

MARKET FOCUSED - environmental ORGANOPHOSPHOROUS PESTICIDES

US EPA 8141 METHOD

The use of SGE's exceptionally inert and thermally stable BPX5 (5% phenyl equivalent), BPX35 (35% phenyl equivalent) and BPX50 (50% phenyl equivalent) capillary columns for the analysis of organophosphorous pesticides has solved all the problems associated with the chromatography of this class of compounds.

Organophosphorous pesticide analysis can be difficult and time consuming. High temperatures are usually required for the chromatography of many pesticides, causing problems with the bleed profile of the column and contaminants being left behind. Sample throughput and hence laboratory efficiency are further reduced by lengthy analysis times – often up to 40 minutes.

SGE's BPX5, BPX35 and BPX50 columns can analyze the USEPA 8141 mix (Table 1) in less than 22 minutes allowing a higher throughput of samples. The baseline resolution of the organophosphorous pesticides is excellent on BPX5, BPX35 and BPX50 with the bleed profile a strong feature at temperatures up to 360°C. The high thermal stability of the phase for each of these columns allows the analyst to "bake out" any high boiling contaminants to 360°C without damaging the



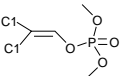




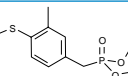
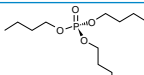

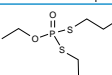

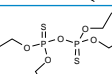

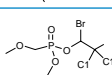

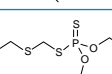

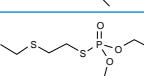
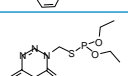

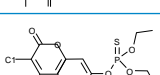
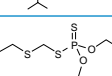
stationary phase. This insures against the possibility of any interference from these contaminants with further analyses.

BPX5, BPX35 and BPX50 columns show outstanding inertness with even the most difficult of organophosphorous compounds; Naled, which readily breaks down to Dichlorvos on column is easily detected without any apparent decomposition. This analysis has been performed on columns with dimensions

of 30m x 0.25mm ID x 0.25µm which is a standard dimension column in most laboratories. There are no co-elutions on any of these columns making BPX5, BPX35 and BPX50 the ideal column of choice for organophosphorous pesticide analysis.

Table 1 shows the structure of the relevant organophosphorous pesticides analysed on BPX5, BPX35 and BPX50.

Table 1. OPP STRUCTURES

Compound	Structure	Compound	Compound
4-chloro-3-nitrobenzo-trifluoride		Methyl Parathion	
Dichlorvos		Ronnel	
2-Bromonitro-benzene		Chlorpyrifos	
α-Mevinophos		Fenthion	
Tributyl Phosphate		Trichlorinate	
Ethoprop		Tokuthion	
Sulfotepp		Tetrachlorvinphos	
Naled		Fensulfothion	
Phorate		Triphenyl Phosphate	
O-Demeton		Guthion	
Diazinon		Coumaphos	
Disulfoton			

BPX5

5% phenyl (equiv)
polysilphenylene-siloxane

Figure 1 shows the USEPA 8141 mix analyzed on a BPX5 column. Note the excellent separation of the components in less than 20 minutes allowing higher sample throughput. Also note the brilliant bleed profile at 300°C.

BPX5

Replaces

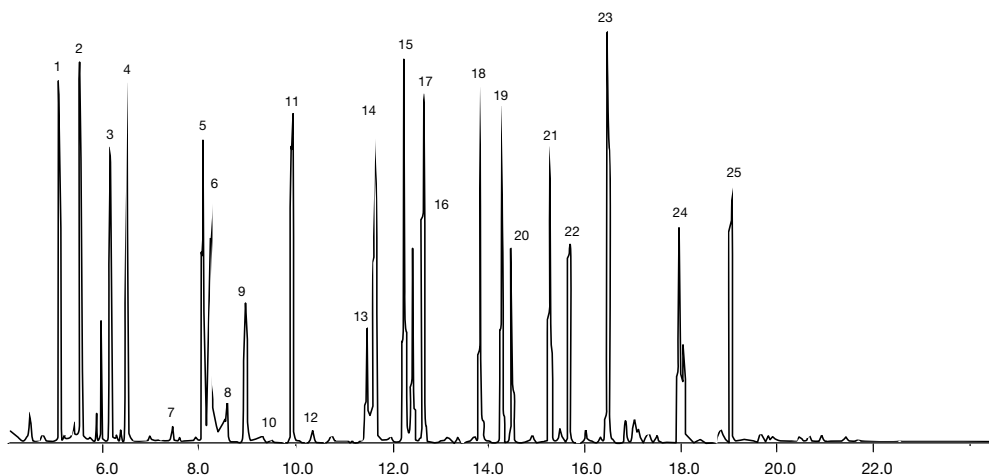
DB-5
DB-5MS
DB-5.625
XTI-5
Rtx-5ms
Ultra-2
HP-5
HP-5MS
HP5-TA
SPB-5
MDN-5S
CP-Sil 8CB
Rtx-5Sil MS
AT-5
CP-Sil 8CB M

