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PRODUCT DATA

Fast GC Columns

Reduce Analysis Times

FAST GC columns are an exciting product which will save you time and money. SGE's new range of columns make best use of state-of-the-art technology available in modern GC's. You reap the benefits.

GC capillary columns have traditionally been available in various internal diameters from 0.22 to 0.53 mm. Recently, there has become available a range of capillary columns with internal diameters of 0.1 mm and with lengths of 10 meters. These columns are known as Fast GC columns. They are available in a wide range of phases.

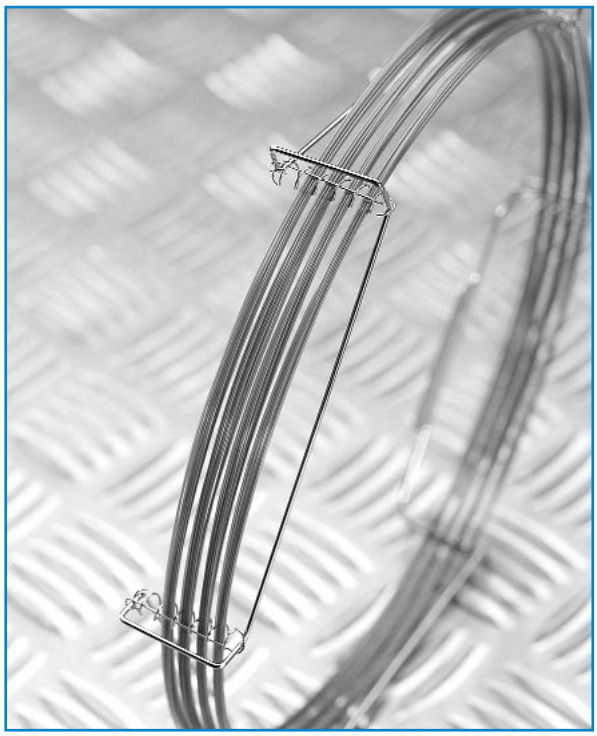
WHY USE FAST GC COLUMNS?

The major advantage of these columns is their ability to deliver equivalent resolution compared with conventional length and diameter columns but in shorter analysis times. Often run times can be halved using these columns. However, the bonus of faster analysis times does come at a cost. These columns are more difficult to use with quadrupole and ion trap mass spectrometers. The peak width with these columns can be as fast as half a second. These fast peaks place a heavier demand on the system, as fast sampling rates are required. For the most part, these sampling rates are beyond most benchtop mass spectrometers in full scan mode.

This new range of columns is especially suited to modern gas chromatographs which have high pressure (up to 100psi) electronic pressure control and detectors with fast sampling rates. Detectors such as the FID, ECD and EPD all have fast sampling rates and can handle the very narrow peaks that Fast GC columns provide. Additionally, the most modern GC's can handle very fast oven temperature program rates and programmed pressure profiles which are advantageous for these coloumns.

WHAT LINER SHOULD I USE WITH FAST GC COLUMNS?

For Fast GC columns applications, a liner with a smaller internal diameter and a small volume is suitable. Most conventional liners have an internal diameter of about 4 or 5 mm. But with fast columns it is recommended to use a liner of approximately
2 mm ID.
In narrow bore capillary chromatography the band broadening that occurs within the column is minimal. But, the low carrier gas flow rates



associated with the technique can exaggerate the band broadening that occurs in the injection port. In some cases the sample band in the liner could expand faster than it is drawn into the column, causing incomplete sample transfer in splitless and band broadening in split injections. For this reason it is very important to use inlet liners with small internal diameters to increase the velocity of the carrier gas through the liner. This results in much higher sensitivity and allows you to take full advantage of the higher efficiency associated with fast columns.

APPLICATIONS FOR FAST GC COLUMNS

Fast GC columns are especially suited for screening applications. For example, screening of water and soil samples for environmental pollutants or drug screening in human and animal samples. This product data sheet presents a number of examples showing applications of SGE's Fast GC capillary columns. Analysis times with fast columns can be reduced even further with temperature programs higher than 30°C/min. Conditions used in these applications are also attainable with most older model GCs.

PAH analysis is one of the most routine methods used in environmental laboratories throughout the world. **Figure 1** shows a chromatogram of the 16 priority PAH compounds using a FAST BPX5 column. The most attractive feature of this chromatogram is the reduction in the run time from 25 minutes to 12 minutes. An extra bonus is the increase in peak height of the later eluting compounds, due to a reduction in peak broadening in the short, thin film column.

Figure 1. Separation of Polynuclear Aromatic Hydrocarbon (PAH) analysis.

