

Applications note

cat.# 59571

The New Rtx[®]-Wax Column

Restek's new Rtx[®]-Wax column has:

- a 20°C minimum operating temperature.
- thermal stability with guaranteed low bleed to 250°C.
- the capability to resolve xylene isomers for BTEX analysis.
- excellent inertness for aldehyde analysis.

Restek's Rtx[®]-Wax columns are made with a new Crossbond[®] polyethylene glycol (PEG) stationary phase. This new innovation in polymer technology has produced the most inert and efficient PEG columns currently available. The extended operating temperature range allows the analysis of compounds with a wide volatility range, while the Crossbond[®] technology ensures low bleed at temperatures as high as 250°C.

The selectivity of the Rtx[®]-Wax is comparable to other bonded Carbowax[®] columns*, yielding excellent resolution of compounds ranging from intermediate to high polarity. This exceptional inertness and efficiency allows versatility in difficult analyses such as isomeric separations, aldehydes, and alcohols.

Reduced Minimum Operating Temperature

Many PEG columns undergo a solid-liquid phase transition at temperatures below 40°C that results in a loss of efficiency, reduced sample capacity, and poor retention time reproducibility¹. The new Rtx[®]-Wax column can effectively operate at 20°C without displaying any adverse effects. This is especially advantageous for applications involving purge & trap and headspace analyses where volatile components must be

cold-trapped onto the column. Figures 1 and 2 demonstrate the difference in PEG column performance at 20°C.

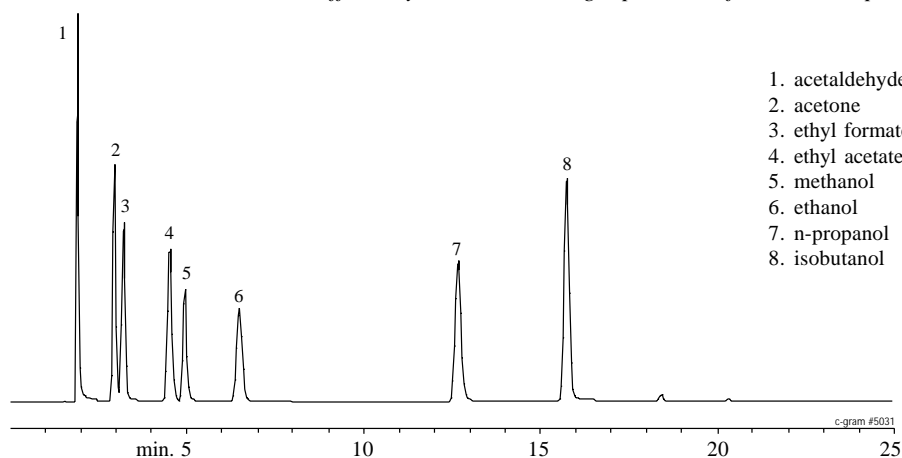
Figure 1 is a chromatogram of eight volatile components on the Rtx[®]-Wax column. **Figure 2** (on the next page) shows the same analysis and conditions on a Stabilwax[®] column. The Rtx[®]-Wax column provides better column efficiency and resolution of the analytes demonstrating its superior suitability for low temperature analyses.

Questions?
Call our technical
service staff at
800-356-1688, ext. 4

* Selectivity data available upon request.

Figure 1

The Rtx[®]-Wax maintains column efficiency at 20°C allowing separation of volatile components.



30m, 0.53mm ID, 1.0µm Rtx-Wax (cat.# 12455). 0.1µl split injection of volatile solvents.

