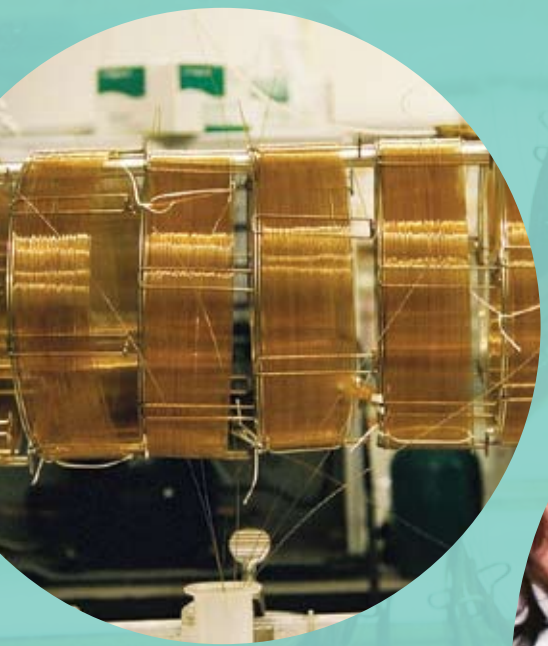
In the field of gas chromatography, not much has changed in the last 15 years. However, technology is our passion and Phenomenex is gaining international recognitions for its GC products that are specially designed for today's most challenging methods.

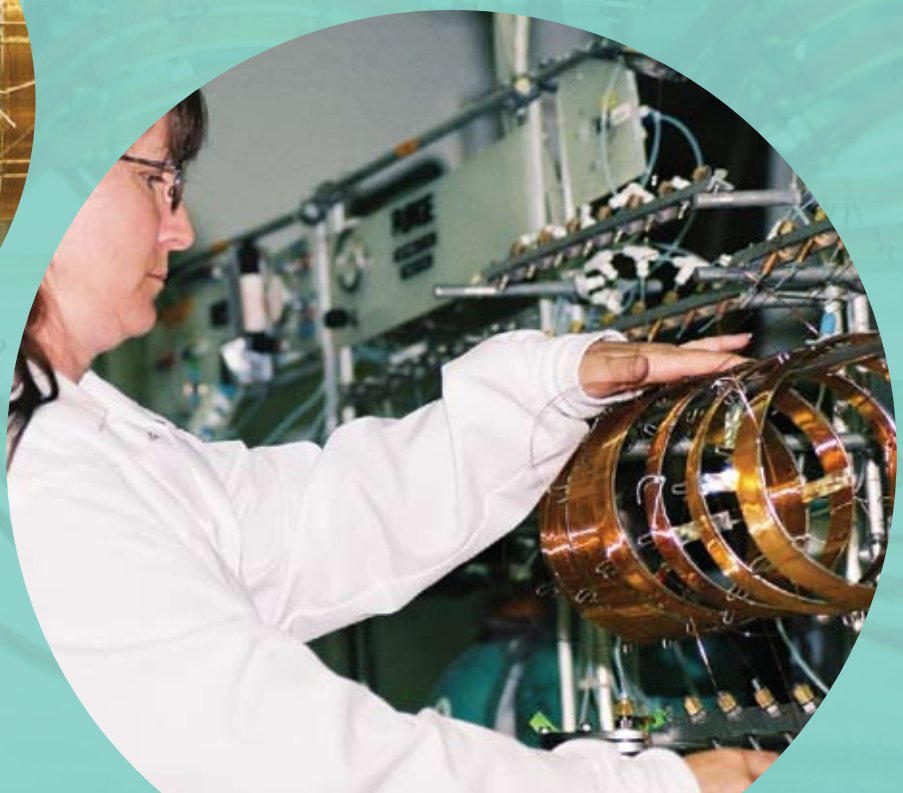
For chemists struggling with high boilers, contaminants, or carry-overs, Phenomenex developed the Zebron™ Inferno™ line. This line of GC columns have revolutionized GC analysis by allowing chemists to run their analysis at oven temperatures that were never before attainable - all without having to use a metal column!

The Zebron ZB-1HT and ZB-5HT Inferno columns are rugged, mid-polarity columns that allow chemists to push their standard analysis up to 430 °C for increased lab productivity and improved performance. The newly developed Zebron ZB-35HT and ZB-XLB-HT Inferno columns provide high temperature capability up to 400 °C for those using more polar columns.

guarantee

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





Zebron™ Inferno™

Rugged High Temperature GC Analysis

Challenges with Traditional GC Columns

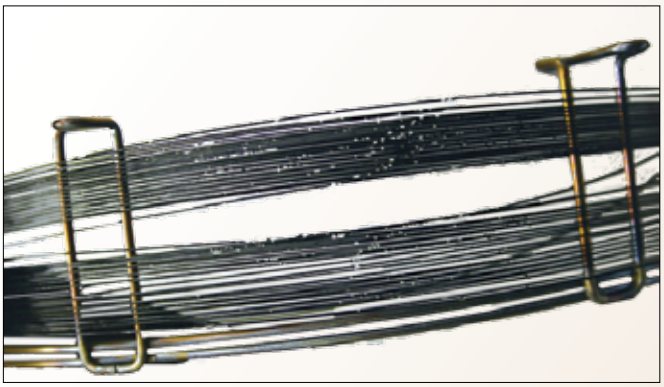
Standard fused silica columns - Shorter lifetime

Unlike the Zebron™ Inferno™ GC columns, most fused silica columns are not developed to handle prolong exposure to temperatures above 360 °C.

At high temperatures, fused silica GC columns:

- Become inflexible and brittle
- Break easily and are costly to replace
- Require more system downtime to replace columns
- Can't separate high molecular weight compounds

Deterioration of a standard column at high temperatures

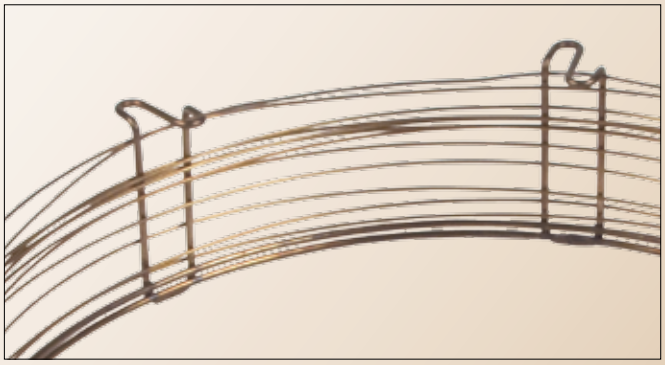


Metal columns – Difficult to use

Though metal columns have higher temperature limits than capillary columns, they are more difficult to use.

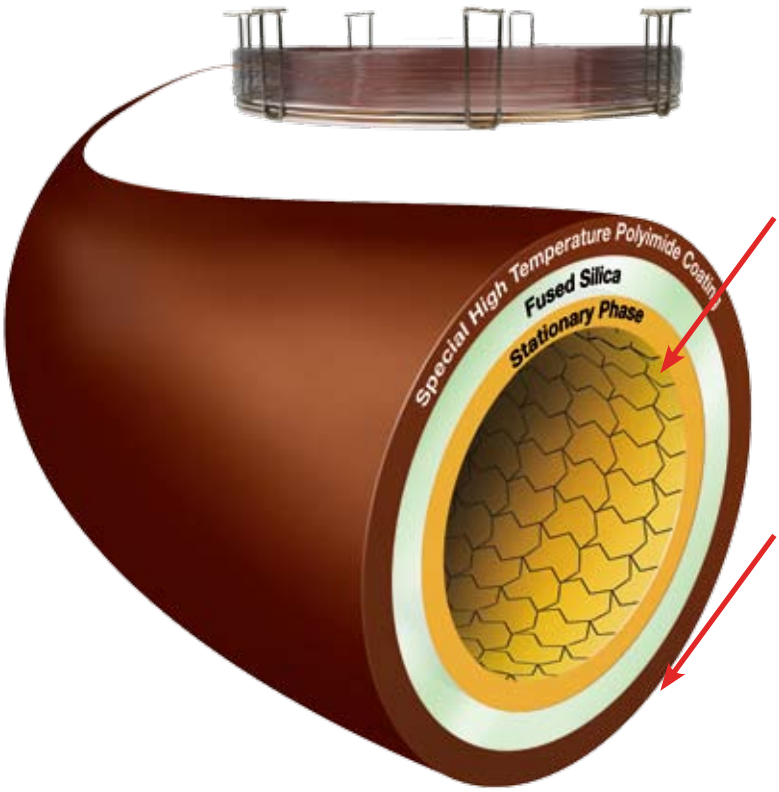
Metal columns:

- Inflexible and hard to use
- Require special tubing cutters for installation
- Prone to leaks from expansion and contraction
- Have active surface, giving poor peak shapes for acids and bases
- Incompatible with MS detectors



Advanced Solutions for High Temperature Analysis

Zebron™ Inferno™ columns offer enhanced performance where other columns fail. The two critical factors that allow for this are:



1. Advanced ESC™ Bonding Technology

At high temperature ranges, the stability of standard GC columns will deteriorate, resulting in increased bleed. Zebron's Engineered Self Cross-linking™ (ESC) bonding technology reinforces the stationary phase for enhanced column durability and extremely low bleed levels. The result - our Inferno columns allow for the flexibility to perform GC analysis at high temperatures while providing low bleed and longer column lifetime.

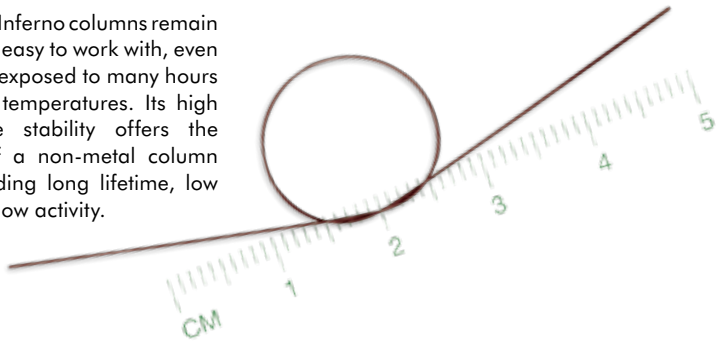
2. Special High Temperature Polyimide Coating

Standard polyimide resin pyrolyzes at temperatures above 360 °C, making the tubing unstable. The Zebron Inferno columns utilize a special dark polyimide resin that shows minimal thermal degradation even at temperatures up to 430 °C.* This results in longer column lifetime at elevated temperatures.

Phase		Temperature Limit
ZB-1HT		430 °C
ZB-5HT		430 °C
ZB-35HT	NEW!	400 °C
ZB-XLB-HT	NEW!	400 °C

Flexible Even at 430 °C!**

The Zebron Inferno columns remain flexible and easy to work with, even after being exposed to many hours at extreme temperatures. Its high temperature stability offers the flexibility of a non-metal column while providing long lifetime, low bleed, and low activity.



* Zebron ZB-1HT and ZB-5HT Inferno columns have an upper temperature limit of 430 °C.
Zebron ZB-35HT and ZB-XLB-HT Inferno columns have an upper temperature limit of 400 °C.

** Evaluated by performing 185 programmed temperature runs, total 23 hours at 430 °C.
Polyimide tubing was still flexible as shown here.

Extremely Low Bleed for Rugged Performance

- Longer column lifetime
- Better reproducibility
- Maximum sensitivity
- Accurate quantitation

What is column bleed?

Column bleed is the loss of stationary phase as a result of impurities in the starting polymer or the decomposition of the phase at elevated temperatures.

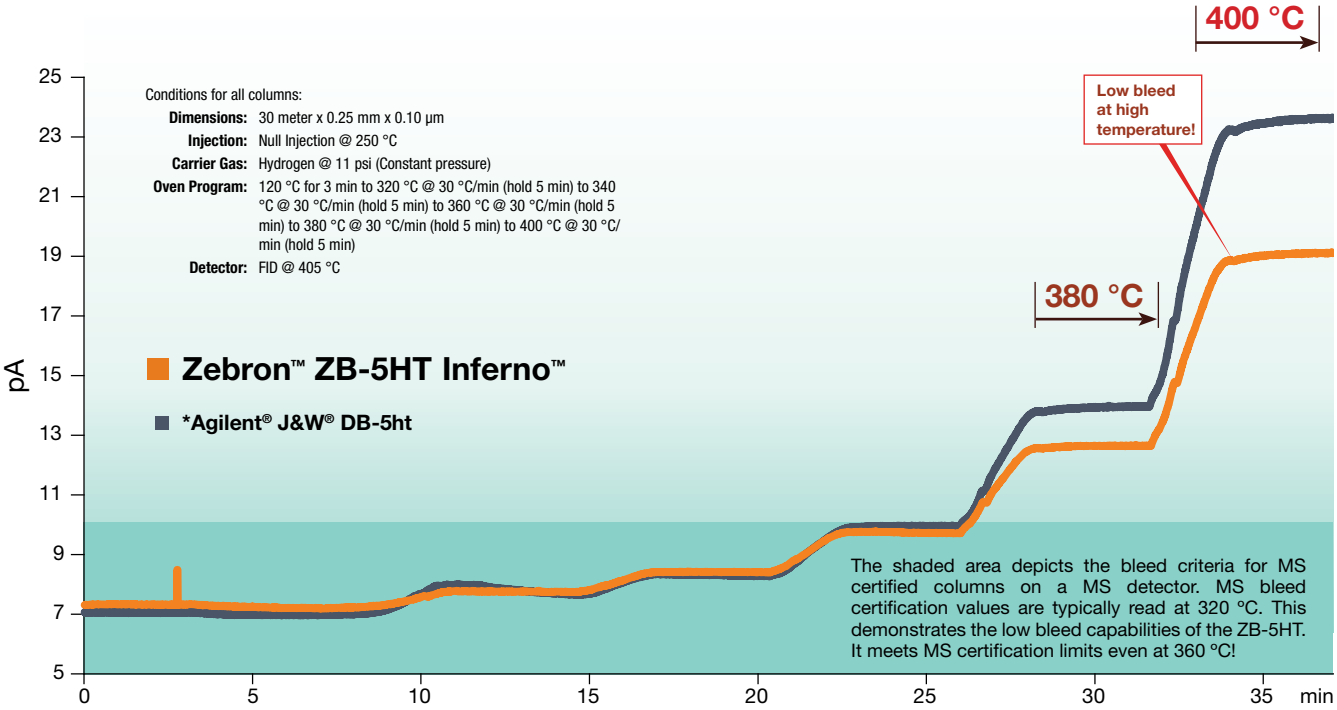
Why is column bleed undesirable?