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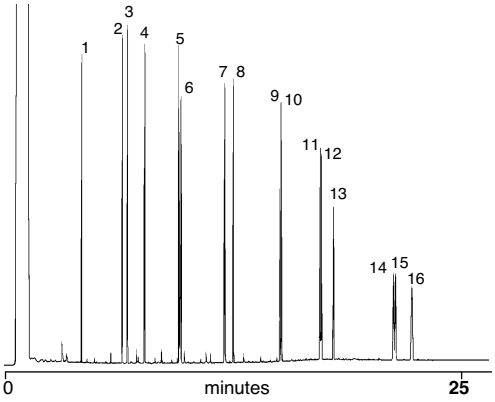
Figure 1a. Chromatogram showing Polynuclear Aromatic Hydrocarbons (PAHs) using a conventional 30 meter x 0.25 mm ID BPX5 column with a 0.25 micron film.

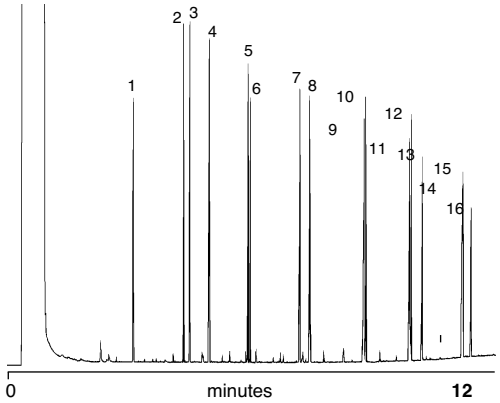


Components

1. Naphthalene
2. Acenaphthyene
3. Acenaphthylene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benzo(a)anthracene
10. Chrysene
11. Benzo(b)fluoranthene
12. Benzo(k)fluoranthene
13. Benzo(a)pyrene
14. Indeno(1,2,3,-c,d)pyrene
15. Dibenzo(a,h)anthracene
16. Benzo(g,h,I)perylene

FAST

Figure 1b. Chromatogram showing separation of Polynuclear Aromatic Hydrocarbons (PAHs) using a FAST BPX5 column.



Phase:	**BPX5, 0.25µm film**
(PAH) Standard:	**5 ng / µL in dichloromethane**
Column:	**30m x 0.25mm ID**
Initial Temp:	65°C , 1 min
Rate 1:	25°C/min to 140°C
Rate 2:	10°C/min to 290°C
Final Temp:	290°C, 11 min
Detector Type:	FID, 300°C
Carrier Gas:	He, 17.5 psi
Carrier Gas Flow :	1.5 mL/min
Constant Flow:	On
Average Linear Velocity:	35 cm/sec at 65°C
Injection Mode:	Splitless
Purge On Time:	0.5min
Purge On (Split) Vent Flow:	60mL/min
Injection Volume:	1µL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054101**

Phase:	**BPX5, 0.10µm film**
(PAH) Standard:	**5 ng / µL**
Column:	**10m x 0.10mm ID**
Initial Temp:	70°C , 1 min
Rate 1:	30°C/min to 160°C
Rate 2:	20°C/min to 320°C
Final Temp:	320°C, 1 min
Detector Type:	FID, 320°C
Carrier Gas:	He, 45.1 psi
Carrier Gas Flow :	0.467 mL/min
Constant Flow:	On
Average Linear Velocity:	40 cm/sec at 70°C
Injection Mode:	Splitless
Purge On Time:	0.5min
Purge On (Split) Vent Flow:	10mL/min
Injection Volume:	0.5µL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™ with single taper
Liner Part Number:	**092111**
Column Part Number:	**054099**

Total Recoverable Petroleum Hydrocarbon Analysis is also a common screening method in water and soil used in environmental laboratories. **Figure 2** shows the value of using a FAST GC column for this screening. In this particular example, a sample containing hydrocarbons from C8 to C40 is analyzed. With the conventional 0.25 mm ID column the run time is about 19 minutes. This has been reduced to under 10 minutes using a Fast BPX5 column.

There are 209 possible PCB congeners varying from the mono to the deca substituted PCB. These compounds are

Figure 2: Analysis of Total Recoverable Petroleum Hydrocarbons (TRPH) Analysis.

NORMAL

Figure 2a. Chromatogram showing separation of Total Recoverable Petroleum Hydrocarbons using a conventional 30 meter x 0.25 mm ID BPX5 column with a 0.25 micron film.

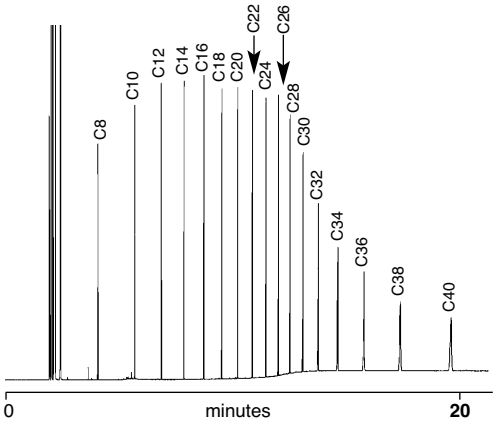


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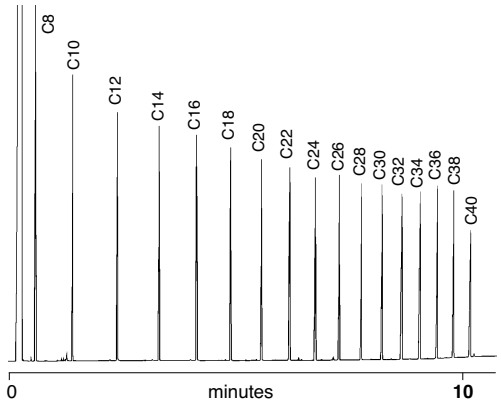
Figure 2b. Chromatogram showing separation of Total Recoverable Petroleum Hydrocarbon using a FAST BPX5 column.



