

# New Rxi™-1ms GC Capillary Column

For Low Level GC/MS Analysis

By Robert Freeman, Environmental Innovations Chemist

- Inert, low-bleed column for reliable results from low-level GC/MS analyses.
- Save time – analyze acidic and basic compounds under the same conditions.
- Guaranteed reproducible performance, column to column.

The second column in our new Rxi™ GC column line – the Rxi™-1ms column – will provide the same outstanding performance as the Rxi™-5ms column, with equally superior inertness, ultra-low bleed, and excellent batch to batch reproducibility.

Our first test for this 100% dimethylpolysiloxane phase column was an analysis of a complex mixture of semivolatile organic compounds. The extensive target list was comprised of many classes of compounds including chloroacetanilides, chlorotriazines, triazinones, uracils, polycyclic aromatic hydrocarbons, and phthalates. Figure 1 shows peak shape and selectivity are equally good for all of these diverse compounds, and all are eluted in an acceptable analysis time.<sup>1</sup>

## Excellent Inertness

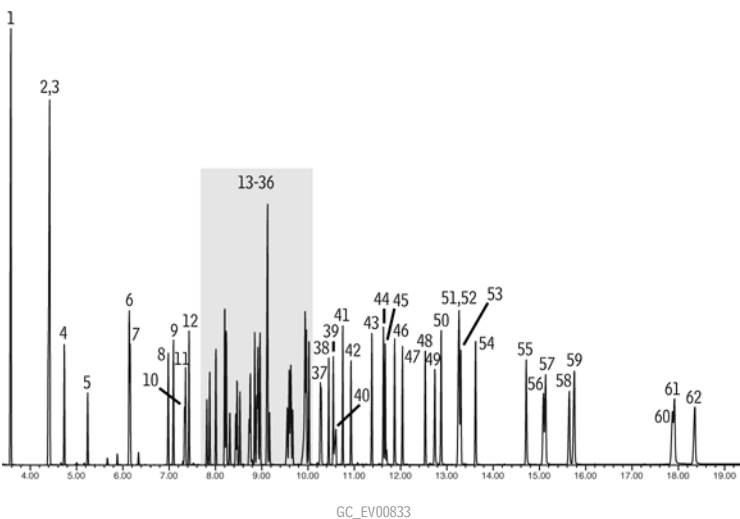
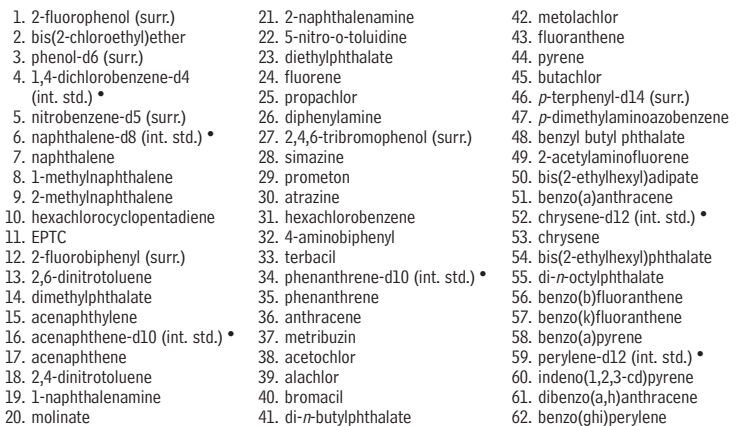
In addition to analyzing these compounds, we analyzed an acidic compound (2,4-dinitrophenol) and a basic compound (pyridine), each at 0.5ng on column, to assess column inertness. Column activity reveals itself through poor response and peak tailing for such active compounds, and these two compounds present both varying difficulties in a GC/MS analysis and differing modes of degradation. Figure 2 shows the excellent peak shapes and responses for these compounds on the 30m x 0.25mm ID, 0.25µm film column.