Column bleed can be an indicator of the stability and lifetime a GC column will offer. When using sensitive detectors such as MS, bleed can impact method detection limits (MDLs) causing difficulties at the low calibration ranges.

What sets Zebron's bleed apart from others?

Our proprietary ESC™ bonding technology and special polyimide tubing provides enhanced column durability for extremely low bleed levels.

Zebron™ Inferno™ Columns Have Lower Bleed than Other Manufacturers†



† All columns were new, never used, prior to this testing. Columns were purchased either directly from the original manufacturer or through an authorized distributor. All testing was carefully controlled to ensure conditions were similar for all columns involved. The comparative data is not representative of every application.

*Agilent and J&W are registered trademarks of Agilent Technologies, Inc.

Zebron™ Inferno™'s High Durability Provides Increased Column Lifetime

- Less instrument downtime
- More productivity
- Lower laboratory costs

Standard GC Columns Cannot Withstand High Temperature

After prolonged exposure to temperatures above 360 °C, most traditional GC columns become brittle and inflexible, often spontaneously breaking in the middle of a run. Work is stopped in order to change out the column and perform system maintenance. Unlike these fragile columns, the Zebron Inferno columns have a special polyimide coating that provides longer column lifetime at temperatures up to 430 °C. As a result, you will experience longer column lifetime, less instrument downtime, and higher productivity.

Zebron Inferno Columns Win In The Lifetime Test

*All columns were new, never used, prior to this testing. Columns were purchased either directly from the original manufacturer or through an authorized distributor. All testing was carefully controlled to ensure conditions were similar for all columns involved. The comparative data is not representative of every application.

How does the lifetime test work?

Hydrocarbons are a good way to measure the stability and lifetime of a non-polar column. Because its interaction with the phase is mostly based on London Dispersion forces, any change in retention time is correlated with phase loss. This will result in increased bleed and poor reproducibility.

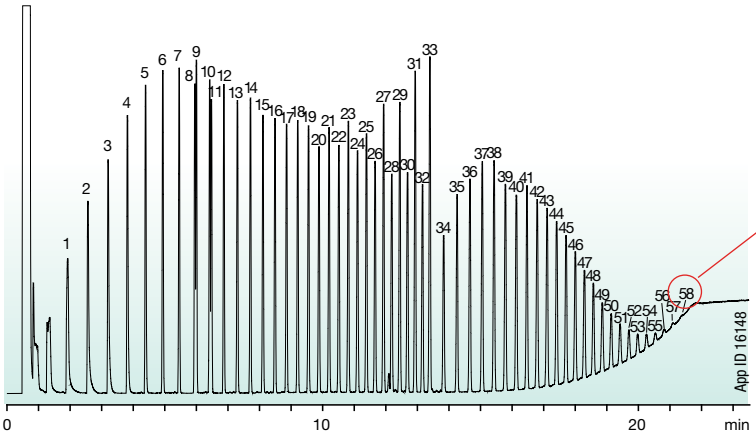
In the lifetime study above, the Zebron ZB-5HT Inferno column has twice the lifetime as the two comparative columns. For the test, all columns were held at 400 °C for 2 hours and then the oven was lowered to 120 °C for Pentadecane analysis. The Varian® HT column broke just after 40 hours at 400 °C. The Agilent® J&W® DB-5ht column had the same retention for Pentadecane at 40 hours as the ZB-5HT at 100 hours.

Greater Performance for High Boiling Compounds

- Better peak shape
- Improved separation
- More analytes detected

Zebron™ Inferno™ GC columns have the inertness and temperature stability needed for separating high molecular weight compounds. These high boiling compounds require a thermally rugged column with low bleed levels. Zebron Inferno columns have the high temperature stability and durability to provide optimal separation of these compounds.

Great Separation of High Boiling Hydrocarbons (ASTM Method D6352)



Easily Elute Hydrocarbons Up To C90

Zebron's ZB-1HT Inferno can operate at 430 °C, allowing C90 to elute on temperature ramp to meet ASTM requirements

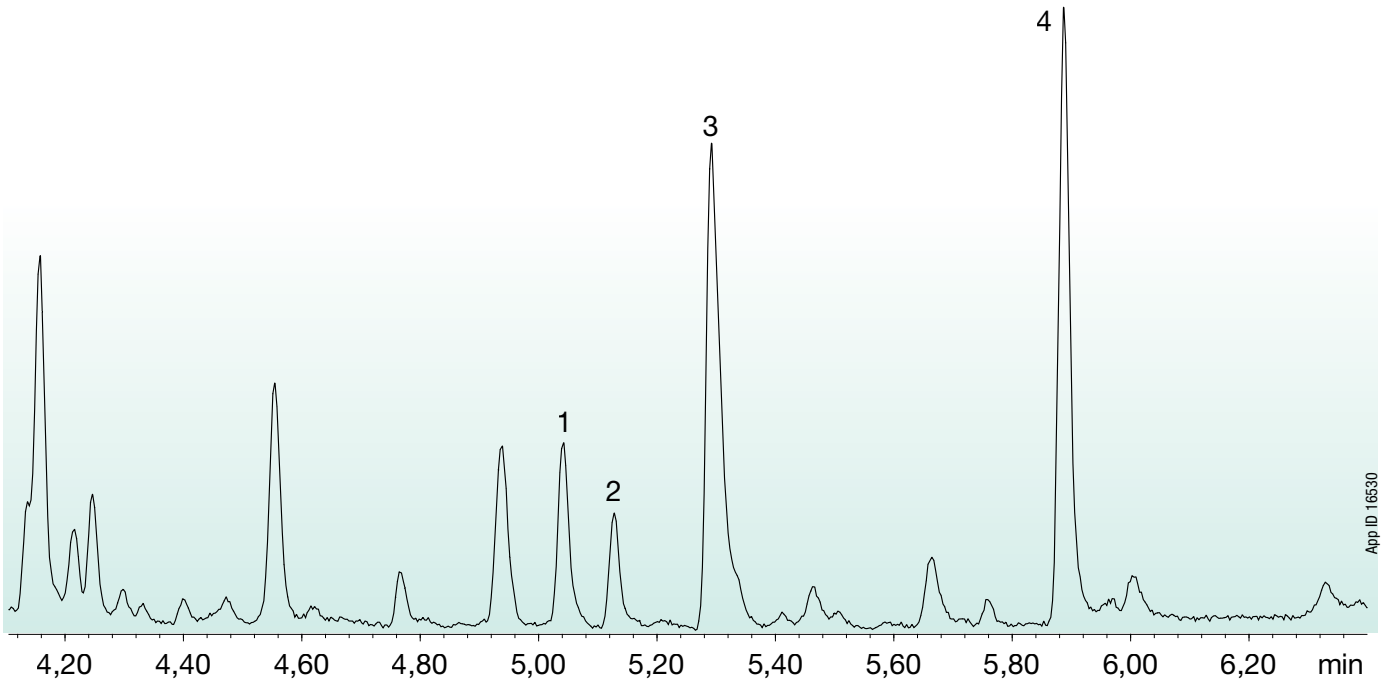
Column: Zebron ZB-1HT Inferno
Dimensions: 5 meter x 0.53 mm x 0.10 µm
Part No.: 7AK-G014-02
Injection: On-Column @ 43 °C, 0.1 µL
Carrier Gas: Helium @ 4.4 mL/min (constant flow)
Oven Program: 40 °C for 0.5 min to 430 °C @ 20 °C/min for 10 min
Detector: FID @ 430 °C

Note: Sample was a combination of PolyWax 655 and retention time markers C8-C40 in CS2/Chloroform

Sample:

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

Separation of Sterols from Margarine on a Zebron™ ZB-5HT Inferno™



Column: Zebron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G015-02
Injection: Splitless @ 275 °C, 0.5 µL
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 20 °C/min
Detector: MSD @ 275 °C

Sample: 1. Campesterol
2. Stigmasterol
3. β-Sitosterol
4. Betulin (IS)

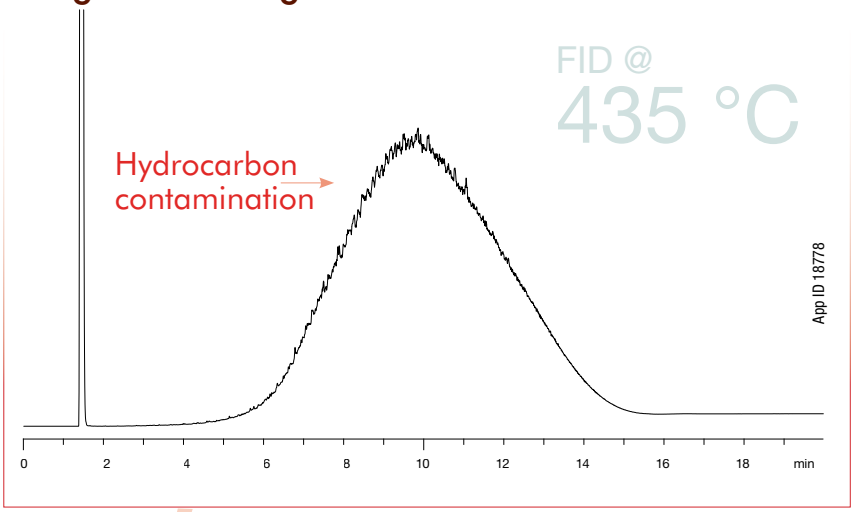
Bake-off Contaminants and Eliminate Carry-overs!

- Achieve better reproducibility
- Extend column lifetime
- Attain sharper peak shapes

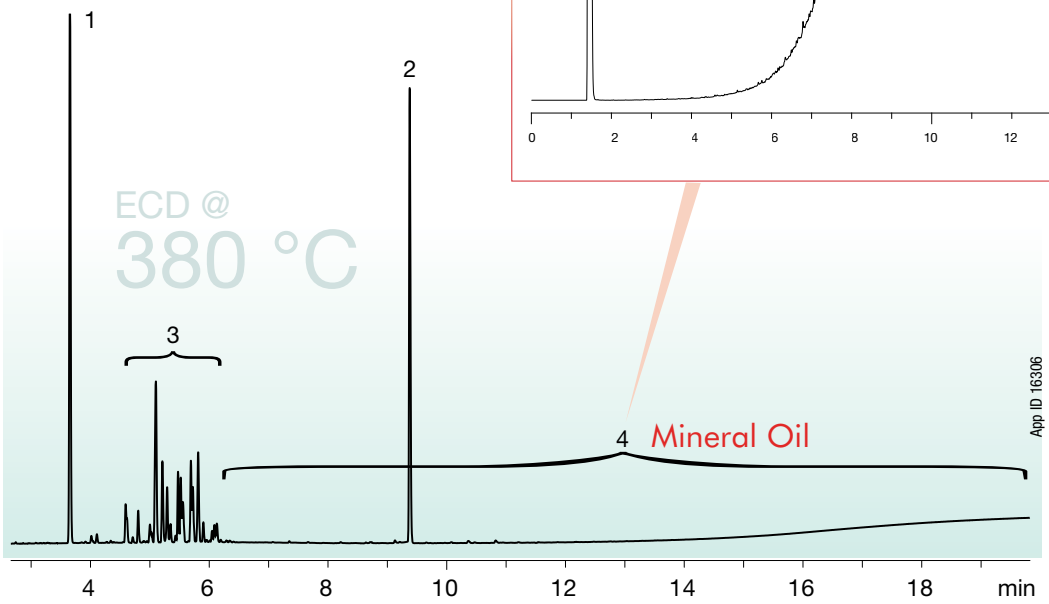
Eliminate Problems Associated with Dirty Samples

Dirty samples can linger on a GC column, eventually changing the selectivity and shortening the lifetime of a column. Since Zebron™ Inferno™ columns have extremely high temperature limits, it allows for the use of more aggressive column baking steps to remove persistent contaminants, thus prolonging column lifetimes.

Hydrocarbon contaminants revealed using FID starting at 5 minutes



Hydrocarbon contaminants are not detected by ECD!