Phase:	**BPX5, 0.25µm film**
TRPH (C_8-C_{40}):	**5 ng / µL in dichloromethane**
Column:	**30m x 0.25mm ID**
Initial Temp:	40°C , 2 min
Rate 1:	30°C/min to 330°C
Rate 2:	N/A
Final Temp:	330°C, 9 min
Detector Type:	FID, 350°C
Carrier Gas:	He, 14.1 psi
Carrier Gas Flow :	1.29 mL/min
Constant Flow:	On
Average Linear Velocity:	40 cm/sec at 40°C
Injection Mode:	Split, 120:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	160mL/min
Injection Volume:	1µL
Injection Temperature:	250°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054101**

Phase:	**BPX5, 0.10µm film**
TRPH (C_8-C_{40}) Standard:	**5 ng / µL**
Column:	**10m x 0.10mm ID**
Initial Temp:	40°C , 1 min
Rate 1:	30°C/min to 330°C
Rate 2:	N/A
Final Temp:	330°C, 0 min
Detector Type:	FID, 350°C
Carrier Gas:	He, 28 psi
Carrier Gas Flow :	0.52 mL/min
Constant Flow:	On
Average Linear Velocity:	55 cm/sec at 40°C
Injection Mode:	Split, 120:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	62mL/min
Injection Volume:	1µL
Injection Temperature:	250°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™
Liner Part Number:	**092005**
Column Part Number:	**054099**

all very hydrophobic (lipophilic) and consequently can accumulate in the fat cells of humans. Some of the congeners are very toxic and consequently these are monitored in the environment.

The world's standard phase for polychlorinated biphenyl (PCB) analysis is the HT8 column. This phase is an 8% phenyl (equivalent) polycarborane phase and the column shows a specificity for PCBs not seen by any other phase. The carborane unit in the polysiloxane backbone gives the phase thermal stability (the higher substituted congeners have low vapor pressures) as well as a unique selectivity towards PCBs. It has been shown that PCBs with the least number of chlorine substitutions in the ortho position of the biphenyl rings, show a greater affinity for the phase. These PCBs are able to rotate in a planar orientation and are thus able to get closer to the carborane functionality in the phase. Thus the phase is able to offer selectivity not seen by conventional non-polar phases such as a 5% phenyl / 95% methyl polysiloxane which essentially separate this class of compounds on boiling point.

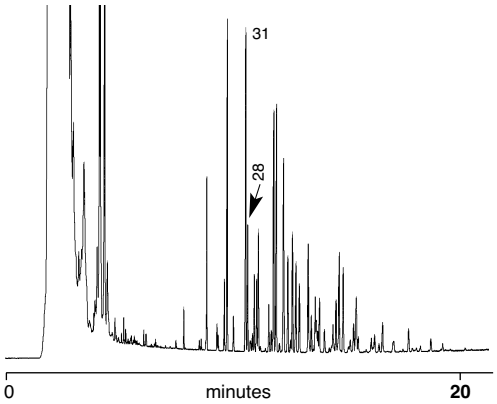
The Fast PCB column is the ideal column for screening PCBs. A comparison of the Fast GC column with a conventional HT8 column shows the run time has been reduced by a factor of 2 **(see Figure 3)** – a substantial time saving in the lab. The Fast column still shows excellent separation of the IUPAC PCB congeners 28 and 31.

Fatty Acid Methyl Esters (FAME) analysis is widely used in

Figure 3: Separation of PolyChlorinated Biphenyl (PCB) Analysis

NORMAL

Figure 3a. Chromatogram showing separation of an Arochlor 1242 mix (PCBs) using a conventional 30 meter x 0.25 mm ID HT8 column with a 0.25 micron film.



Phase:	**HT8, 0.25µm film**
Arochlor PCB Standard:	**100 ng / µL**
Column:	**30m x 0.25mm ID**
Initial Temp:	50°C , 1 min
Rate 1:	30°C/min to 200°C
Rate 2:	5°C/min to 280°C
Final Temp:	280°C, 0 min
Detector Type:	FID, 310°C
Carrier Gas:	He, 14.4 psi
Carrier Gas Flow :	1.3 mL/min
Constant Flow:	On
Average Linear Velocity:	30 cm/sec at 50°C
Injection Mode:	Splitless
Purge On Time:	1.0 min
Purge On (Split) Vent Flow:	60mL/min
Injection Volume:	1.5µL
Injection Temperature:	250°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054677**

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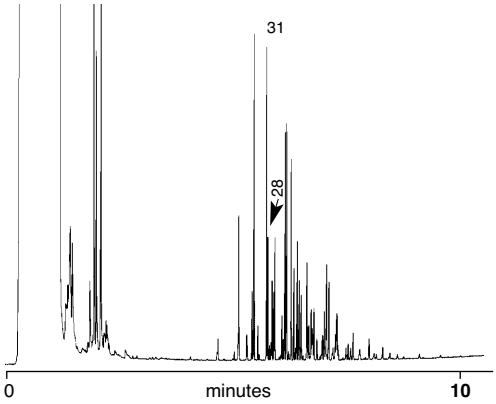
Figure 3b. Chromatogram showing separation of an Arochlor 1242 mix (PCBs) using a FAST PCB column.