Oven temp.: 20°C (hold 10 min.) to 100°C @ 5°C/min.; Inj./det. temp.: 200°C;

Carrier gas: helium; Linear velocity: 40cm/sec. set @ 20°C; FID sensitivity: 8 x 10⁻¹¹ AFS; Split ratio: 10:1

Thermal Stability to 250°C

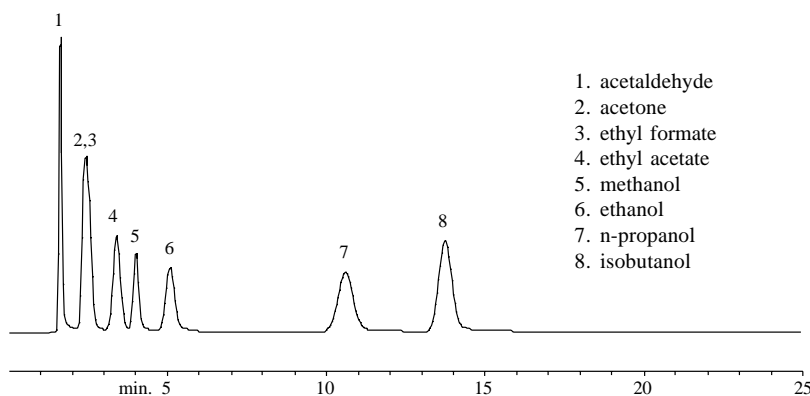
Crosslinking or bonding of the PEG stationary phase minimizes bleed to ensure accurate identification and quantitation of higher-boiling components. As a result, minimal detector contamination and extended column lifetime are observed. Only a small baseline rise is evident at the maximum operating temperature for the stationary phase. In comparison to similar PEGs from other manufacturers, the Rtx[®]-Wax exhibits the lowest bleed profile at 250°C (see **Figure 3**).

Resolution of BTEX isomers

The new Rtx[®]-Wax column offers the same selectivity as other Carbowax[®] columns for isomers of substituted aromatics. This is useful for BTEX analyses that require the specific quantitation of the individual xylene isomers. **Figure 4** illustrates that all components in the BTEX analysis (including meta-, para-, and ortho-xylene) are completely resolved in just 13 minutes.

Figure 2

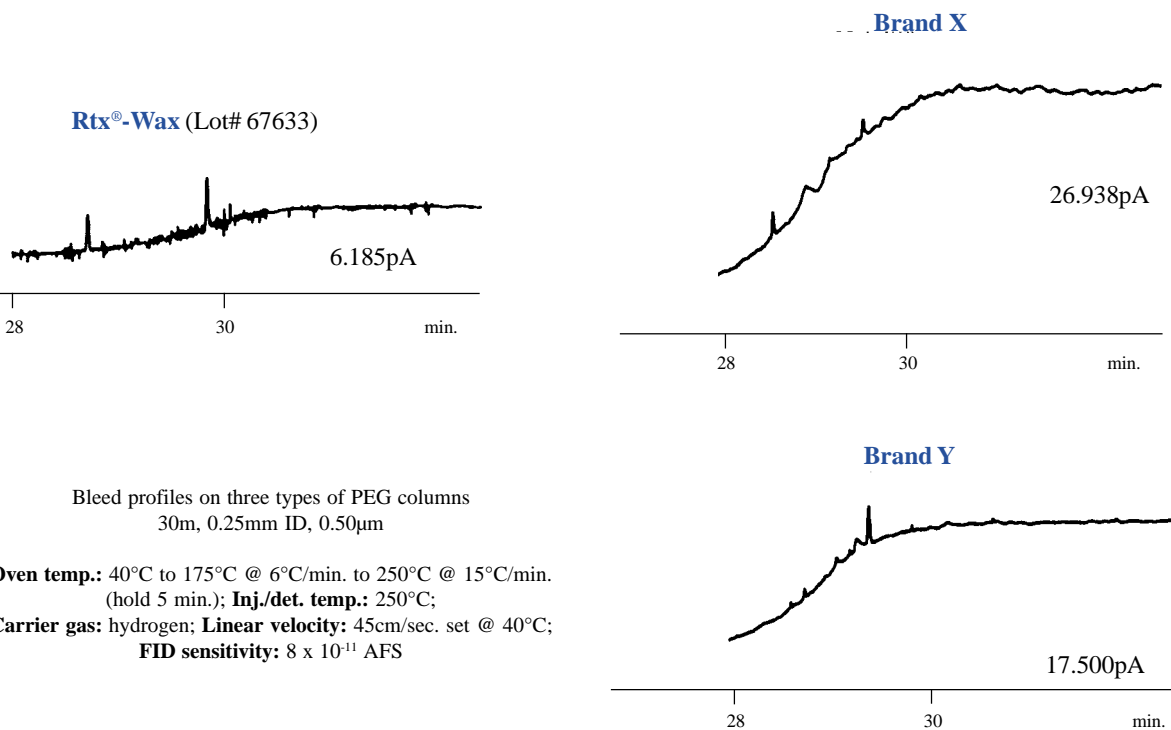
The Stabilwax[®] column demonstrates a phase transition below 40°C, resulting in decreased efficiency and separation power.