Conditions for App ID 16306:

Column: Zebron ZB-5HT Inferno
Dimensions: 30 meter x 0.32 mm x 0.10 µm
Part No.: 7HM-G015-02
Injection: Split 52:1 @ 330 °C , 1 µL
Carrier Gas: Helium @ 1.9 mL/min (constant flow)
Oven Program: 150 °C for 2 min to 420 °C @ 20 °C/min for 4.5 min
Detector: ECD @ 380 °C
Sample: 1. TCMX
2. DCOB
3. Aroclor 1016
4. Mineral Oil

Note: Aroclor 1016 @ 100 ppb; Mineral Oil @ 1 % in isooctane

Conditions for App ID 18778:

Column: Zebron ZB-5HT
Dimensions: 30 meter x 0.32 mm x 0.10 µm
Part No.: 7HM-G015-02
Injection: Split 5:1 @ 330 °C, 1 µL
Carrier Gas: Helium @ 1.9 mL/min (constant flow)
Oven Program: 150 °C for 2 min to 420 °C @ 20 °C/min for 4.5 min
Detector: FID @ 435 °C
Sample: Mineral Oil

Note: Mineral Oil is 1 % in isooctane

See What You have been Missing!

- Uncover compounds that were previously undetected
- Elute compounds at higher temperatures
- Achieve more accurate, reproducible results

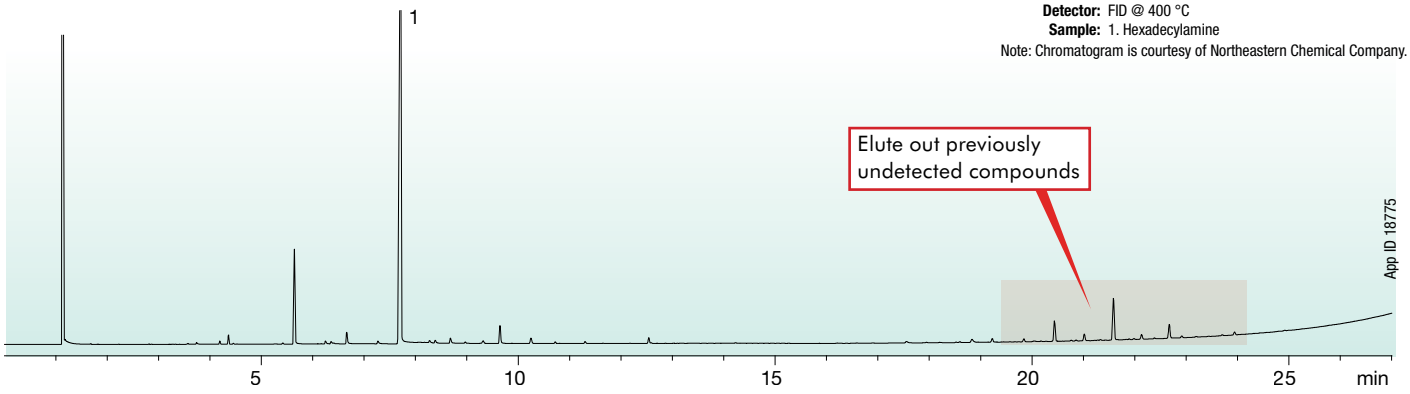
Many high boiling compounds will stay on a column and go undetected run after run. As a consequence, results are inaccurate because of missing data. Running at higher temperatures will allow these formerly undetected compounds to elute and be detected, giving more accurate and reproducible results.

New Zebron™ ZB-35HT Inferno™ Column

Hexadecylamine

Column: Zebron ZB-35HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11
Injection: Split 50:1 @ 350 °C, 1 µL
Carrier Gas: Helium @ 2.1 mL/min (constant flow)
Oven Program: 140 °C to 400 °C @ 10 °C/min
Detector: FID @ 400 °C
Sample: 1. Hexadecylamine

Note: Chromatogram is courtesy of Northeastern Chemical Company.

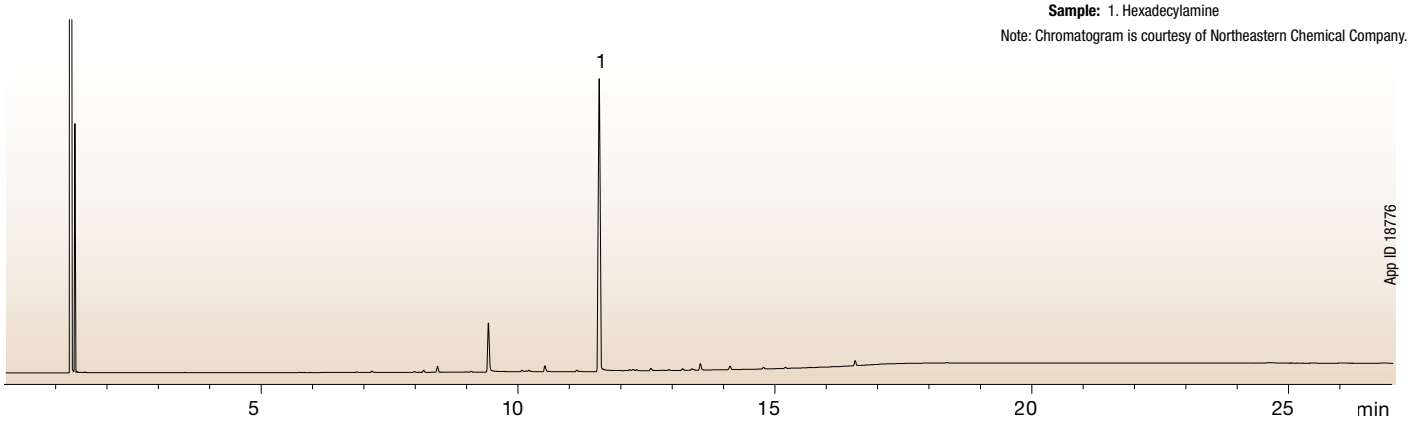


Restek® Rtx®-35 GC Column

Hexadecylamine

Column: Restek® Rtx®-35
Dimensions: 30 meter x 0.25 mm x 1.00 µm
Injection: Split 50:1 @ 300 °C, 1 µL
Carrier Gas: Helium @ 2.1 mL/min (constant flow)
Oven Program: 140 °C to 300 °C @ 10 °C/min
Detector: FID @ 320 °C
Sample: 1. Hexadecylamine

Note: Chromatogram is courtesy of Northeastern Chemical Company.



Available in Widely Used Phases

ZB-1HT Inferno™

- Temperature Limits: -60 to 400/430 °C (Isothermal/TPGC)*
- First non-metal columns stable to 430 °C
- Provides true boiling point separation for hydrocarbon distillation methods
- Individually tested for low bleed, MS certified

guarantee

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

Alternative to any 100 % Dimethylpolysiloxane High-Temperature Phase:

• DB-1ht • MXT-1 SimDist • Petrocol 2887 • CP-SimDist

Column Profile

Applications

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

Ordering Information

Zebron ZB-1HT Inferno GC Columns

ID(mm)	df(µm)	Temp. Limits °C	Part No.	Price
5-Meter				
0.53	0.10	-60 to 400/430	7AK-G014-02	
15-Meter				
0.25	0.10	-60 to 400/430	7EG-G014-02	
0.32	0.10	-60 to 400/430	7EM-G014-02	
0.32	0.25	-60 to 400/430	7EM-G014-11	
0.53	0.15	-60 to 400	7EK-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	
0.53	0.15	-60 to 400	7HK-G014-05	

ZB-1HT Test Mix **Part No.: AG0-5155**

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

If you need a 5 in. cage, simply add a (-B) after the part number, e.g., 7HG-G014-11-B. Some exceptions may apply.
**0.53 mm ID columns are rated to 400 °C max operational temperature.*

ZB-5HT Inferno™

- Temperature Limits: -60 to 400/430 °C (Isothermal/TPGC)*
- First non-metal columns stable to 430 °C
- Individually tested for low bleed, MS certified

Alternative to Any 5 %-Phenyl-95 % Dimethylpolysiloxane High Temperature Phase:

• DB-5ht • VF-5ht • HT-5 • Stx-5HT • XTI-5HT

Column Profile

Applications

- High Boiling Petroleum Products
- Triglycerides
- Simulated Distillation Methods
- Diesel Fuel
- Long-chained Hydrocarbons
- Motor Oils
- Polymers/Plastics
- Surfactants
- High Molecular Weight Waxes

Ordering Information

Zebron ZB-5HT Inferno GC Columns

ID(mm)	df(µm)	Temp. Limits °C	Part No.	Price
15-Meter				
0.25	0.10	-60 to 400/430	7EG-G015-02	
0.25	0.25	-60 to 400/430	7EG-G015-11	
0.32	0.10	-60 to 400/430	7EM-G015-02	
0.32	0.25	-60 to 400/430	7EM-G015-11	
0.53	0.15	-60 to 400	7EK-G015-05	
15-Meter with 2-Meter Spliced Guard (0.53 mm ID)				
0.32	0.10	-60 to 400/430	7EM-G015-02-GST	
20-Meter				
0.18	0.18	-60 to 400/430	7FD-G015-08	
30-Meter				
0.25	0.10	-60 to 400/430	7HG-G015-02	
0.25	0.25	-60 to 400/430	7HG-G015-11	
0.32	0.10	-60 to 400/430	7HM-G015-02	
0.32	0.25	-60 to 400/430	7HM-G015-11	
0.53	0.15	-60 to 400	7HK-G015-05	

ZB-5HT Test Mix **Part No.: AG0-5155**

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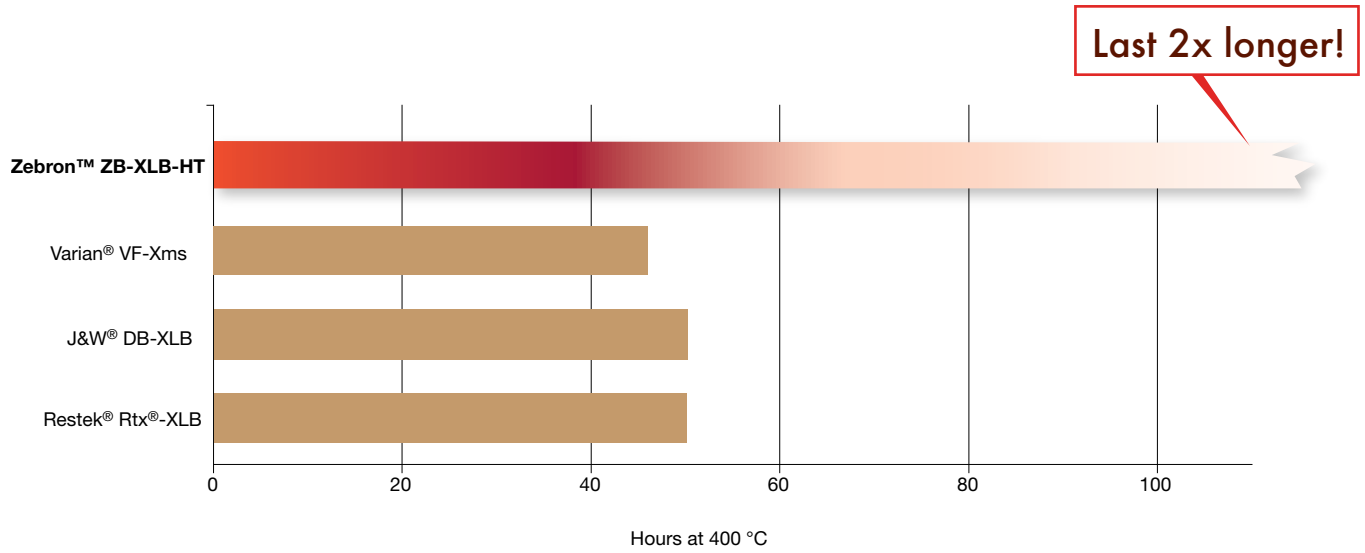
If you need a 5 in. cage, simply add a (-B) after the part number, e.g., 7HG-G015-11-B. Some exceptions may apply.
**0.53 mm ID columns are rated to 400 °C max operational temperature.*

Two New Innovative Mid-Polar Phases:

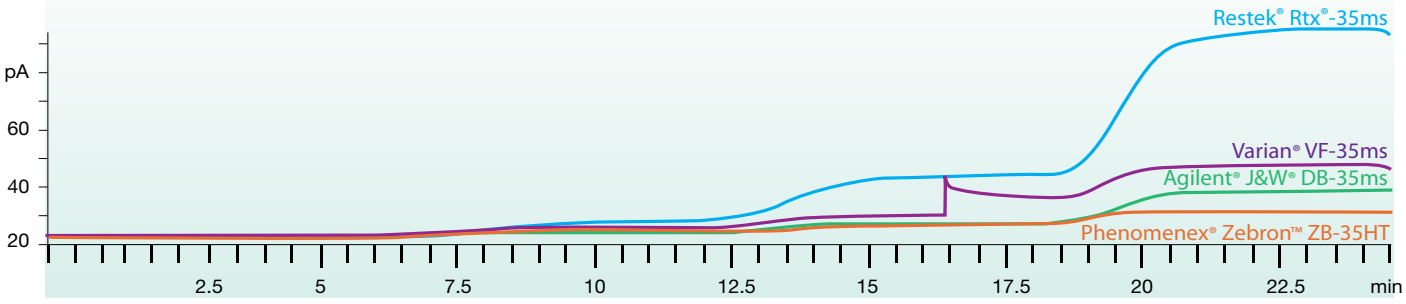
Zebron™ ZB-35HT and ZB-XLB-HT Inferno™

Unlike standard mid-polar GC columns that fail at high oven temperatures, the NEW Zebron ZB-35HT and ZB-XLB-HT Inferno columns have the durability and ruggedness to perform well at extreme temperatures. With an astonishing upper temperature limit of 400 °C, both columns will provide the separation of high boiling compounds at extremely low bleed levels.