Phase:	**Fast PCB, HT8, 0.1µm film**
Arochlor PCB Standard:	**100 ng / µL**
Column:	**10m x 0.10mm ID**
Initial Temp:	50°C , 1 min
Rate 1:	30°C/min to 200°C
Rate 2:	15°C/min to 90°C
Final Temp:	290°C, 0 min
Detector Type:	FID, 310°C
Carrier Gas:	He, 43.1 psi
Carrier Gas Flow :	0.5 mL/min
Constant Flow:	On
Average Linear Velocity:	40 cm/sec at 50°C
Injection Mode:	Splitless
Purge On Time:	1.0 min
Purge On (Split) Vent Flow:	10mL/min
Injection Volume:	0.5µL
Injection Temperature:	250°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™ with single taper
Liner Part Number:	**092111**
Column Part Number:	**054690**

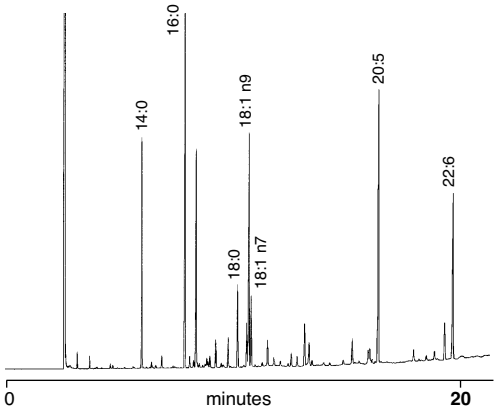
the food industry to characterize foodstuffs and raw materials. The BPX70 column is a 70% Cyanopropyl (equivalent) polysilphenylene -siloxane phase with a selectivity which is targeted for the resolution of FAMEs. **Figure 4** shows the analysis of Salmon oil which has been derivatized into fatty acid methyl esters. With the conventional 0.25 mm column, this analysis takes about 19 minutes but this can be reduced to under 8 minutes using the Fast BPX70 column.

Figure 5 shows a comparison of a BP20 (Polyethylene glycol phase) Fast GC column against a conventional column for the analysis of a mixture of industrial solvents.

Figure 4: Separation of FATTY ACID METHYL ESTER ANALYSIS (FAMES)

NORMAL

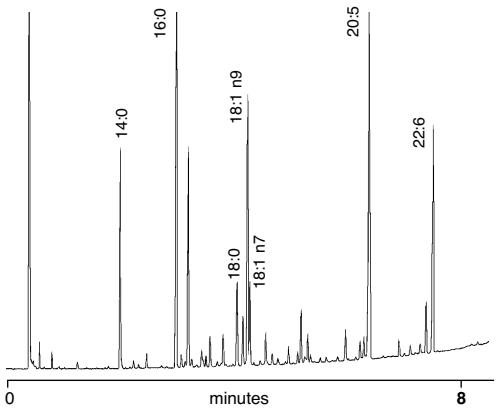
Figure 4a. Chromatogram showing separation of Fatty Acid Methyl Esters (FAMEs) using a conventional 50 meter x 0.25 mm ID BPX70 column with a 0.25 micron film.



Phase:	**BPX70 0.25μm film**
Sample derived from Salmon Fish Oil showing Fatty Acid Methyl Esters	
Column:	**30m x 0.25mm ID**
Initial Temp:	150°C , 1 min
Rate 1:	10°C/min to 170°C
Rate 2:	4°C/min to 240°C
Final Temp:	240°C, 0 min
Detector Type:	FID, 280°C
Carrier Gas:	He, 40.1 psi
Carrier Gas Flow :	1.27 mL/min
Constant Flow:	On
Average Linear Velocity:	30 cm/sec at 150°C
Injection Mode:	Split, 47.3:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	60mL/min
Injection Volume:	1μL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054622**

FAST

Figure 4b. Chromatogram showing separation of Fatty Acid Methyl Esters (FAMEs) using a FAST BPX70 column.