30m, 053mm ID, 1.0µm Stabilwax[®] (cat.# 10655). 0.1µl split injection of volatile solvents.
On-column conc.: 60ng; **Oven temp.:** 20°C (hold 10 min.) to 100°C @ 5°C/min.;
Inj./det. temp.: 200°C; **Carrier gas:** helium; **Linear velocity:** 40cm/sec. set @ 20°C;
FID sensitivity: 8 x 10⁻¹¹ AFS; **Split ratio:** 10:1

Figure 3

Rtx[®]-Wax exhibits lowest bleed profile at 250°C.



Excellent Inertness for Aldehydes

Most PEG columns can effectively analyze alcohols, esters, and acids, but some exhibit peak tailing with aldehydes. Because the stationary phase undergoes an extensive purification procedure, peak tailing in the analysis of a series of aldehydes is non-existent on the Rtx[®]-Wax column as shown in **Figure 5**.

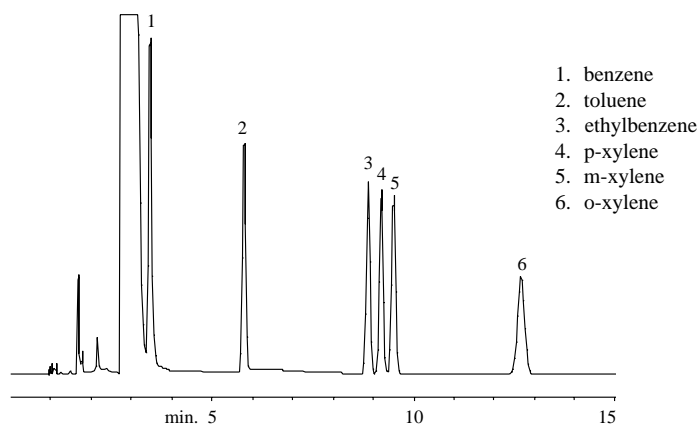
In comparison with other available Carbowax[®] columns, the Crossbond[®] Rtx[®]-Wax column provides an extended operational temperature range, excellent efficiency, selectivity, and superior inertness. These advantages make it the logical choice for all Carbowax[®] applications.

References

¹ Sandra, P.; David, F.; Turner, K.A.; McNair, H.M.; Brownstein, A.D. "Observations with High-Molecular-Weight Polyethylene Glycol Stationary Phases in Capillary Gas Chromatography," *Journal of Chromatography*, 1989.

Figure 4

The Rtx[®]-Wax column efficiently resolves all xylene isomers in BTEX analysis.



30m, 0.53mm ID, 1.0µm Rtx[®]-Wax (cat.# 12455)
 0.25µl direct injection of a BTEX sample. On-column conc.: 50ppm
Oven temp.: 35°C to 75°C @ 2°C/min. (hold 5 min.);
Inj./det. temp.: 200°C; **Carrier gas:** helium;
Linear velocity: 26cm/sec. set @ 35°C; **FID sensitivity:** 8 x 10⁻¹¹ AFS

Figure 5

Rtx[®]-Wax exhibits excellent symmetrical peak shape for aldehydes compared to the Stabilwax[®] column.