Zebron Inferno Provides the Lowest Bleed†

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

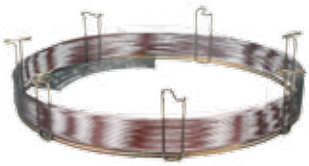


†All columns were new, never used, prior to this testing. Columns were purchased either directly from the original manufacturer or through an authorized distributor. All testing was carefully controlled to ensure conditions were similar for all columns involved. The comparative data is not representative of every application.

NEW!

Zebron ZB-35HT Inferno

- First non-metal, 35 %-Phenyl columns stable to 400 °C
- Great for high molecular weight compounds
- Individually tested for low bleed, MS certified
- Equivalent to USP Phase G42
- Temperature Limits: -60 to 400 °C (Isothermal/TPGC)



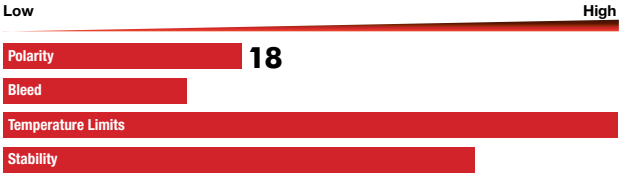
guarantee

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

Alternative to Any 35 %-Phenyl-65 % Dimethylpolysiloxane High Temperature Phase:

- DB-35ms
- SPB-35
- AT-35
- OV-11
- SPB-608
- Rtx-35MS
- HP-35ms
- HP-35
- MDN-35
- 007-11
- Sup-Herb
- BPX608
- DB-35
- EC-35
- Rtx-35
- BPX35

Column Profile



Ordering Information

Zebron ZB-35HT Inferno GC Columns

ID(mm)	df(µm)	Temp. Limits °C	Part No.	Price
15-Meter				
0.25	0.25	-60 to 400	7EG-G025-11	
30-Meter				
0.25	0.25	-60 to 400	7HG-G025-11	
0.32	0.25	-60 to 400	7HM-G025-11	

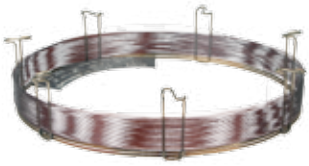
Applications

- Aroclors
- Semi-volatiles
- Amines
- EPA Methods 508, 608, 8081, 8141, 8151
- Pesticides
- Drugs of Abuse
- Pharmaceuticals
- Steroids
- Chemicals

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

NEW!

Zebron ZB-XLB-HT Inferno



- Non-metal si-arylene GC column stable to 400 °C
- Good tool for general screening to identify unknown samples
- Individually tested for low bleed, MS certified
- Temperature Limits: -60 to 400 °C (Isothermal/TPGC)

Similar* to:

- MDN-12
- DB-XLB
- Rtx-XLB

*not exact equivalent, selectivity might be different

Column Profile

Ordering Information

Zebron ZB-XLB-HT Inferno GC Columns

ID(mm)	df(µm)	Temp. Limits °C	Part No.	Price
15-Meter				
0.25	0.10	-60 to 400	7EG-G024-02	
0.25	0.25	-60 to 400	7EG-G024-11	
0.32	0.10	-60 to 400	7EM-G024-02	
30-Meter				
0.25	0.10	-60 to 400	7HG-G024-02	
0.25	0.25	-60 to 400	7HG-G024-11	
0.32	0.25	-60 to 400	7HM-G024-11	

Applications

- Polychlorinated Biphenyls (PCBs)
- Pesticides
- Herbicides
- EPA Methods

ZB-XLB-HT Test Mix **Part No.: AG0-7578**

Suited for a Wide Range of Applications

For Many Industries:

Dual Column Analysis

High Molecular Weight Compounds

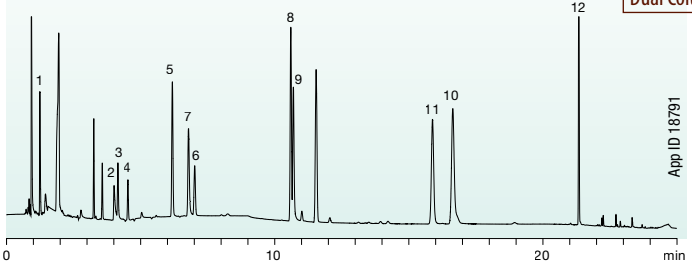
Dirty Samples

Low Level Analysis

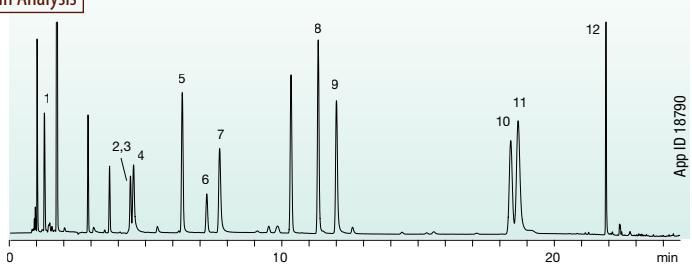
EPA Method 552.2 - Haloacetic Acids

Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11

Dual Column Analysis



Column: Zebron ZB-35-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11

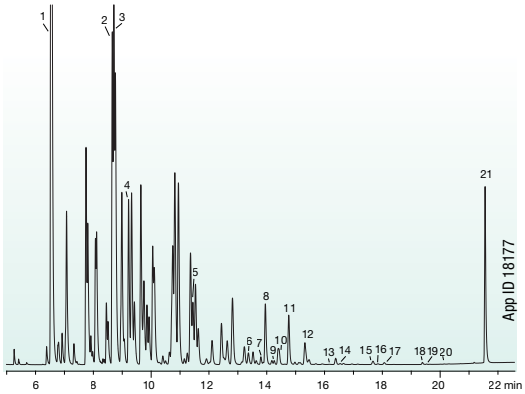


Conditions for both columns:

Injection: Split 5:1 @ 250 °C, 1 µL
Carrier Gas: Helium @ 4.0 mL/min (constant flow)
Oven Program: 40 °C for 1 min to 55 °C @ 5 °C/min for 5 min to 70 °C @ 10 °C/min for 9 min to 250 °C @ 30 °C/min for 2 min
Detector: ECD @ 300 °C
Note: Analytes are methylated and 100 ppb in isooctane.

Sample:
1. Chloroacetic Acid
2. Bromoacetic Acid
3. Dichloroacetic Acid
4. Dalapon
5. Trichloroacetic Acid
6. 1,2,3-Trichloropropane
7. Bromochloroacetic Acid
8. Bromodichloroacetic Acid
9. Dibromoacetic Acid
10. Chlorodibromoacetic Acid
11. 2,3-Dibromopropionate
12. Tribromoacetic Acid

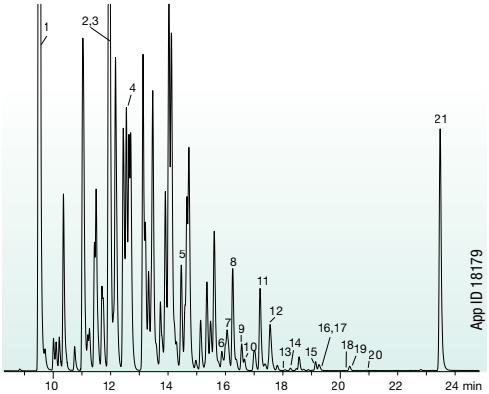
DIN Method 51527: Aroclors 1242



Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11
Injection: Split 2:1 @ 250 °C, 1 µL
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
Note: Total concentration of aroclors was 90 ppm in isooctane.

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

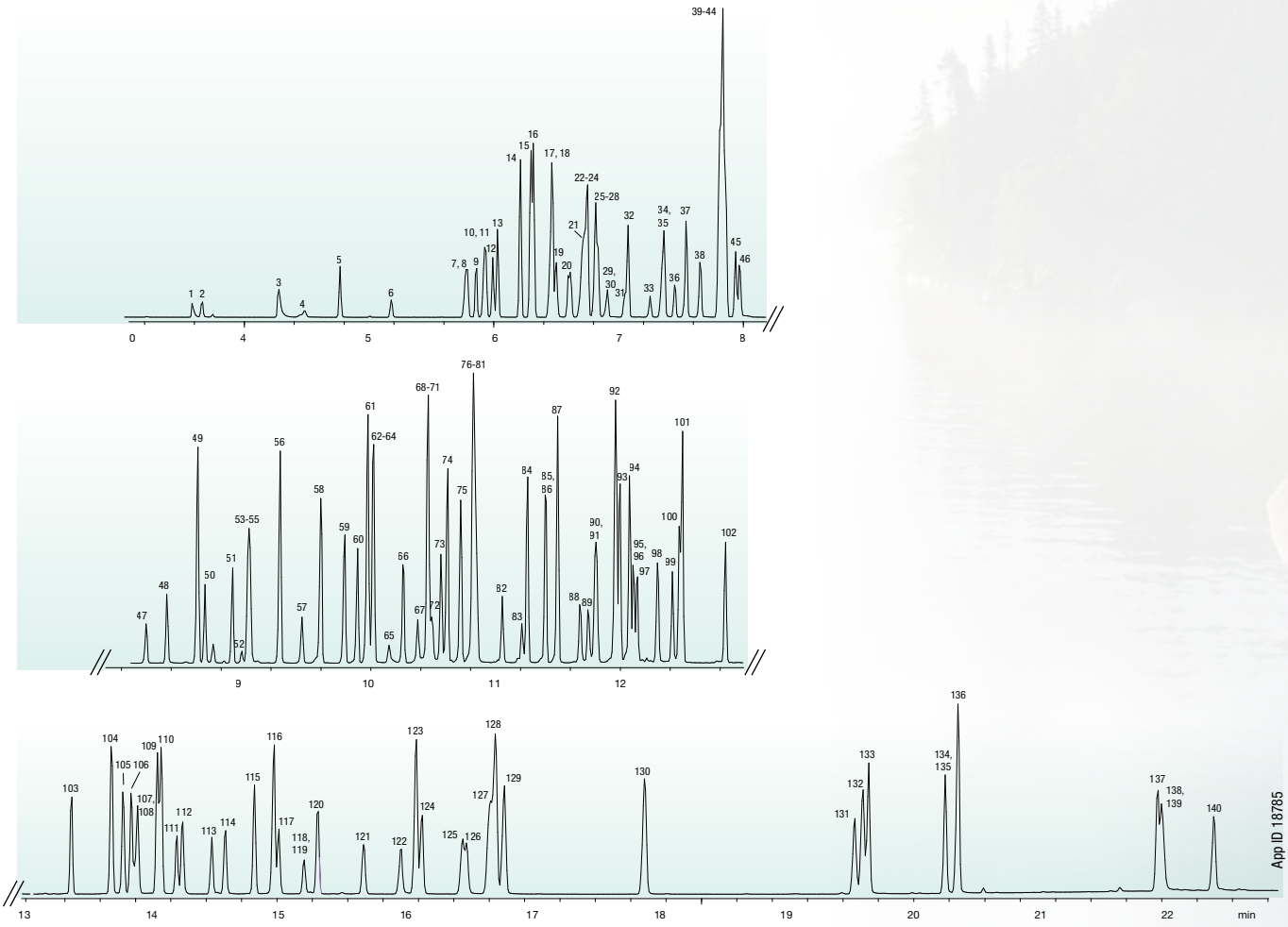
DIN Method 51527: Aroclors 1242



Column: Zebron ZB-35HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11
Injection: Splitless @ 250 °C, 1 µL
Carrier Gas: Helium @ 0.5 mL/min (constant flow)
Oven Program: 50 °C for 0.5 min to 220 °C @ 30 °C/min to 320 °C @ 6 °C/min for 2 min
Detector: ECD @ 350 °C

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

EPA Method 8270 - Semi-volatile Organics



Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11
Injection: Pulsed @ 280 °C, 1 µL
Carrier Gas: Helium @ 1 mL/min (constant flow)
Oven Program: 40 °C for 1.5 min to 260 °C @ 20 °C/min to 290 °C @ 5 °C/min to 350 °C @ 25 °C/min for 2 min
Detector: MSD @ 350 °C; 45-450 amu
Note: Analytes are 20 ppm in dichloromethane

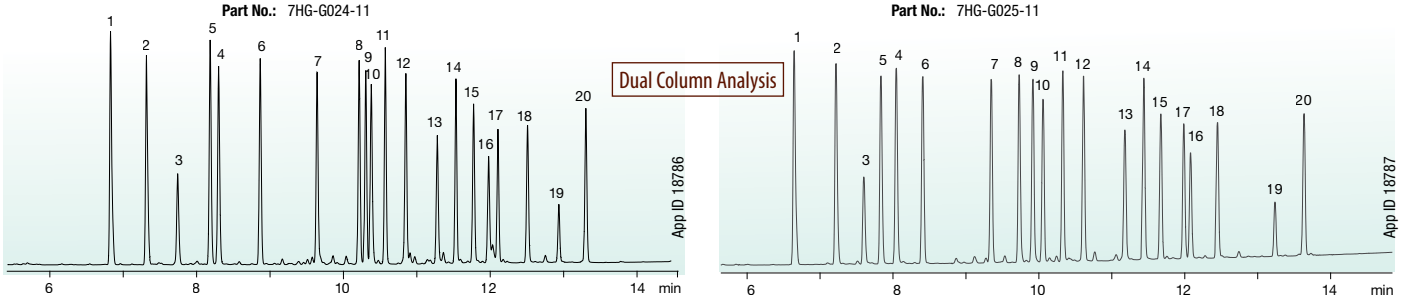
Sample:

1. Pyridine
2. N-Nitrosodimethylamine
3. 2-Picoline
4. N-Nitrosomethylethylamine
5. 2-Fluorobiphenyl
6. N-Nitrosodiethylamine
7. Phenol-D5
8. Phenol
9. n-Decane
10. Aniline
11. Pentachloroethane
12. 2-Chlorophenol
13. Bis(2-chloroethyl)ether
14. 1,3-Dichlorobenzene
15. 1,4-Dichlorobenzene-D4
16. 1,4-Dichlorobenzene
17. Benzyl alcohol
18. 1,2-Dichlorobenzene
19. o-Cresol
20. Bis(2-chloroisopropyl)ether
21. p-Cresol
22. m-Cresol
23. 3-Methylphenol
24. Hexachloroethane
25. Nitrosodi-n-propylamine
26. N-Nitroso-di-n-propylamine
27. o-Toluidine
28. Acetophenone
29. N-Nitrosomorpholine
30. N-Nitrosopyrolidine
31. Nitrobenzene-D5
32. Nitrobenzene
33. N-Nitrosopiperidine
34. Isophorone
35. 2,4-Dimethylphenol
36. 2-Nitrophenol
37. Bis(2-chloroethoxy)methane
38. 2,4-Dichlorophenol
39. 1,2,4-Trichlorobenzene
40. Naphthalene-D8
41. α-Terpineol
42. Hexachloro-1,3-butadiene
43. Hexachloropropene
44. Naphthalene
45. 2,6-Dichlorophenol
46. p-Chloroaniline
47. N-Nitrosodi-n-butylamine
48. 4-Chloro-3-methylphenol
49. 2-Methylnaphthalene
50. Hexachlorocyclopentadiene
51. 1,2,4,5-Tetrachlorobenzene
52. 2,3-Dichloroaniline
53. 2,4,6-Trichlorophenol
54. 2-Fluorophenol
55. 2,4,5-Trichlorophenol
56. 2-Chloronaphthalene
57. 2-Nitroaniline
58. Dimethyl phthalate
59. Acenaphthylene
60. 2,6-Dinitrotoluene
61. Acenaphthene-D10
62. Acenaphthene
63. 3-Nitroaniline
64. 1,3-Dinitrobenzene
65. 4-Nitrophenol
66. Pentachlorobenzene
67. 1-Naphthylamine
68. Diethyl phthalate
69. 2,3,4,6-Tetrachlorophenol
70. Diethyl phthalate
71. 2,4-Dinitrophenol
72. 2-Naphthylamine
73. 2,4-Dinitrotoluene
74. 4-Chlorophenyl phenyl ether
75. Fluorene
76. N-Nitrosodiphenylamine
77. Azobenzene
78. Diphenylamine
79. 4-Nitroaniline
80. 5-Nitro-o-toluidine
81. Azobenzene
82. 2,4,6-Tribromophenol
83. 2-Methyl-4,6-dinitrophenol
84. 4-Bromophenyl phenyl ether
85. n-Octadecane
86. α-BHC
87. Hexachlorobenzene
88. 4-Aminobiphenyl
89. Pentachlorophenol
90. γ-BHC
91. Pentachloronitrobenzene
92. Phenanthrene-D10
93. Phenanthrene
94. Anthracene
95. Dinoseb
96. 1,3,5-Trinitrobenzene
97. β-BHC
98. Carbazole
99. δ-BHC
100. Heptachlor
101. Di-n-butyl phthalate
102. Aldrin
103. Heptachlor epoxide
104. Fluoranthene
105. γ-Chlordane
106. α-Chlordane
107. Benzidine
108. Endosulfan I
109. 4,4'-DDE
110. Pyrene
111. p-Terphenyl-D14
112. Dieldrin
113. p-Dimethylaminoazobenzene
114. Endrin
115. 4,4'-DDD
116. Butyl benzyl phthalate
117. Endosulfan II
118. Endrin aldehyde
119. 3,3'-Dimethylbenzidine
120. 4,4'-DDT
121. Endosulfan sulfate
122. 2-Acetylaminofluorene
123. Bis(2-ethylhexyl) phthalate
124. Methoxychlor
125. Endrin ketone
126. 3,3'-Dichlorobenzidine
127. Benz[a]anthracene
128. Chrysene-D12
129. Chrysene
130. Di-n-octyl phthalate
131. 7,12-Dimethylbenz(a)anthracene
132. Benzo[b]fluoranthene
133. Benzo[k]fluoranthene
134. Hexachlorophene
135. Benzo[a]pyrene
136. Perylene-D12
137. Dibenz[a,h]anthracene
138. Indeno[1,2,3-cd]pyrene
139. N-Nitrosodiphenylamine
140. Benzo[g,h,i]perylene

EPA Method 8081- Chlorinated Pesticides

Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11

Column: Zebron ZB-35-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11



Conditions for both columns:

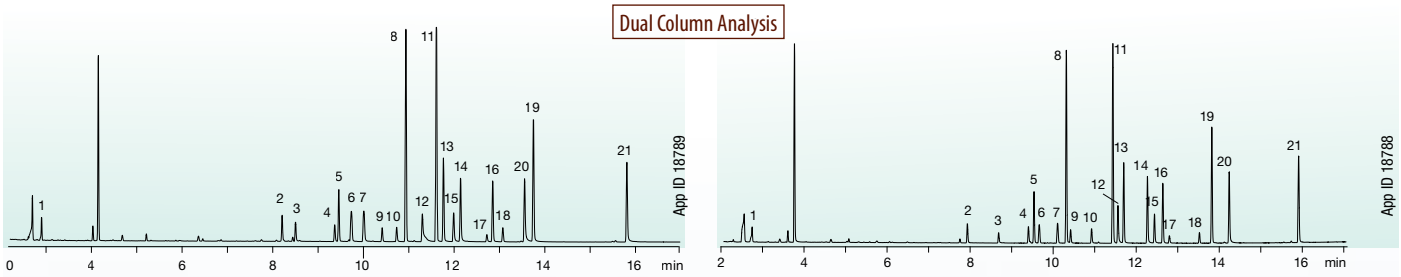
Injection: Splitless 15:1 @ 250 °C, 1 µL
Carrier Gas: Helium @ 0.8 mL/min (constant flow)
Oven Program: 160 °C for 1 min to 250 °C @ 15 °C/min for 1 min to 320 °C @ 10 °C/min
Detector: ECD @ 335 °C
Note: Analytes are 25 ppb in isooctane

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

EPA Method 8151 - Chlorinated Herbicides

Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11

Column: Zebron ZB-35-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11

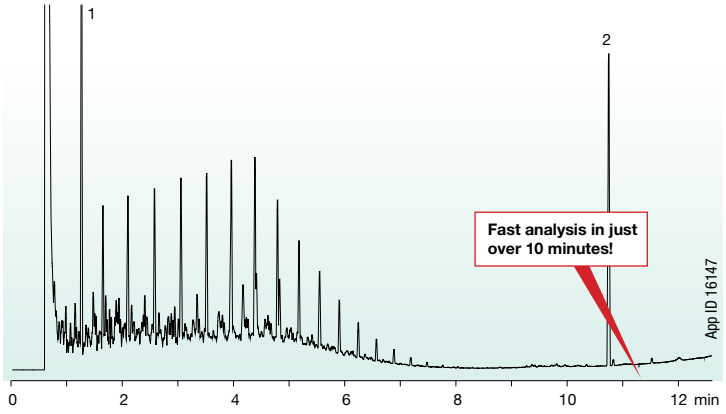


Conditions for both columns:

Injection: Split 10:1 @ 200 °C. 1 µL
Carrier Gas: Helium @ 0.5 mL/min (constant flow)
Oven Program: 50 °C for 0.5 min to 100 °C @ 25 °C/min to 320 °C @ 12 °C/min for 2 min
Detector: MSD @ 350 °C
Note: Analytes are 50 ppb in isooctane

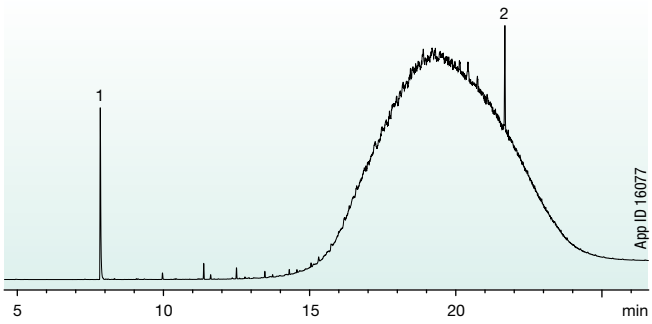
Sample:
1. Dalapon
2. 3,5-Dichlorobenzoic acid
3. 4-Nitrophenol
4. DCAA (Internal Standard)
5. Dicamba
6. MCPP
7. MCPA
8. DBOB (Internal Standard)
9. Dichlorprop
10. 2,4-D
11. Pentachlorophenol
12. Contaminant
13. Silvex
14. Chloramben
15. 2,4,5-T
16. 2,4-DB
17. Dinoseb
18. Bentazon
19. Picloram
20. DCPA
21. Acifluorfen

Fast H-53 Analysis of Diesel Fuel



Column: Zebron ZB-5HT Inferno™
Dimensions: 15 meter x 0.32 mm x 0.10 µm
Part No.: 7EM-G015-02
Injection: On-Column @ 63 °C, 0.1 µL
Carrier Gas: Helium @ 2.7 mL/min (constant flow)
Oven Program: 60 °C to 375 °C @ 25 °C/min
Detector: FID @ 400 °C
Note: Diesel Fuel was 200 ppm in dichloromethane with Internal Standards at 50 ppm
Sample: 1. Decane (C10)
2. Tetracontane (C40)

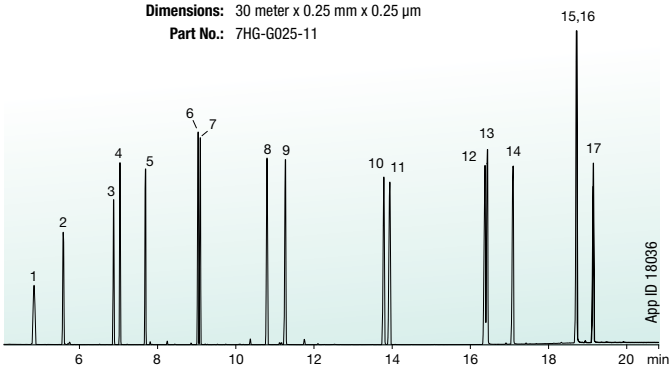
Mineral Oil using H-53 Conditions



Column: Zebron ZB-5HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G015-02
Injection: On-Column @ 53 °C, 0.1 µL
Carrier Gas: Helium @ 1.3 mL/min (constant flow)
Oven Program:: 50 °C for 6 min to 400 °C @ 20 °C/min for 15 min
Detector: FID @ 415 °C
Note: Fuel was 10 mg/mL in dichloromethane with 50 ppm markers
Sample: 1. Decane (C10)
2. Tetracontane (C40)

Polynuclear Aromatic Hydrocarbons (PAHs)

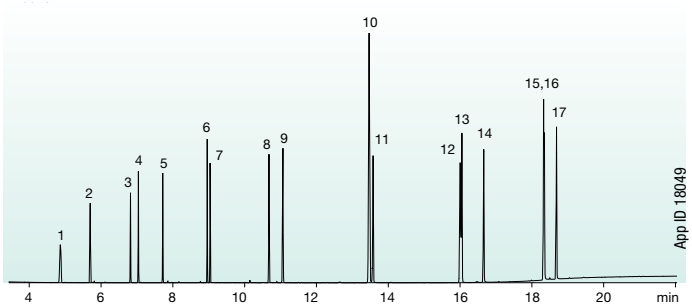
Column: Zebron ZB-35HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11



Conditions for both columns:
Injection: Splitless @ 280 °C, 1 µL
Carrier Gas: Helium @ 1.2 mL/min (constant flow)
Oven Program: 80 °C for 0.66 min to 250 °C @ 20 °C/min to 300 °C @ 8 °C/min to 360 °C @ 20 °C/min for 6 min
Detector: MSD @360 °C; 45-400 amu
Note: Pulsed splitless injection @ 20 psi for 0.66 min. All analytes @ 10 ppm in dichloromethane.

Polynuclear Aromatic Hydrocarbons (PAHs)

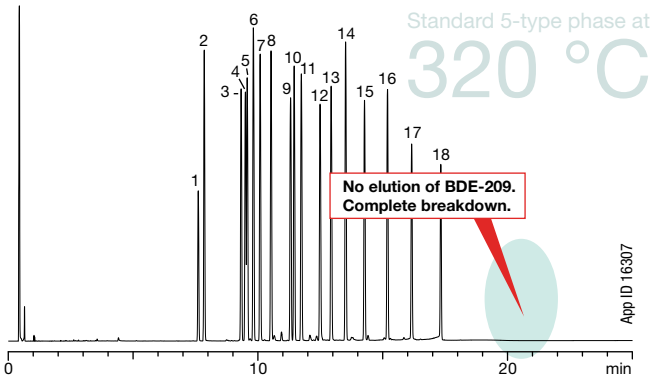
Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G024-11



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

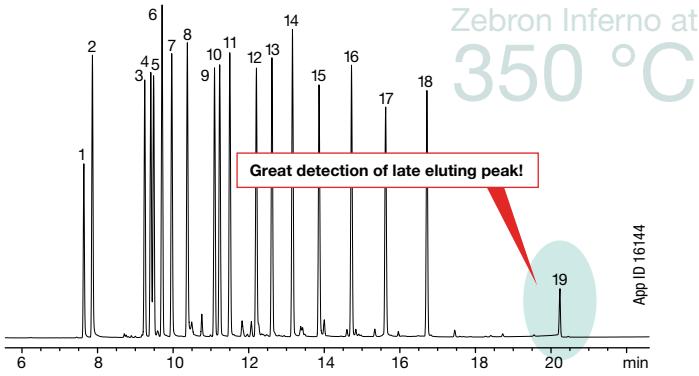
PolyBrominated Diphenyl Ethers (PBDE)

In a GC column, late eluting PBDEs often break down and become difficult to detect. The Zebron™ Inferno™ columns have increased sensitivity for late eluting compounds and thus can easily detect these analytes.