Phase:	**BPX70, 0.20μm film**
Sample derived from Salmon Fish Oil showing Fatty Acid Methyl Esters	
Column:	**10m x 0.10mm ID**
Initial Temp:	150°C , 1 min
Rate 1:	12°C/min to 240°C
Rate 2:	N/A
Final Temp:	240°C, 0 min
Detector Type:	FID, 280°C
Carrier Gas:	He, 45.8 psi
Carrier Gas Flow :	0.335 mL/min
Constant Flow:	On
Average Linear Velocity:	35 cm/sec at 150°C
Injection Mode:	Split, 89.6:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	30mL/min
Injection Volume:	0.1μL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™
Liner Part Number:	**092005**
Column Part Number:	**054600**

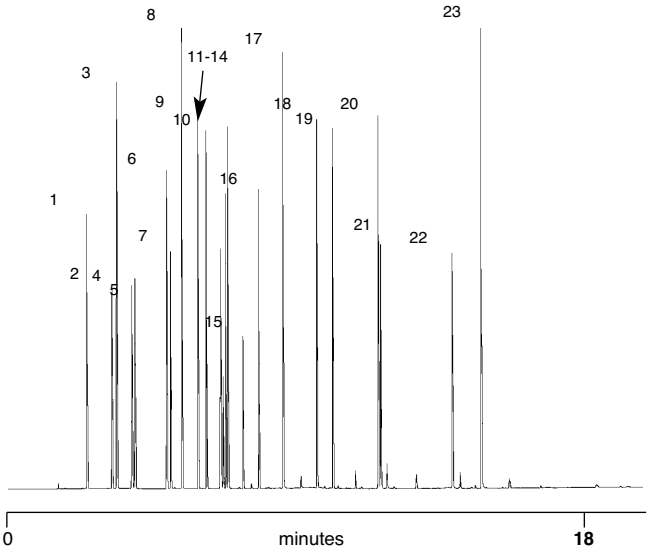
This mix includes glycol ethers, ketones, esters and hydrocarbons. The run time for this analysis has been reduced from 15 minutes to 6 minutes.

A mixture of organophosphorus pesticides from the USEPA method is shown in **Figure 6.** For this analysis, a conventional BPX50 column is compared against a Fast

Figure 5. Separation of a mixture of Industrial Solvents

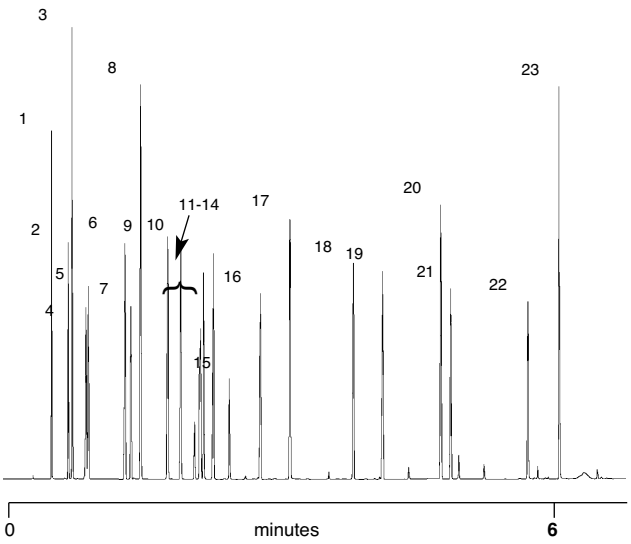
NORMAL

Figure 5a. Chromatogram showing separation of Industrial Solvents using a conventional 30 meter x 0.25 mm ID BP20 column with a 0.25 micron film.



FAST

Figure 5b. Chromatogram showing separation of Industrial Solvents using a FAST BP20 column.



Components

1. Acetone
2. Ethyl acetate
3. Methyl ethyl ketone
4. iso-Propanol
5. Ethanol
6. Methyl isobutyl ketone
7. Toluene
8. Butyl acetate
9. Isobutanol
10. Propylene glycol monomethyl ether
11. n-Butanol
12. Ethyl benzene
13. p-Xylene
14. m-Xylene
15. o-Xylene
16. Butyl Cellosolve acetate
17. Cyclohexanone
18. Butyl Cellosolve
19. Butyl glycol acetate
20. Hexyl Cellosolve
21. Isophorone
22. Butyl Carbitol
23. Benzyl alcohol

Phase:	**BP20, 0.25μm film**
Mixture of 23 industrial solvents	
Column:	**30m x 0.25mm ID**
Initial Temp:	35°C , 3 min
Rate 1:	15°C/min to 145°C, 2 min
Rate 2:	15°C/min to 215°C
Final Temp:	215°C, 3 min
Detector Type:	FID, 250°C
Carrier Gas:	He, 13.9 psi
Carrier Gas Flow :	1.31 mL/min
Constant Flow:	On
Average Linear Velocity:	30 cm/sec at 35°C
Injection Mode:	Split, 190:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	250mL/min
Injection Volume:	0.5μL
Injection Temperature:	220°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054427**