Figure 1

Phase: BPX5 0.25µm film
8141 Standard: 10 ng/mL in dichloromethane
Column: 30m x 0.25 mm ID
Initial Temp: 50°C, 1 min
Rate 1: 30°C/min to 190°C, 3 min.
Rate 2: 10°C/min to 300°C
Final Temp: 300°C, 5 min
Detector Type: Mass Spectrometer
Carrier Gas: He, 10.8psi
Carrier Gas Flow: 1.3 mL/min
Constant Flow: On
Average Linear Velocity: 42 cm/sec at 50°C
Injection Mode: Splitless
Purge on Time: 0.5 min
Purge on (Split) Vent: 60mL/min
Injection Volume: 1 µL
Injection Temperature: 250°C
Autosampler: No
Liner Type: 4 mm ID Double Taper Liner
Liner Part Number: 092018
Column Part Number: 054101

Organophosphorous Pesticides

- | | |
|-------------------------------------|-------------------------|
| 1. 4-Chloro-3-nitrobenzotrifluoride | 13. Methyl parathion |
| 2. Dichlorvos | 14. Ronnel® |
| 3. 2-Bromonitrobenzene | 15. Chlorpyrifos® |
| 4. α-Mevinophos | 16. Fenthion® |
| 5. Tri-butyl phosphate | 17. Trichlorinate® |
| 6. Ethoprop | 18. Tetrachlorvinphos® |
| 7. Sulfotepp | 19. Tokuthion® |
| 8. Naled | 20. Impurity |
| 9. Phorate | 21. Fensulfotion |
| 10. Demeton | 22. Impurity |
| 11. Diazinon | 23. Triphenylphosphate |
| 12. Disulfoton | 24. Guthion (Azinophos) |
| | 25. Coumaphos |



BPX35

35% phenyl (equiv) polysilphenylene-siloxane

BPX35
Replaces

- DB-35
- DB-35MS
- Rtx-35
- Rtx-35ms
- HP-35
- HP-35MS
- SPB-35
- MDN-35
- AT-35

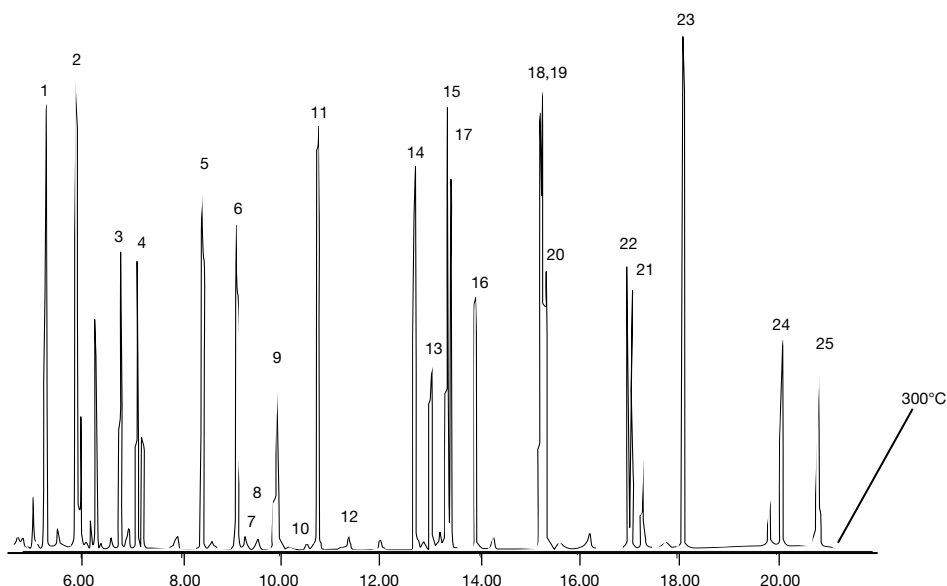
Figure 2 shows the USEPA 8141 mix analyzed on a BPX35 column. The BPX35 is a great confirmation column for both BPX5 and BPX50 with there being two changes in elution order. Also note the superior bleed profile at 300°C.