Column: Standard 5-type phase
Dimensions: 15 meter x 0.25 mm x 0.10 µm
Injection: On-Column @ 73 °C, 0.5 µL
Carrier Gas: Helium @ 3.4 mL/min (constant pressure)
Oven Program: 70 °C to 160 °C @ 25 °C/min to 320 °C @ 10 °C/min hold 10 min
Detector: ECD @ 340 °C
Note: PBDE Standard @ 2.5 ppm in isooctane

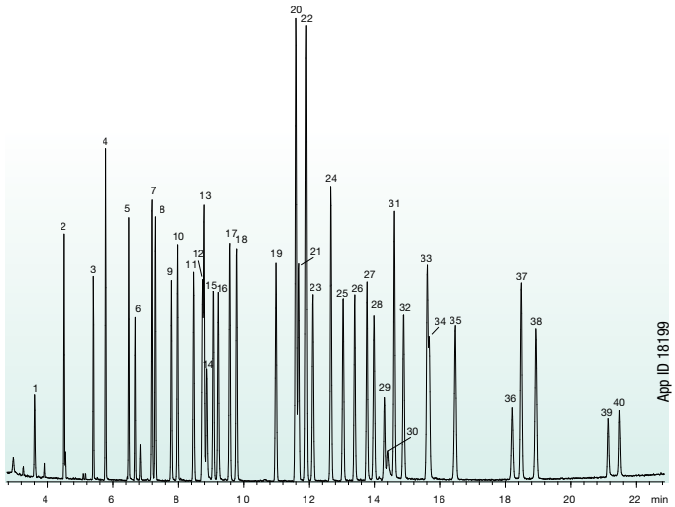
Sample:
1. BDE-25
2. BDE-28
3. BDE-75
4. BDE-49
5. BDE-71
6. BDE-47
7. BDE-66
8. BDE-77
9. BDE-100
10. BDE-119
11. BDE-99
12. BDE-85
13. BDE-154
14. BDE-153
15. BDE-138
16. BDE-183
17. BDE-190
18. BDE-203



Column: Zebron ZB-5HT Inferno
Dimensions: 15 meter x 0.25 mm x 0.10 µm
Part No.: 7EG-G015-02
Injection: On-Column @ 73 °C, 0.5 µL
Carrier Gas: Helium @ 1.5 mL/min (constant flow)
Oven Program: 70 °C to 160 °C @ 25 °C/min to 350 °C @ 10 °C/min for 5 min
Detector: ECD @ 400 °C
Note: Sample was 2.5 ppm in isooctane.

Sample:
1. BDE-25
2. BDE-28
3. BDE-75
4. BDE-49
5. BDE-71
6. BDE-47
7. BDE-66
8. BDE-77
9. BDE-100
10. BDE-119
11. BDE-99
12. BDE-85
13. BDE-154
14. BDE-153
15. BDE-138
16. BDE-183
17. BDE-190
18. BDE-203
19. BDE-209

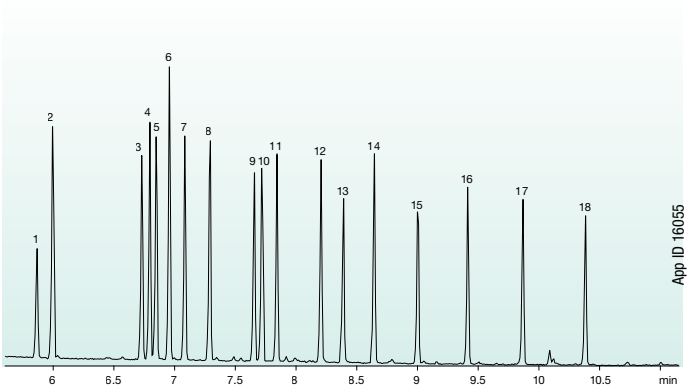
EPA Methods 508 and 8081A



Column: Zebron ZB-35HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11
Injection: Split 10:1 @ 200 °C, 1 µL
Carrier Gas: Helium @ 0.5 mL/min (constant flow)
Oven Program: 100 °C for 0.5 min to 210 °C @ 30 °C/min for 0.5 min to 230 °C @ 10 °C/min for 2 min to 260 °C @ 5 °C/min for 2 min to 300 °C @ 6 °C/min for 2 min
Detector: MSD @ 350 °C; 50-550 amu
Note: All analytes were 10 ppm in isooctane.

Sample:
1. DBCP
2. Hexachlorocyclopentadiene
3. Etridiazole
4. Chloroneb
5. Propachlor
6. Diallate
7. Hexachlorobenzene
8. α-BHC
9. PCNB
10. γ-BHC
11. β-BHC
12. Alachlor
13. Heptachlor
14. Dichlone
15. δ-BHC
16. Chlorothalonil
17. Aldrin
18. DCPA (Dacthal)
19. Heptachlor epoxide
20. trans-Chlordane (gamma)
21. trans-Nonachlor
22. cis-Chlordane (alpha)
23. Endosulfan I
24. 4,4'-DDE
25. Dieldrin
26. Chloropropylate
27. Chlorobenzilate
28. Endrin
29. Nitrofen
30. Kepone
31. 4,4'-DDD
32. Endosulfan II
33. 4,4'-DDT
34. Endrin Aldehyde
35. Endosulfan sulfate
36. Captafol
37. Methoxychlor
38. Endrin Ketone
39. Permethrin
40. Permethrin isomer

Poly Brominated Diphenyl Ethers (PBDEs)

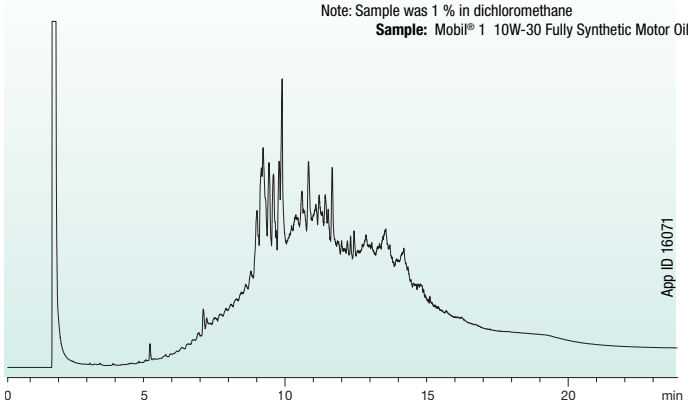


Column: Zebron ZB-5HT Inferno
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G015-02
Injection: Pulsed @ 350 °C, 2 µL
Carrier Gas: Helium @ 1.3 mL/min (constant flow)
Oven Program: 125 °C to 380 °C @ 22 °C/min for 15 min
Detector: MSD; 45 - 800 amu
Note: Analytes were 2.5 ppm in isooctane. Pulsed splitless injection at 50 psi using direct connect liner

Sample:
1. BDE-25
2. BDE-28
3. BDE-75
4. BDE-49
5. BDE-71
6. BDE-47
7. BDE-66
8. BDE-77
9. BDE-100
10. BDE-119
11. BDE-99
12. BDE-85
13. BDE-154
14. BDE-153
15. BDE-138
16. BDE-183
17. BDE-190
18. BDE-203

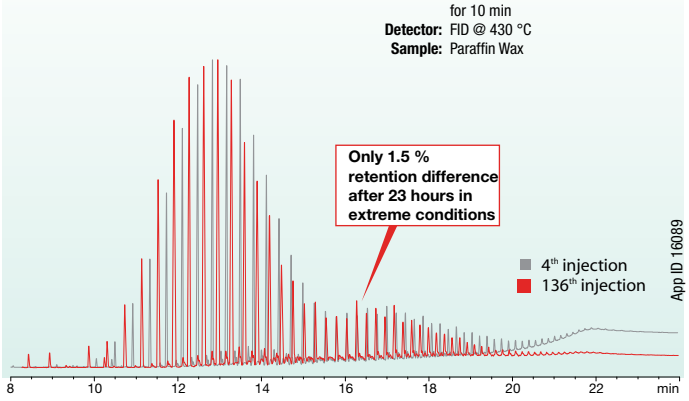
Motor Oil

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



Paraffin Wax

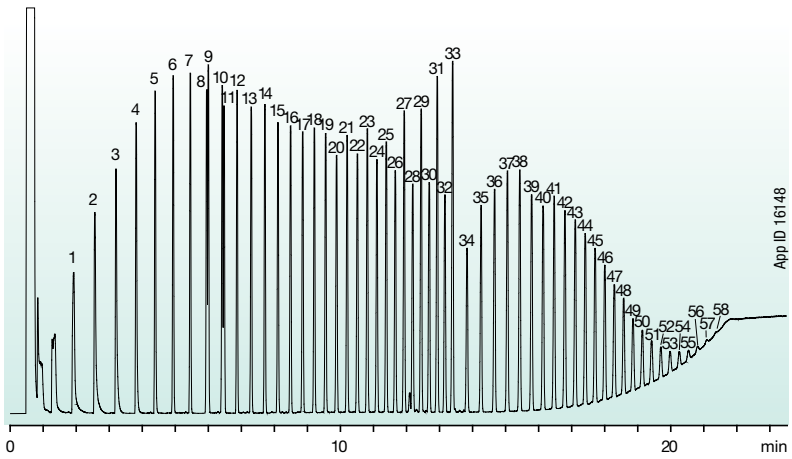
Column: Zebron ZB-5HT Inferno™
Dimensions: 15 meter x 0.32 mm x 0.10 µm
Part No.: 7EM-G015-02
Injection: Direct on column @ 43 °C, 0.01 µL
Carrier Gas: Helium @ 1.9 mL/min (35 cm/sec) (constant flow)
Oven Program: 40 °C for 2 min to 430 °C @ 20 °C for 10 min
Detector: FID @ 430 °C
Sample: Paraffin Wax



ASTM Methods D2887 and D6352 on One Column

ASTM D2887 and D6352 both set standard test methods for boiling range determination of petroleum fractions by GC. While ASTM D2887 is used for products having a final boiling point of 538 °C or lower, ASTM D6352 is used for determining petroleum distillate fractions with a boiling point (BP) up to 700 °C. The Zebron™ Inferno™ columns make simulated distillation analysis easier and less expensive. Typically you would have to use a traditional fused silica column for ASTM D2887 and a metal column for ASTM D6352. Zebron Inferno columns provide a robust solution for both analyses.

ASTM Method D6352



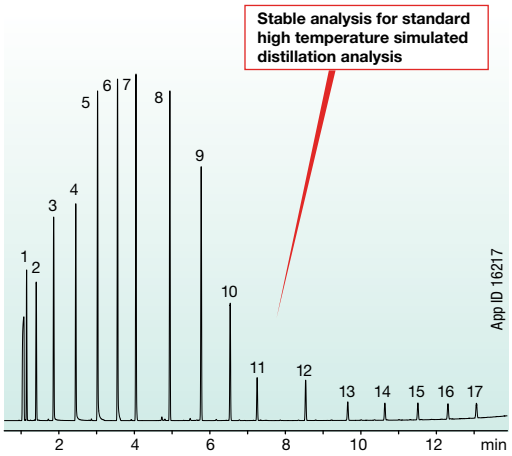
Column: Zebron ZB-1HT Inferno™
Dimensions: 5 meter x 0.53 mm x 0.10 µm
Part No.: 7AK-G014-02
Injection: On-Column @ 43 °C, 0.1 µL
Carrier Gas: Helium @ 4.4 mL/min (constant flow)
Oven Program: 40 °C for 0.5 min to 430 °C @ 20 °C/min for 10 min
Detector: FID @ 430 °C

Note: Sample was a combination of PolyWax 655 and retention time markers C8-C40 in CS2/Chloroform.

Sample:

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

ASTM Method D2887-97



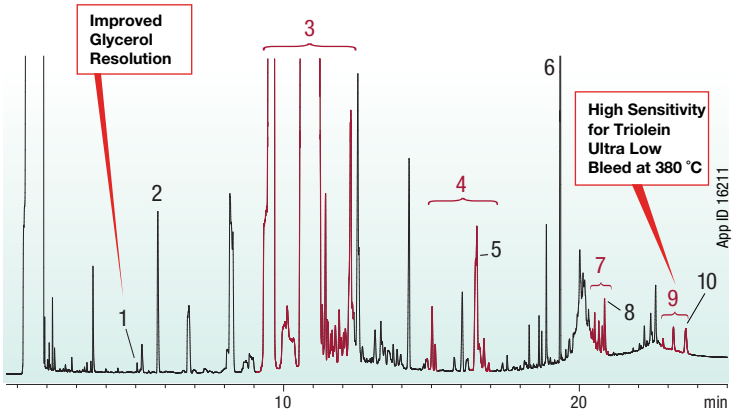
Column: Zebron ZB-1HT Inferno™
Dimensions: 15 meter x 0.53 mm x 0.15 µm
Part No.: 7EK-G014-05
Injection: On-Column @ 38 ºC, 0.1 µL
Carrier Gas: Helium @ 10 mL/min (constant flow)
Oven Program: 35 ºC for 1 min to 360 ºC @ 25 ºC/min
Detector: FID @ 375 ºC
Sample:

1. Hexane	10. Octadecane
2. Heptane	11. Eicosane
3. Octane	12. Tetracosane
4. Nonane	13. Octacosane
5. Decane	14. n-Dotriacontane
6. Undecane	15. n-Hexatriacontane
7. Dodecane	16. Tetracontane
8. Tetradecane	17. Tetratetracontane
9. Hexadecane	

Free and Total Glycerin in Biodiesel

The Zebron™ ZB-1HT Inferno™ column is ideal for biodiesel analysis because it is stable at the elevated temperatures needed to resolve and remove high boiling triglycerides. While standard polyimide resin degrades at temperatures above 380 °C, the Inferno columns utilize a polyimide resin material that shows minimal thermal breakdown, even at programmed temperatures up to 430 °C– the highest thermal stability of any non-metal GC column!