Phase:	**BP20, 0.10μm film**
Mixture of 23 industrial solvents	
Column:	**10m x 0.10mm ID**
Initial Temp:	35°C , 1 min
Rate 1:	25°C/min to 220°C
Rate 2:	N/A
Final Temp:	220°C, 0 min
Detector Type:	FID, 250°C
Carrier Gas:	He, 41.7 psi
Carrier Gas Flow :	0.493 mL/min
Constant Flow:	On
Average Linear Velocity:	40 cm/sec at 35°C
Injection Mode:	Split, 609:1
Purge On Time:	N/A
Purge On (Split) Vent Flow:	300mL/min
Injection Volume:	0.1μL
Injection Temperature:	220°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™ with single taper
Liner Part Number:	**092005**
Column Part Number:	**054405**

BPX50 column. The BPX50 phase is a 50% Phenyl (equivalent) Polysilphenylene – siloxane and offers different selectivity compared with a more non-polar phase such as a BPX5. It is possible with the Fast GC columns to reduce screening times by a factor of two. This result can dramatically improve sample throughput in the laboratory and directly affect the profitability of the lab.

Figure 6. Separation of a mixture of Organophosphorous Pesticides

NORMAL

Figure 6a. Chromatogram showing separation of Organophosphorus pesticides using a conventional 30 meter x 0.25 mm ID BPX50 column with a 0.25 micron film.

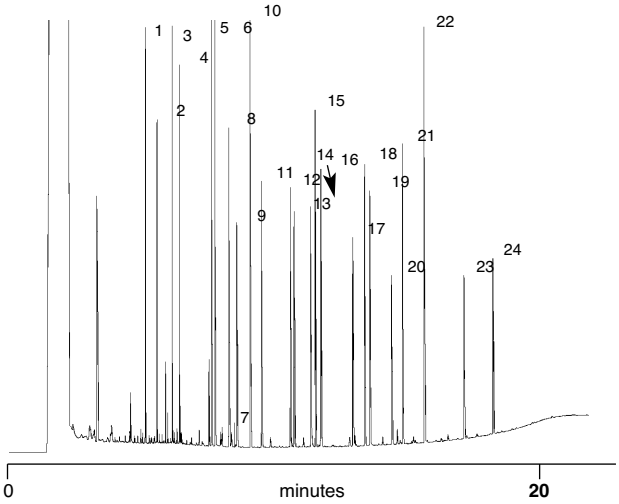


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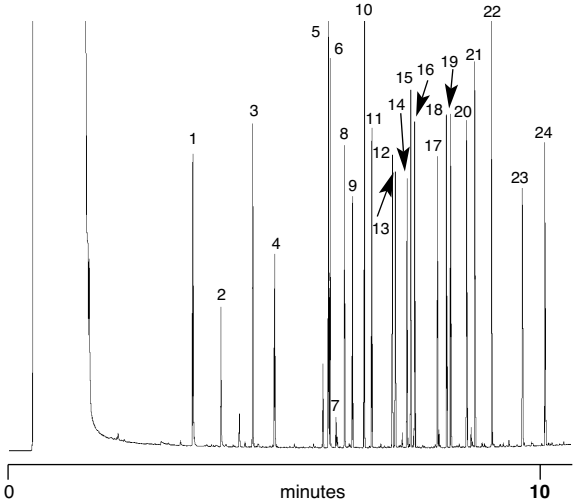
Figure 6b. Chromatogram showing separation of Organophosphorus pesticides using a FAST BPX50 column.



Components

1. 4-chloro-3-nitrobenzotrifluoride
2. Dichlorvos
3. 1-Bromo-2-nitrobenzene
4. Mevinphos
5. Tributyl phosphate (IS)
6. Ethoprop
7. Naled
8. Phorate
9. Demeton
10. Diazinon
11. Disulfoton
12. Methyl Parathion
13. Ronnel
14. Chlorpyrifos
15. Fenthion
16. Trichlorinate
17. Tetrachlorvinphos
18. Tokuthion
19. Impurity
20. Fensulfothion
21. Impurity
22. Triphenyl phosphate (IS)
23. Guthion
24. Coumaphos

Phase:	**BPX50, 0.25μm film**
Mixture of Organophosphorous Pesticides	**10ng/μL**
Column:	**30m x 0.25mm ID**
Initial Temp:	50°C , 1 min
Rate 1:	30°C/min to 200°C, 3 min
Rate 2:	10°C/min to 310°C, 2 min
Final Temp:	310°C, 2 min
Detector Type:	FID, 320°C
Carrier Gas:	He, 14.4 psi
Carrier Gas Flow :	1.30 mL/min
Constant Flow:	On
Average Linear Velocity:	30 cm/sec at 50°C
Injection Mode:	Splitless
Purge On Time:	0.5 min.
Purge On (Split) Vent Flow:	60mL/min
Injection Volume:	1.0μL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	4 mm ID FocusLiner™ with single taper
Liner Part Number:	**092003**
Column Part Number:	**054751**

Phase:	**BPX50, 0.10μm film**
Mixture of Organophosphorous Pesticides	**10ng/μL**
Column:	**10m x 0.10mm ID**
Initial Temp:	70°C , 1 min
Rate 1:	25°C/min to 320°C
Rate 2:	N/A
Final Temp:	320°C, 0 min
Detector Type:	FID, 320°C
Carrier Gas:	He, 39.0 psi
Carrier Gas Flow :	0.370 mL/min
Constant Flow:	On
Average Linear Velocity:	35 cm/sec at 70°C
Injection Mode:	Split
Purge On Time:	1.0
Purge On (Split) Vent Flow:	10mL/min
Injection Volume:	0.5μL
Injection Temperature:	240°C
Autosampler:	Yes
Liner Type :	2 mm ID FocusLiner™
Liner Part Number:	**092005**
Column Part Number:	**054740**

Fast GC Columns

Reduce Analysis Times

CONCLUSION

Fast GC capillary columns are an exciting step forward in GC analysis. These columns are particularly suited to screening applications as they offer very short analysis time compared to columns of conventional length and diameter.