Figure 2

Phase: BPX35 0.25mm film
8141 Standard: 10 ng/mL in dichloromethane
Column: 30m x 0.25 mm ID
Initial Temp: 50°C, 1 min
Rate 1: 30°C to 190°C, 3 min
Rate 2: 10°C to 300°C
Final Temp: 300°C, 5 min
Detector Type: Mass Spectrometer
Carrier Gas: He, 10.8psi
Carrier Gas Flow: 1.3 mL/min
Constant Flow: On
Average Linear Velocity: 42 cm/sec at 50°C
Injection Mode: Splitless
Purge on Time: 0.5 min.
Purge on (Split) Vent: 60mL/min.
Injection Volume: 1 µL
Injection Temperature: 250°C
Autosampler: No
Liner Type: 4 mm ID Double Taper Liner
Liner Part Number: 092018
Column Part Number: 054701

Organophosphorous Pesticides

- | | |
|-------------------------------------|-------------------------|
| 1. 4-Chloro-3-nitrobenzotrifluoride | 13. Ronnel® |
| 2. Dichlorvos | 14. Methyl parathion |
| 3. 2-Bromonitrobenzene | 15. Chlorpyrifos® |
| 4. α-Mevinophos | 16. Trichlorinate® |
| 5. Tri-butyl phosphate | 17. Fenthion® |
| 6. Ethoprop | 18. Tetrachlorvinphos® |
| 7. Sulfotepp | 19. Tokuthion® |
| 8. Naled | 20. Impurity |
| 9. Phorate | 21. Impurity |
| 10. Demeton | 22. Fensulfothion |
| 11. Diazinon | 23. Triphenylphosphate |
| 12. Disulfoton | 24. Guthion (Azinophos) |
| | 25. Coumaphos |



BPX50

50% phenyl (equiv)
polysilphenylene-siloxane

BPX50
Replaces

OV-17
SP-2250
DB-17
DB-17MS
DB-17ht
Rtx-50
SPB-50
HP-50+
HP-17
AT-50
007-17

Figure 3 shows the separation of the USEPA 8141 mix analyzed on a BPX50 column. Note the excellent peak shape and separation of each component. The bleed profile at 300°C is superb.

Figure 3

NORMAL

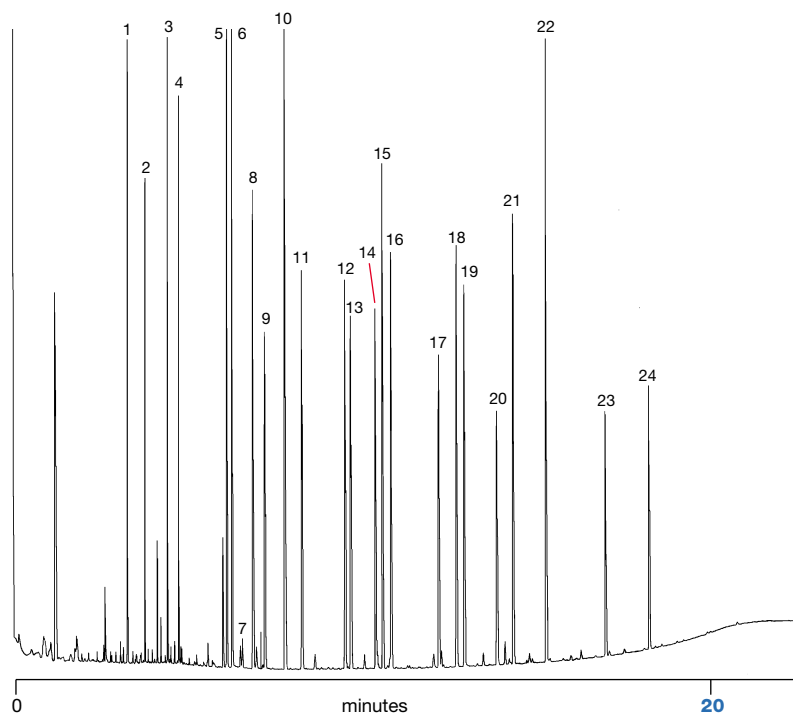
Chromatogram showing separation of Organophosphorous pesticides using a conventional BPX50 column.