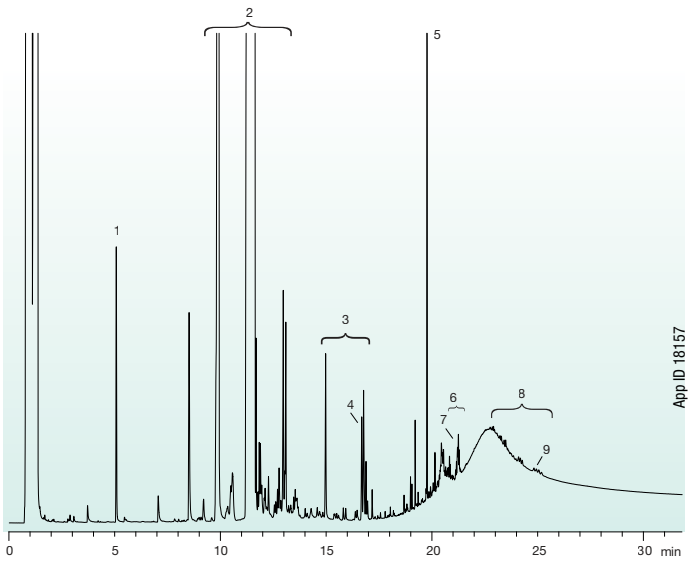
ASTM Method D6584: Free and Total Glycerin in B-100 Biodiesel Methyl Esters



Column: Zebron ZB-5HT Inferno™
Dimensions: 15 meter x 0.32 mm x 0.10 µm + 2 meter x 0.53 mm Z-Guard
Part No.: 7EM-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 2.0 m x 0.53 mm Guard Column was connected to the analytical column per ASTM method requirements.

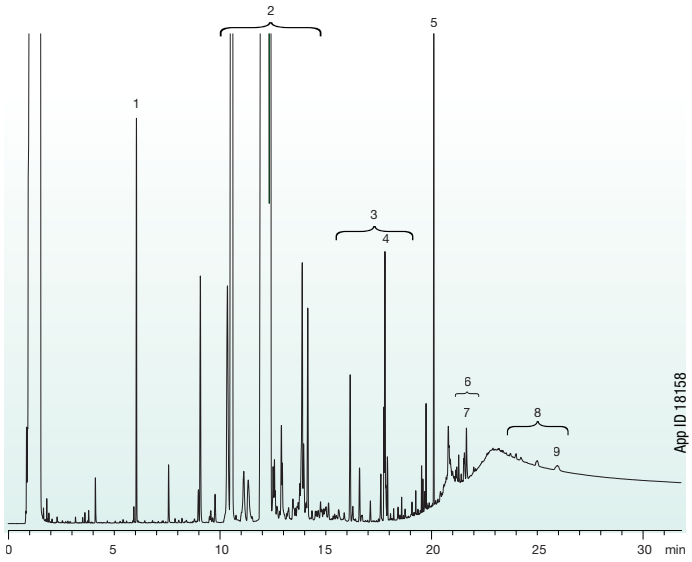
Sample:
1. Glycerol
2. Butanetriol (ISTD1)
3. Esters
4. Monoglycerides
5. 1-Monooleoyl-rac-glycerol
6. Tricarpin (ISTD2)
7. Diglycerides
8. 1,3-Diolein
9. Triglycerides
10. Triolein



Column: Zebron ZB-35HT Inferno™
Dimensions: 15 meter x 0.25 mm x 0.10 µm
Part No.: 7EG-G025-02
Injection: On-Column @ 53 °C, 0.1 µL
Carrier Gas: Helium @ 1.3 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 30 cm x 0.5 mm ID guard column was connected to the analytical column per ASTM method requirements

Sample:
1. Butanetriol (ISTD1)
2. Ester
3. Monoglycerides
4. 1-Monooleoyl-rac-glycerol
5. Tricarpin (ISTD2)
6. Diglycerides
7. 1,3-Diolein
8. Triglycerides
9. Triolein

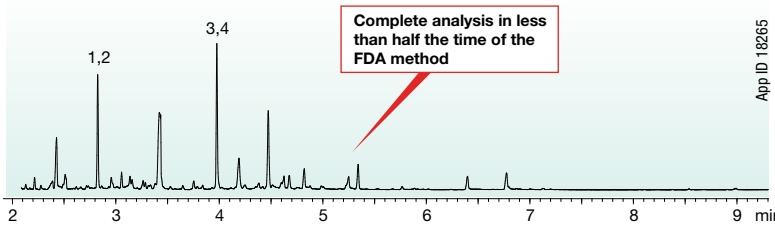


Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 15 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G024-11
Injection: On-Column @ 53 °C, 0.10 µL
Carrier Gas: Helium @ 1.3 mL/min (constant flow)
Oven Program: 50 °C for 1 min to 180 °C @ 15 °C/min to 230 °C @ 7 °C/min to 380 °C @ 30 °C/min for 10 min
Detector: FID @ 380 °C

Note: A 30 cm x 0.5 mm ID guard column was connected to the analytical column per ASTM method requirements

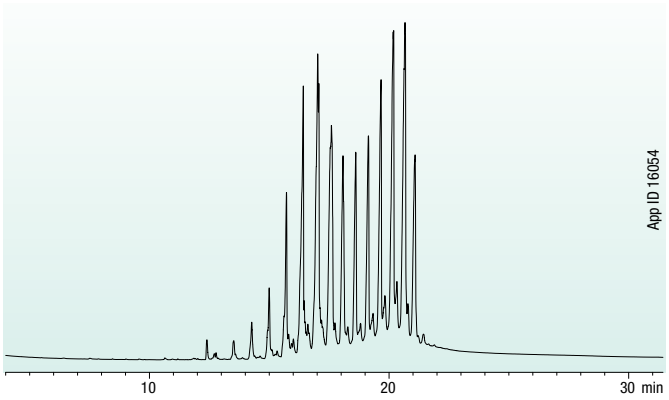
Sample:
1. Butanetriol (ISTD1)
2. Ester
3. Monoglycerides
4. 1-Monooleoyl-rac-glycerol
5. Tricarpin (ISTD2)
6. Diglycerides
7. 1,3-Diolein
8. Triglycerides
9. Triolein

Melamine in Baby Formula



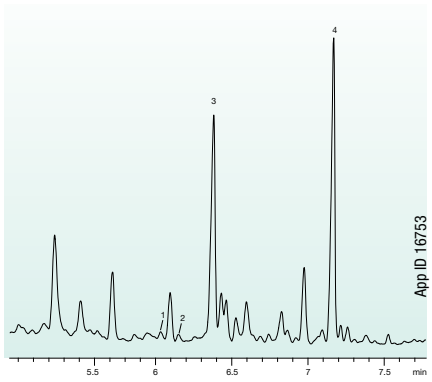
Column: Zebron ZB-XLB-HT Inferno™
Dimensions: 15 meter x 0.25 mm x 0.25 µm
Part No.: 7EG-G024-11
Injection: On-Column @ 103 °C, 1 µL
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 100 °C for 0.5 min to 320 °C @ 25 °C/min
Detector: Mass Selective (MSD) @ 325 °C
Sample: Analytes are 200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

Butter Triglycerides



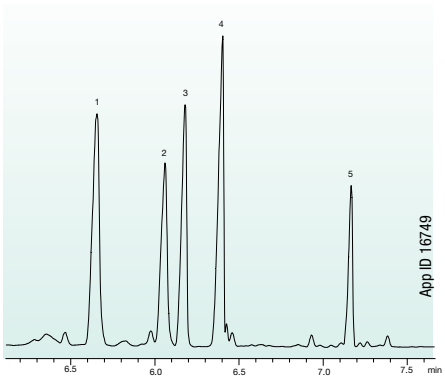
Column: Zebron ZB-5HT Inferno™
Dimensions: 15 meter x 0.32 mm x 0.10 µm
Part No.: 7EM-G015-02
Injection: On-Column @ 103 °C, 2 µL
Carrier Gas: Helium @ 1.8 mL/min (constant flow)
Oven Program: 100 °C to 400 °C @ 14 °C/min for 10 min
Detector: FID @ 400 °C
Sample: Butter

Sterols from Olive Oil: Underivatized



Column: Zebron ZB-5HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G015-02
Injection: Splitless @ 350 °C, 0.5 µL
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 15 °C/min
Detector: FID @ 350 °C
Sample: 1. Campesterol
2. Stigmasterol
3. β-Sitosterol
4. Betulin (IS)

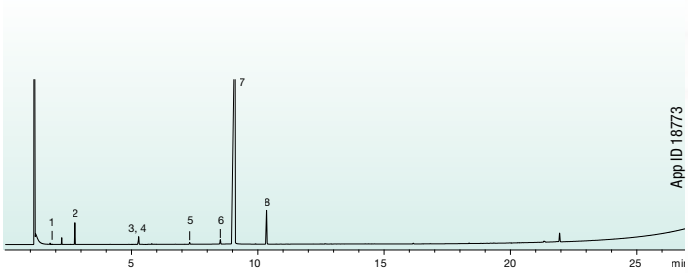
Sterols from Olive Oil: Derivatized



Column: Zebron ZB-5HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G015-02
Injection: Splitless @ 350 °C, 0.5 µL
Carrier Gas: Helium @ 2 mL/min (constant flow)
Oven Program: 220 °C to 350 °C @ 15 °C/min.
Detector: FID @ 350 °C
Note: Sterols derivatized via BSTFA:TMCS; 99:1 in pyridine
Sample: 1. Cholesterol
2. Campesterol
3. Stigmasterol
4. β-Sitosterol
5. Betulin (IS)

Chemical Applications

Amine and Nitrosamine

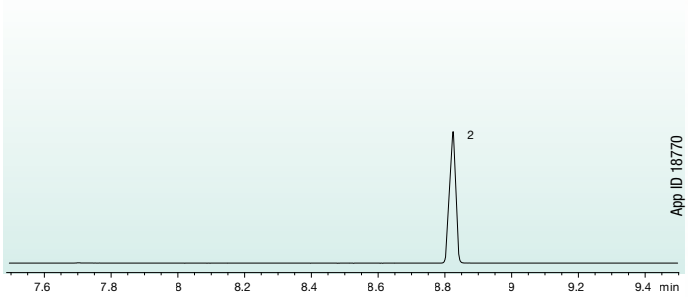


Column: Zebron ZB-35HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11
Injection: Split 50:1 @ 350 °C, 1 µL
Carrier Gas: Helium @ 2.1 mL/min (constant flow)
Oven Program: 140 °C to 400 °C @ 10 °C/min
Detector: FID @ 410 °C

Note: Application courtesy of Northeastern Chemical Company

Sample:
1. MW 135 Amine
2. MW 163 Amine
3. MW 178 Amine
4. MW 208 Amine
5. MW 164 Nitrosamine
6. MW 178 Nitrosamine
7. MW 192 Nitrosamine
8. MW 208 Nitrosamine

Diethylene Glycol Divinyl Ether

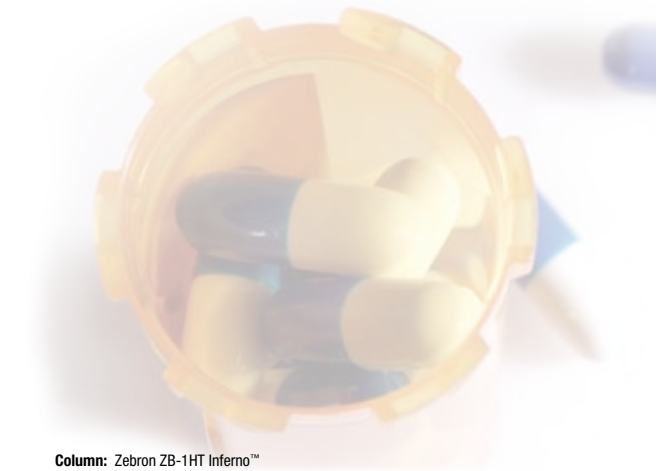


Column: Zebron ZB-35HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.25 µm
Part No.: 7HG-G025-11
Injection: Split 40:1 @ 250 °C, 1 µL
Carrier Gas: Helium @ 1.4 mL/min (constant flow)
Oven Program: 40 °C for 0.5 min to 150 °C @ 10 °C/min to 310 °C @ 25 °C/min for 2 min
Detector: FID @ 320 °C

