

New SPB-50 Capillary Column for Environmental Applications

US EPA methods for monitoring phenols, chlorinated pesticides, base-neutrals and phthalates in environmental samples specify packed gas chromatography columns using a 50% phenyl polysiloxane phase (SP™-2250 or OV®-17). Supelco's new SPB™-50 capillary column provides the polarity of the 50% phenyl polysiloxane phase with the advantages of a capillary column. This column was designed with very low bleed and high polarizability for separating complex mixtures of semivolatiles by GC-MS, GC-FID and GC-ECD.

The SPB-50 column expands Supelco's line of phenyl-containing capillary columns (Table 1). The bonded 50% phenyl polysiloxane phase offers better selectivity for compounds of similar structure and boiling points than the 5% phenyl polysiloxane phase of the widely-used PTE™-5 column. The SPB-50 phase has the highest phenyl content, and therefore the highest polarizability of the bonded, phenyl-containing series of capillary phases. SPB-50 columns exhibit excellent selectivity for the analysis of polar semivolatile pollutants. In addition to its high polarizability, the very low bleed of the SPB-50 column under GC/MS conditions (typically only 2pA at 290°C and 9pA at 320°C) makes it an excellent choice for many EPA methods involving semivolatile pollutants. (We recommend operating the SPB-50 column within temperature limits of 30°C to 310°C for longer column life.)

Table 1. McReynolds Numbers

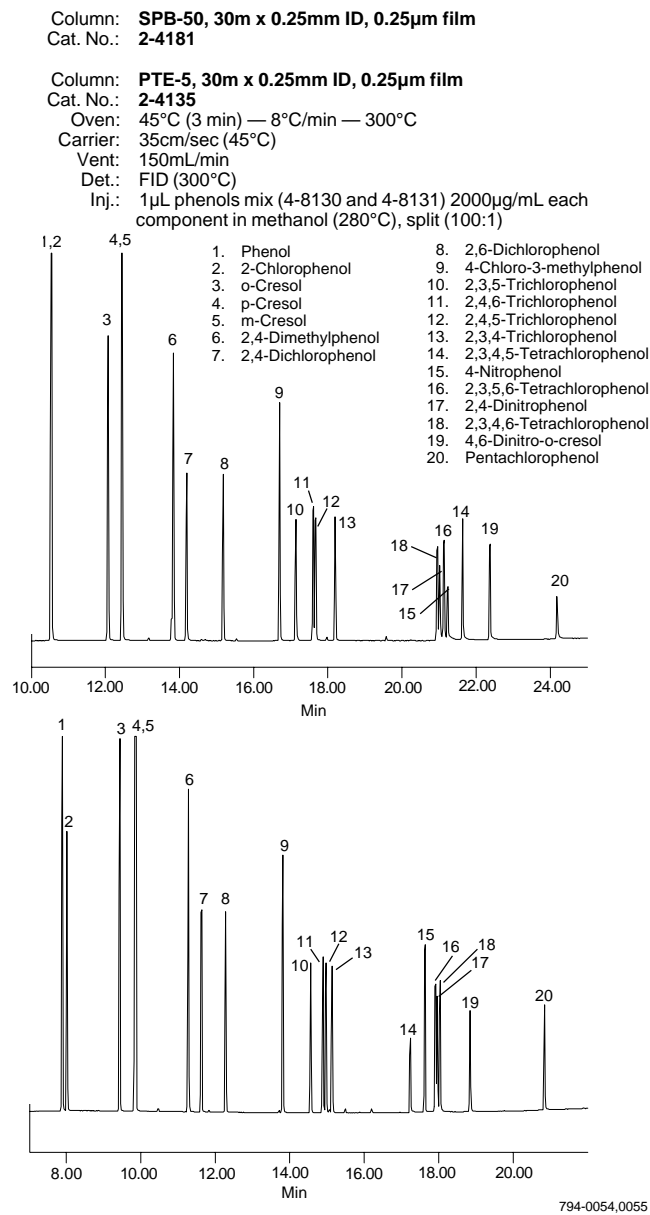
	x'	y'	z'	u'	s'
SPB-5 (PTE-5)	19	74	64	93	62
SPB-20	67	116	117	174	131
SPB-35	101	146	151	219	202
SPB-50	125	175	183	268	220