Phase: BPX50, 0.25µm film
Mixture: 10ng/µL Organophosphorous Pesticides
Column: 30m x 0.25mm ID
Initial Temp: 50°C, 1min
Rate 1: 30°C/min to 200°C, 3min
Rate 2: 10°C/min to 310°C, 2min
Final Temp: 310°C, 2min
Detector Type: FID, 320°C
Carrier Gas: He, 14.4psi
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: 0.5min
Purge On (Split) Vent: 60mL/min
Injection Volume: 1.0µL
Injection Temperature: 240°C
Autosampler: Yes
Liner Type : 4mm ID FocusLiner with single taper

Liner Part Number: 092003
Column Part Number: 054751



1. 4-chloro-3-nitrobenzo trifluoride
2. Dichlorvos
3. 1-Bromo-2-nitrobenzene
4. α-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

SUMMARY:

BPX5, BPX35 and BPX50 columns show unparalleled performance for the separation of the phosphorated pesticides listed in the U.S. EPA 8141 method. They can be conditioned at the end of each analysis to remove any high boiling point contaminants without any degradation to the stationary phase and give excellent response and very little on column breakdown. BPX5, BPX35 and BPX50 are the columns of choice for all organophosphorous pesticide analyses.

MARKET FOCUSED - environmental

ORGANOPHOSPHOROUS PESTICIDES

US EPA 8141 METHOD

Ordering Information

	ID(mm) (mm)	Length (m)	Film Thickness (µm)	Temperature Limits (°C)	Part No.	
BPX5	0.10	10	0.10	-40 to 360/370	054099	
		12	0.25	-40 to 360/370	054112	
		25	0.25	-40 to 360/370	054113	
		30	0.25	-40 to 360/370	054142	
		50	0.25	-40 to 360/370	054114	
		15	0.25	-40 to 360/370	054100	
	0.25	15	1.00	-40 to 360/370	054121	
		30	0.25	-40 to 360/370	054101	
		30	0.50	-40 to 360/370	0541025	
		30	1.00	-40 to 360/370	054122	
		60	0.25	-40 to 360/370	054102	
		15	0.25	-40 to 360/370	054144	
	0.32	15	1.00	-40 to 360/370	054152	
		25	0.25	-40 to 360/370	054119	
		25	0.50	-40 to 360/370	054125	
		30	0.25	-40 to 360/370	054145	
		30	0.50	-40 to 360/370	0541205	
		30	1.00	-40 to 360/370	054145	
	0.53	60	0.25	-40 to 360/370	054146	
		60	1.00	-40 to 360/370	054154	
		12	1.00	-40 to 360/370	054130	
		15	1.00	-40 to 360/370	054147	
		15	1.50	-40 to 350/360	0541347	
		15	3.00	-40 to 350/360	054159	
		25	1.00	-40 to 360/370	054131	
		30	0.50	-40 to 360/370	0541345	
		30	1.00	-40 to 360/370	054148	
		30	1.50	-40 to 360/370	0541348	
		30	3.00	-40 to 350/360	054160	
		60	1.00	-40 to 360/370	054158	
	60	3.00	-40 to 350/360	054164		
	BPX35	0.10	10	0.1	0 to 360/370	054699
			15	0.25	0 to 360/370	054713
			30	0.25	0 to 360/370	054714
			15	0.25	0 to 360/370	054700
			15	1	0 to 360/370	054703
30			0.25	0 to 360/370	054701	
0.25		30	0.5	0 to 360/370	0547025	
		30	1	0 to 360/370	054704	
		60	0.25	0 to 360/370	054702	
		60	1	0 to 360/370	054705	
		15	0.25	0 to 360/370	054723	
		15	0.5	0 to 360/370	054718	
0.32		15	1	0 to 360/370	054716	
		30	0.25	0 to 360/370	054724	
		30	0.5	0 to 360/370	0547158	
		30	1	0 to 360/370	054717	
		60	0.25	0 to 360/370	054725	
		15	0.5	0 to 360/370	054734	
0.53		15	1	0 to 360/370	054736	
		30	0.5	0 to 360/370	054735	
		30	1	0 to 360/370	054737	
		10	0.10	0 to 360/370	054740	
		15	0.25	0 to 360/370	054750	
		30	0.25	0 to 360/370	054751	
0.32	60	0.25	0 to 360/370	054752		
	15	0.25	0 to 360/370	054760		
	30	0.25	0 to 360/370	054761		
	15	0.50	0 to 360/370	054770		
	30	0.50	0 to 360/370	054771		
	30	1.00	0 to 360/370	054772		

For information on SGE's complete range of GC accessories, please refer to our latest catalog, or contact your nearest SGE office or distributor.



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