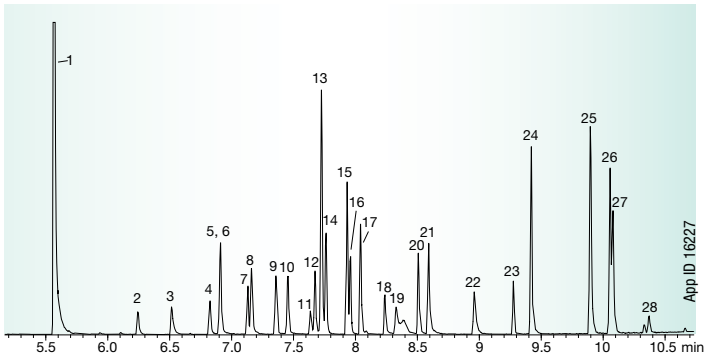
Note: Application courtesy of Northeastern Chemical Company

Sample:
1. Isopar C
2. Diethylene glycol divinyl ether
3. Isobornyl acrylate

Pharmaceutical/Drugs



Drug Screen



Column: Zebron ZB-1HT Inferno™
Dimensions: 30 meter x 0.25 mm x 0.10 µm
Part No.: 7HG-G014-02
Injection: Split 15:1 @ 250 °C, 1 µL
Carrier Gas: Helium 1.1 mL/min (constant flow)
Oven Program: 50 °C for 1 min to 320 °C @ 25 °C/min for 3 min
Detector: MSD @ 310 °C; 45-450 amu

Note: Analytes were 25 ppm

Sample:
1. Nicotine
2. Contaminant
3. Acetaminophen
4. Allobarbital
5. Aprobarbital
6. Ibuprofen
7. Butabarbital
8. Phenacetin
9. Amobarbital
10. Pentobarbital
11. Meprobomate
12. Secobarbital
13. Caffeine
14. Methyl Benzilate
15. Benzphetamine
16. Hexobarbital
17. Dimenhydrinate
18. Doxylamine
19. Phenobarbital
20. Methapyrilene
21. Chlorpheniramine
22. Bromopheniramine
23. Cocaine
24. Chlorcyclizine
25. Codeine
26. Diazepam
27. Hydrocodone
28. Oxymorphone

Cool-Lock™ Nut

Capillary GC Installation with the Cool-Lock™ Nut

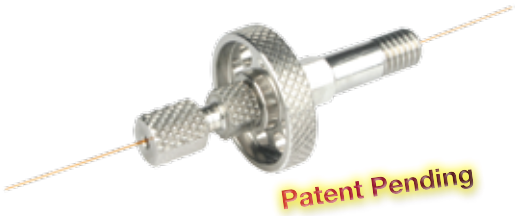
- Avoid burning your fingers again – cools with the oven
- No Wite-Out® or Tipp-Ex® needed
- Achieve the proper installation depth each and every time
- No need for wrench with hand-tightened connections

1. Insert column through column nut and ferrule. Insert the end of the column and column nut into the bottom of the Cool-Lock Nut Installation Gauge.

2. Hand-tighten the column nut into the gauge until the ferrule starts to compress. Adjust the length of the column to the desired length.

3. Unscrew the installation gauge and install the nut and column into the instrument.

4. Make sure Cool-Lock nut is in the full extension position to achieve the correct pre-measured position, and allow for proper leak checking.



Ordering Information

Cool-Lock GC Capillary Nut For Agilent GC Systems*

Part No.	Description	Unit	Price
AG0-8319	Cool-Lock GC Capillary Nut For Use With Short-Style Ferrules	ea	
AG0-8320	Cool-Lock GC Capillary Nut For Use With Long-Style Ferrules	ea	
AG0-8349	Cool-Lock Nut Installation Gauge	ea	
Replacement Ferrules			
AG0-4701	GC Capillary Ferrules Graphite 1/16 in. to 0.5 mm ID	10/pk	
AG0-4704	GC Capillary Ferrules Graphite 1/16 in. to 0.8 mm ID	10/pk	

*Guaranteed fit for Aglilent 5850, 5890, 6850, 6890 GC systems

Cool-Lock GC Capillary Nut For Shimadzu Systems**

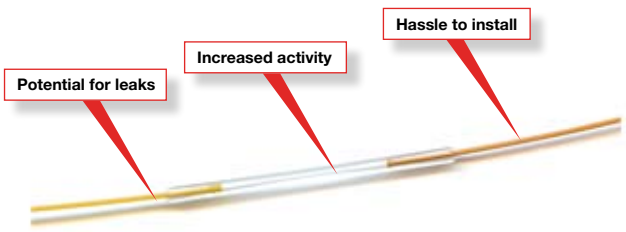
Part No.	Description	Unit	Price
AG0-8419	Cool-Lock GC Capillary Nut For Use With Short-Style Ferrules	ea	
AG0-8420	Cool-Lock Nut Installation Gauge	ea	

**Guaranteed fit for Shimadzu 2010 and 2014 GC systems

Guardian™: Integrated Guard Columns

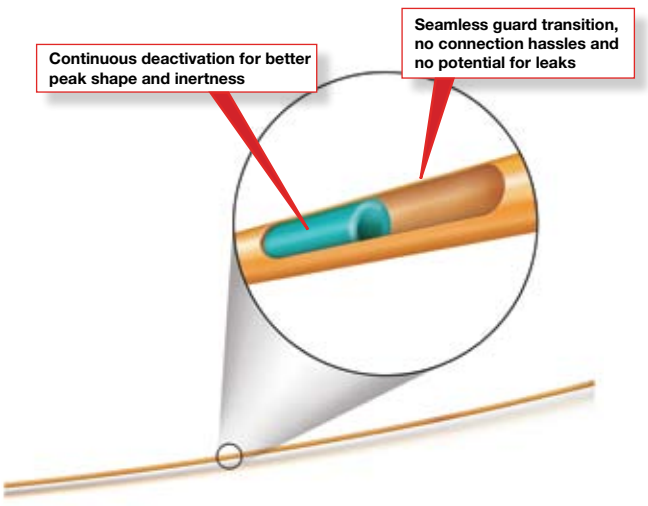
- Eliminates the potential for leaks
- Extends column life
- Improves analyte focusing for low boiling compounds
- Aggressively tested to ensure deactivation

Traditional Union Connected Guard Column



VS.

Guardian Integrated Guard Column



Ordering Information

Guardian: Integrated Guard Column

GC Phase	Dimensions	5 m Guardian Part No.	Price
Zebron ZB-1HT	30 meter x 0.25 mm x 0.10 df (µm)	7HG-G014-02-GGA	
Zebron ZB-5HT	30 meter x 0.25 mm x 0.10 df (µm)	7HG-G015-02-GGA	
Zebron ZB-5HT	30 meter x 0.25 mm x 0.25 df (µm)	7HG-G015-11-GGA	

Inlet Base Seals

- Prevents analyte adsorption
- Improves detection sensitivity
- Improves method reproducibility
- Fits all Agilent 5890/6890 split/splitless injection ports

Ordering Information

Gold inlet Base Seals

Part No.	Description	Similar to Mfr. No.*	Unit	Price
Standard, single groove for splitless applications, 0.8 mm dia. inlet hole				
AG0-7518	Gold Inlet Base Seal, splitless (single groove), 0.8 mm	18740-20885	2/pk	
AG0-7519	Gold Inlet Base Seal, splitless (single groove), 0.8 mm	18740-20885	10/pk	
High Split Flow, cross groove for split applications, 0.8 mm dia. inlet hole				
AG0-7520	Gold Inlet Base Seal, split (double groove/cross), 0.8 mm	5182-9652	2/pk	
AG0-7521	Gold Inlet Base Seal, split (double groove/cross), 0.8 mm	5182-9652	10/pk	
Replacement Inlet Seal Washers				
AG0-8397	Inlet Seal Washers, Gold plated, for Agilent GC injection port	-	12/pk	

Stainless Steel Base Seals

Part No.	Description	Similar to Mfr. No.*	Unit	Price
Standard, single groove for splitless applications, 0.8 mm dia. inlet hole				
AG0-8393	Stainless Steel Inlet Base Seal, splitless (single groove), 0.8 mm	18740-20880	2/pk	
AG0-8394	Stainless Steel Inlet Base Seal, splitless (single groove), 0.8 mm	18740-20880	10/pk	
High Split Flow, cross groove for split applications, 0.8 mm dia. inlet hole				
AG0-8395	Stainless Steel Inlet Base Seal, split (double groove/cross), 0.8 mm	-	2/pk	
AG0-8396	Stainless Steel Inlet Base Seal, split (double groove/cross), 0.8 mm	-	10/pk	
Replacement Inlet Seal Washers				
AG0-7522	Inlet Seal Washers, Stainless Steel, for Agilent GC injection port	5061-5869	12/pk	

Injection Port Inlet Liners

- Fit standard instrument manufacturers' inlets
- Popular designs at excellent prices
- Reduce analyte discrimination
- Improve reproducibility and results
- Clean, non-adsorptive/non-reactive surface

Ordering Information

Description	GC Model No.	Dimensions ID x L x OD (mm)	Material* (deactivated)	Quartz Wool (Y/N)	Similar to Manufacturer Number**	Part No.	Unit	Price
Agilent Technologies (HP)								
Single Taper Direct Connect with Side Hole (top)	5880/5980/6890	4 x 78.5 x 6.3	B (y)	N	21055	AG0-7850	5/pk	
Single Taper Direct Connect with Side Hole (bottom)	5880/5980/6890	4 x 78.5 x 6.3	B (y)	N	G1544-80730 20771	AG0-7851	5/pk	
Split / Splitless Focus Liner with wool	5880/5890/6890	4 x 78.5 x 6.3	B (y)	Y	210-4004	AG0-7515	5/pk	
Shimadzu								
Splitless Liner	9A/15A/16A	3.4 x 139 x 5.0	B (y)	N	20749	AG0-4669	5/pk	
Thermo Scientific (Finnigan)								
Splitless / Single Taper Liner /Trace	8000 series	5 x 105 x 8.0	B (y)	N	45350033	AG0-7852	5/pk	

** B= Borosilicate; Deactivated = Yes (y) or No (n). ** Similar to but not always an exact equivalent to the original manufacturer's product.*

Additional GC accessories are available.
For more information contact our GC Specialists at GCspecialist@phenomenex.com.

Septa

Silicone Rubber Inlet Septa

- Advanced silicone formulations reduce coring and increase septum lifetime
- Enhanced durability and re-sealing capabilities
- Precision formed and cut to exacting specifications
- Reduced needle damage
- General purpose and specialty low bleed, high-temperature septa available

PhenoRed™-400

Fire brick red, with a 50 durometer rating, this specially formulated high-temperature, low-bleed silicone rubber septum is designed and conditioned for high sensitivity analysis where the demands for low bleed and heat stability are critical. Say goodbye to ghost peaks! Temperature-rated to 400 °C.

PhenoGreen™-400

Long life, high-temperature green septum, rated to 400 °C. GuideRight™ through-hole to guide the needle during injection.

Ordering Information
Silicone Rubber Septa

Part No.	Description	Unit	Price
PhenoRed 3/8 in. (9.5 mm) Diameter			
AG0-4690	PhenoRed-400 Injector Septa	50/pk	
AG0-4691	PhenoRed-400 Injector Septa	100/pk	
PhenoRed 7/16 in. (11 mm)			
AG0-4696	PhenoRed-400 Injector Septa	50/pk	
AG0-4697	PhenoRed-400 Injector Septa	100/pk	

GuideRight™ Injection Hole Septa

The GuideRight™ through-hole guides the needle during injection. Septum performance and lifetime increase while downtime due to bent needles or dirty injection ports decreases. Choose from either high-temperature PhenoGreen™ or PhenoRed™, both rated to 400 °C.

Ordering Information
GuideRight Injection Hole Septa

Part No.	Description	Unit	Price
PhenoGreen 3/8 in. (9.5 mm) Diameter 400 °C			
AG0-7874	PhenoGreen™ 400 Injector Septa	50/pk	
PhenoGreen 7/16 in. (11 mm) Diameter 400 °C			
AG0-7875	PhenoGreen™ 400 Injector Septa	50/pk	
PhenoRed 3/8 in. (9.5 mm) Diameter 400 °C			
AG0-7916	PhenoRed™ 400 Injector Septa	50/pk	
PhenoRed 7/16 in. (11 mm) Diameter 400 °C			
AG0-7917	PhenoRed™ 400 Injector Septa	50/pk	

Long Ferrules

Graphite Ferrules

- High-purity graphite significantly reduces ferrule bleed
- Special construction minimizes "flaking"
- Stable to 450 °C - excellent for high temperature use
- Not for use with GC/MS transfer lines

Ordering Information
Graphite Ferrules, Rated to 450 °C

Part No.	Description		Unit	Price
0.4 mm Ferrule ID				
AG0-4698	Graphite Ferrule	1/16 in. to 0.4 mm	10/pk	
AG0-4699	Graphite Ferrule	1/16 in. to 0.4 mm	50/pk	
0.5 mm Ferrule ID				
AG0-4701	Graphite Ferrule	1/16 in. to 0.5 mm	10/pk	
AG0-4702	Graphite Ferrule	1/16 in. to 0.5 mm	50/pk	
0.8 mm Ferrule ID				
AG0-4704	Graphite Ferrule	1/16 in. to 0.8 mm	10/pk	
AG0-4705	Graphite Ferrule	1/16 in. to 0.8 mm	50/pk	

Additional GC accessories are available.
For more information contact our GC Specialists at GCspecialist@phenomenex.com.

Terms and Conditions
Subject to Phenomenex Standard Terms & Conditions, which may be viewed at www.phenomenex.com/TermsAndConditions.

Disclaimer
Comparative separations may not be representative of all applications.

guarantee

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

Australia
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