Rtx[®]-Wax (cat.# 12438)
 30m, 0.25mm ID, 0.50µm

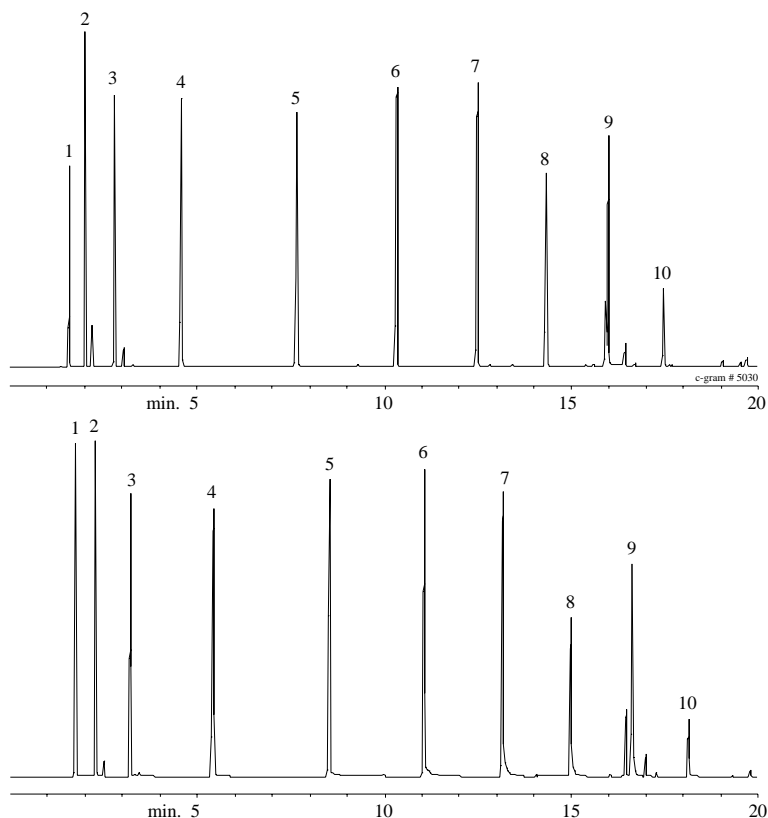
- | | |
|-------------|---------------|
| 1. ethanal | 6. heptanal |
| 2. propanal | 7. octanal |
| 3. butanal | 8. nonanal |
| 4. pentanal | 9. decanal |
| 5. hexanal | 10. undecanal |

Sample: split injection of C2-C11 aldehydes mixture **On-column conc.:** 250ng.

Oven temp.: 40°C (hold 5 min.) to 200°C @ 10°C/min.; **Inj./det. temp.:** 200°C;

Carrier gas: hydrogen; **Linear velocity:** 35cm/sec. set @ 40°C; **FID sensitivity:** 8 x 10⁻¹¹ AFS; **Split ratio:** 100:1

Stabilwax[®] (cat.# 10638)
 30m, 0.25mm ID, 0.50µm



Product Listing

Rtx®-WAX Fused Silica Capillary Columns Questions? Call our technical service staff at	mm ID	df (μ)	temp. range (°C)	15-meter	30-meter	60-meter
	0.25	0.10	20-250	12405	12408	—
		0.25	20-250	12420	12423	12426
		0.50	20-250	12435	12438	12441
	0.32	0.10	20-250	12406	12409	—
		0.25	20-250	12421	12424	12427
		0.50	20-250	12436	12439	12442
		1.00	20-240/250	12451	12454	12457
	0.53	0.25	20-250	12422	12425	—
		0.50	20-250	12437	12440	12443
1.00		20-240/250	12452	12455	12458	
mm ID	df (μ)	temp. range (°C)	10-meter	20-meter		
0.10	0.10	20-250	41601	41602	—	
	0.20	20-240/250	41603	41604	—	

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