x' benzene
y' 1-butanol
z' 2-pentanone
u' 1-nitropropane
s' pyridine

We compared the performance of PTE-5 and SPB-50 columns for separating phenols, base-neutral/phthalates, and chlorinated pesticides. In every case, the SPB-50 column yielded slightly longer retention times (due to increased analyte interaction with the phase), but provided unique elution orders, and often higher resolution compared to the popular PTE-5 column.

Because of its unique selectivity, the SPB-50 is an excellent column for confirmational analysis of phenols. The elution order of 2,3,4,5-tetrachlorophenol, 4-nitrophenol, 2,3,5,6-tetrachlorophenol, 2,4-dinitrophenol, and 2,3,4,6-tetrachlorophenol (peaks 14-18) on the SPB-50 column is reversed compared to the PTE-5 column (Figure A).

Figure A. Phenols on PTE-5 and SPB-50 Columns



When a mixture of base-neutrals and phthalates was separated using SPB-50 and PTE-5 columns, the cluster of peaks 6-12 was resolved better on the SPB-50 column, while peaks 13-18 were resolved better on the PTE-5 column. The combination of the two

Figure B. Base Neutrals and Phthalates on PTE-5 and SPB-50 Columns

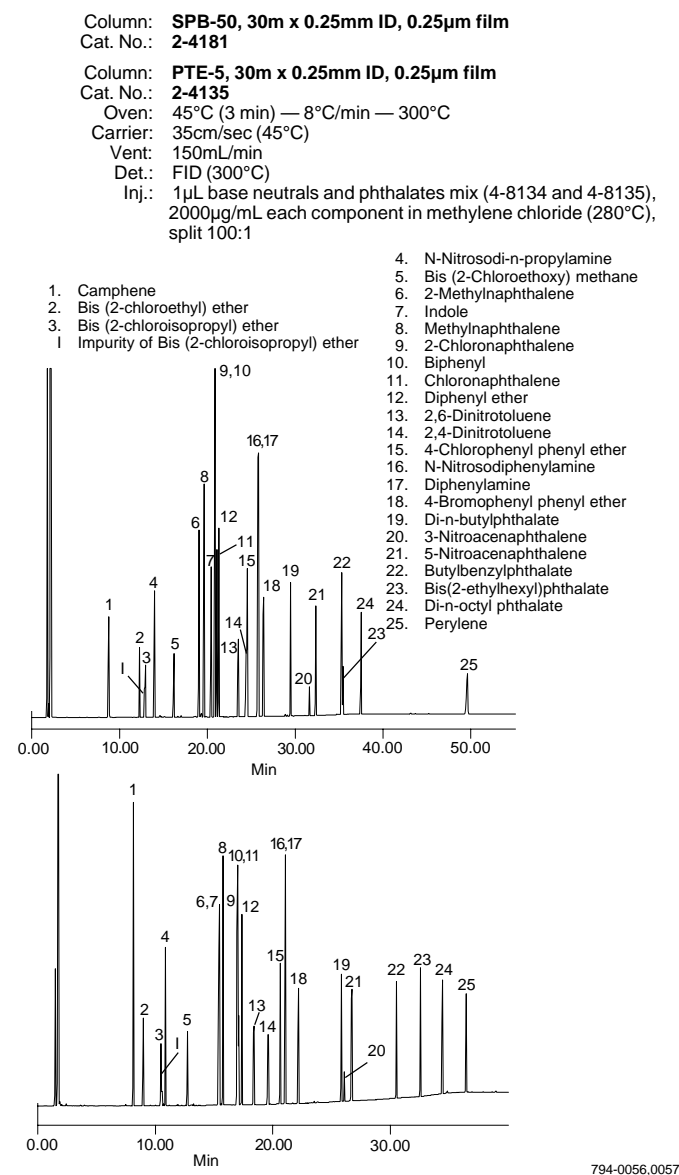
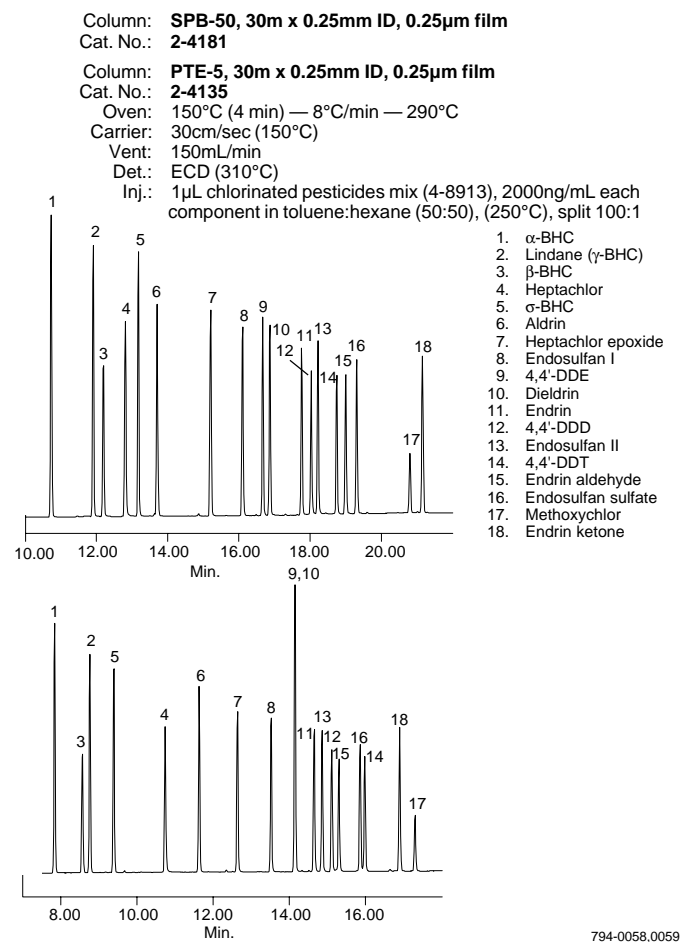