ORDERING INFORMATION - FAST GC COLUMNS

Phase	Length (meters)	ID (mm)	Film Thickness (micron)	Part Number
BP1	10	0.1	0.1	**054022**
BPX5	10	0.1	0.1	**054099**
BPX50	10	0.1	0.1	**054740**
BPX70	10	0.1	0.2	**054600**
Fast PCB	10	0.1	0.1	**054690**
BP20	10	0.1	0.1	**054405**

ORDERING INFORMATION - 2mm ID FocusLiners™

Instrument	Length (mm)	ID (mm)	OD (mm)	Part Number
Hewlett Packard	78.5	2.3	6.3	**092005**
Hewlett Packard (with taper)	78.5	2.3	6.3	**092111**
Varian 1075 /1077	72	2.3	6.3	**092113**

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TECHNICAL ARTICLE

Fast GC for
TPH Analysis

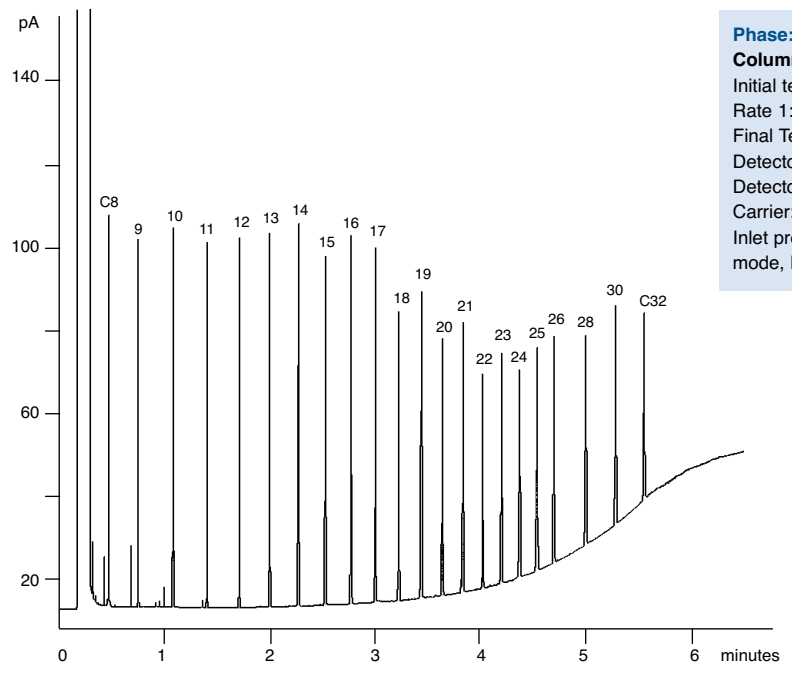
Total Petroleum Hydrocarbon (TPH) analysis is one of the most common analytical methods used in environmental laboratories. This method is applicable to either water or soil and basically involves an extraction (usually with dichloromethane) followed by GC analysis with a flame ionisation detector. The method is applicable to compounds which elute with vapor pressures between the aliphatic hydrocarbons of C8 and C36. Quantitation is carried out by relative response to either one aliphatic standard or relative to hydrocarbons at the elution mid-point of TPH fractions. The more volatile hydrocarbons are often analysed by purge and trap or by headspace methods.

The total instrument time of this analysis is crucial to high volume throughput laboratories. This time includes the actual analytical time and the GC oven cool-down time. These two added together are the cycle time of the analysis. TPH analysis is typically carried out on 0.32 or 0.25 mm ID columns with a film thickness of 0.25 micron. Depending on experimental conditions employed, run times can vary between 15 to 30 minutes. This article describes short ultra narrow bore columns with 0.1 micron films used to analyse TPH standards in around 6 minutes.

The primary advantage of very short ultra narrow bore columns with very thin films is the very fast analysis time possible. Run times can be halved compared to 0.25 and 0.32 mm ID columns. Using 0.1 mm ID columns does, however, present some challenges to the chromatographer. Inlet pressures do not necessarily need to be at optimum but need to be high for fast run times and this places more stress for a leak-free system. Also for fast GC, temperature program rates are limited by the ability of the GC oven to accurately follow the selected program rate. The very thin films equates with reduced capacities i.e. not as much sample can be injected into the column before over-loading occurs.