Figure C. Chlorinated Pesticides on PTE-5 and SPB-50 Columns



resolved on the SPB-50 column.

The SPB-50 column offers a useful alternative to SP-2250 and OV-17 packed columns and was designed to meet or exceed the quality characteristics of other available bonded 50% phenyl capillary columns. With low bleed, high efficiency, long-term stability, and high polarizability, the SPB-50 column is an ideal column for monitoring polar semivolatiles in environmental samples.

capillary columns clearly assists in identifying and quantifying these pollutants.

The SPB-50 column resolved a mixture of 18 chlorinated pesticides with no coelutions (Figure C). The combined breakdown of endrin and 4,4'-DDT on the SPB-50 column was less than 6% with splitless injections of 20pg per component. The elution order of these pesticides and their breakdown levels are nearly the same as those of the specially-tested SPB-608 capillary column. The elution order of the PTE-5 column is quite different, making it a good choice for a confirmational column. 4,4'-DDE and dieldrin (peaks 9 and 10), which coeluted on the PTE-5 column, were well

Ordering Information:

Fused Silica Capillary GC Columns

SPB-50, 30m x 0.25mm ID, 0.25µm film	2-4181	\$370
SPB-50, 30m x 0.32mm ID, 0.25µm film	2-4187	\$395
PTE-5, 30m x 0.25mm ID, 0.25µm film	2-4135	\$395

Fused silica columns manufactured under HP US Pat. No. 4,293,415.

Trademarks

OV — Ohio Valley Specialty Chemical Co.
 PTE, SP, SPB — Supelco, Inc.

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