The speed of elution with 0.1 mm ID columns and peak width also places a higher requirement of detectors. A Gaussian peak needs 20 data points across the peak for representative sampling. For bench-top quadrupole mass spectrometers, systems are often limited to a sampling rate of ≈15 Hz (at best with a narrow mass range) or 15 points / second. For peaks less than one second wide, this sampling rate is less than optimum for good integration.

Figure 1. Chromatogram of TPH standards from C8 to C32



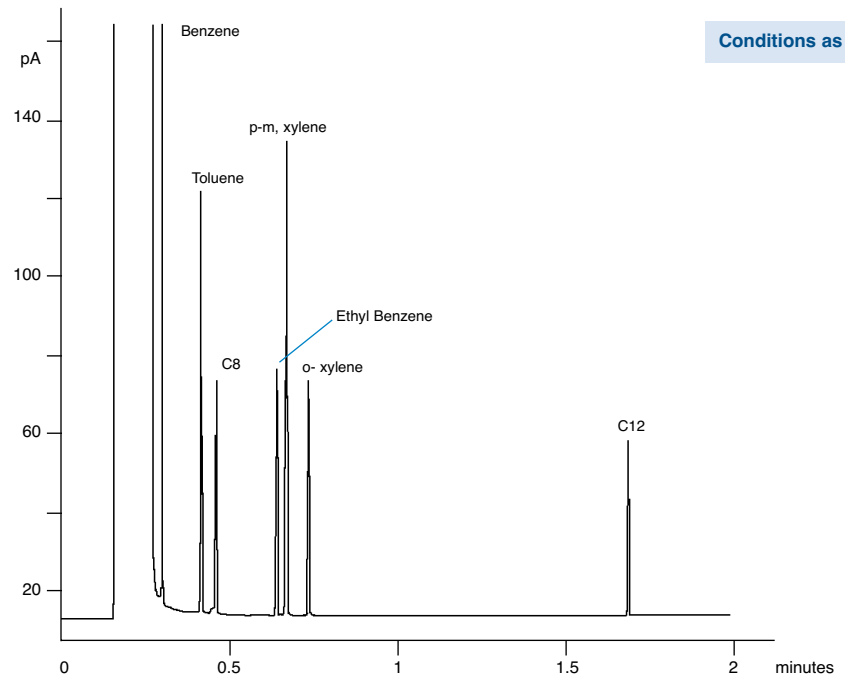
Phase:	**BPX5, 0.1µm**
Column:	**5m x 0.1mm ID**
Initial temp:	50°C
Rate 1:	45°C/min
Final Temp:	300°C, 0 min
Detector Temp:	270°C
Detector:	FID
Carrier:	He,

Inlet pressure 40 psi (constant flow mode, linear velocity of 75cm/sec)

There is still a great deal of interest in fast GC. **Figure 1** shows why this is the case. This is a chromatogram showing excellent resolution of aliphatic hydrocarbons from C8 to C32 in around six minutes. The data was acquired using a temperature program from 50°C (hold time 0.5 minutes) to 300°C at a temperature program rate of 45°C/min. The cycle time for this analysis is less than 12 minutes with an oven cool-down time of 5.5 minutes from 300°C to 50°C.

Figure 2 shows a chromatogram showing excellent resolution of Benzene, Toluene, Ethyl benzene, para and meta-Xylene (co-eluting), ortho-Xylene and (BTEX) and n-octane (C8) in under one minute using the conditions described above.

Figure 2. Chromatogram showing elution of BTEX in under one minute



FAST GC

There has been an increasing interest in 'Fast GC'. What is Fast GC and what are its advantages. Fast GC is about using short and ultra small diameter (usually 0.1 mm ID) columns with thin phase films and instrumental conditions of inlet pressure and temperature which give short analysis times. The attractiveness of the technique is greatly reduced run times. For example, run times can often be halved in Fast GC leading to considerably reduced analysis times and laboratory costs.

Fast GC has always placed heavy demands on GC instrumentation. Fast GC's need rapid sample introduction, handle high inlet pressures, high GC temperature program rates, high inlet split ratios and fast detection rates. Instrument companies, however, have met this challenge and modern GC's offer many improvements such as electronic pressure controls and excellent oven temperature control to operate using Fast GC conditions.

The phase ratio (Beta) is also an important consideration and to maintain a phase ratio the same as that of a 0.25 mm ID column with a film thickness of 0.25 micron, a film thickness of 0.1 micron has to be used for a 0.1 mm ID column.
Remember, phase ratio = (column ID in microns) / (4 x film thickness). This thin film equates with reduced sample capacities and is just another factor which needs consideration. ***FAST GC IS HERE TO STAY!***

ORDERING INFORMATION - FAST GC COLUMNS

Phase	ID mm	Film microns	10 metre	12 metre	25 metre
BPX5	0.1	0.1	**054099**		
BP1	0.1	0.1		**054023**	**054024**
BP5	0.1	0.1		**054150**	**054151**
BP10	0.1	0.1		**054238**	**054239**
BP20	0.1	0.1			**054407**