Phenols are notorious for breakdown and peak tailing, caused by interaction with the surface of an active inlet liner or an active column. Nitrophenols and pentachlorophenol, for example, very often exhibit poor peak shape and/or poor response. Figure 3 shows the 30m x 0.25mm ID, 0.25µm Rxi™-1ms column provides very good peak shapes for phenols. Peak responses are well above method requirements.

## Ultra-Low Bleed

In addition to excellent inertness, Rxi™-1ms columns exhibit very low bleed. Figure 4 is focused on the end of the chromatogram for semivolatiles. At 330°C, bleed is much lower than the signals for 0.5ng of target analytes. This exceptional signal-to-noise differential for late eluting compounds assures better detection limits.

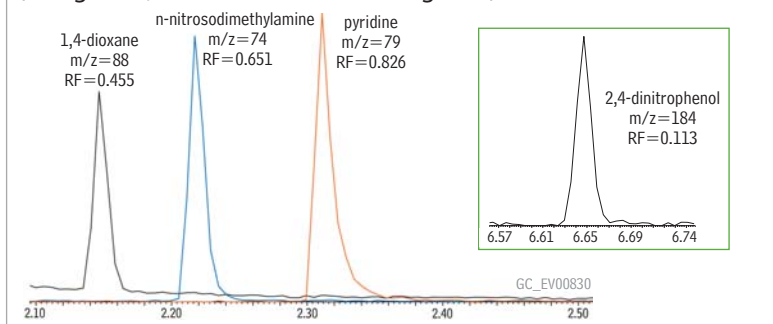
**Figure 1** Excellent selectivity and peak shapes for common drinking water semivolatiles at 10ng, using an Rxi™-1ms column.



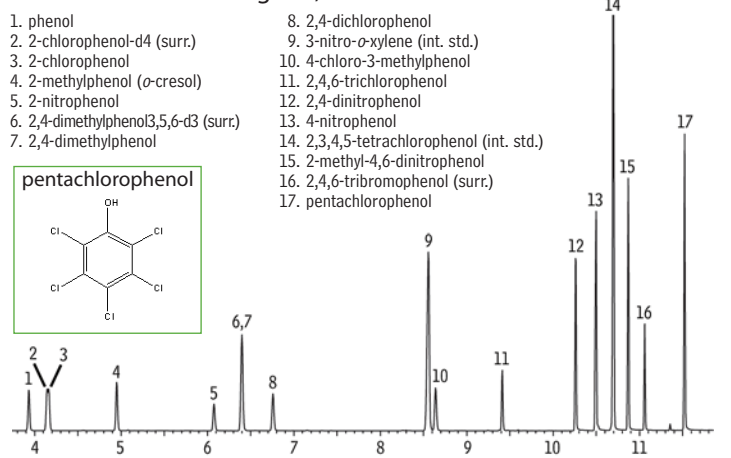
Column: Rxi™-1ms, 30m, 0.25mm ID, 0.25µm (cat.# 13323)  
Sample: US EPA Method 525.2 mix: custom 525.2 calibration mix, SV Internal Standard Mix (cat.# 31206), B/N Surrogate Mix (4/89 SOW) (cat.# 31024), Acid Surrogate Mix (4/89 SOW) (cat.# 31025)  
Inj.: 1.0µL, 10µg/mL each analyte (internal standards 100µg/mL), split (10:1)  
Instrument: Agilent 6890  
Inj. temp.: 250°C  
Flow rate: 1.2mL/min.  
Oven temp.: 50°C (hold 1 min.) to 265°C @ 20°C/min., to 330°C @ 6°C/min. (hold 1 min.)  
Det.: Agilent 5973 MSD  
Transfer line temp.: 280°C  
Scan range: 35-550 amu  
Solvent delay: 3.20 min.  
Tune: DFTPP  
Ionization: EI

• Internal standards at 100ng on-column.

**Figure 2** An Rxi™-1ms column has excellent selectivity for basic or acidic compounds, under the same conditions. (0.5ng each; extracted ion chromatograms).

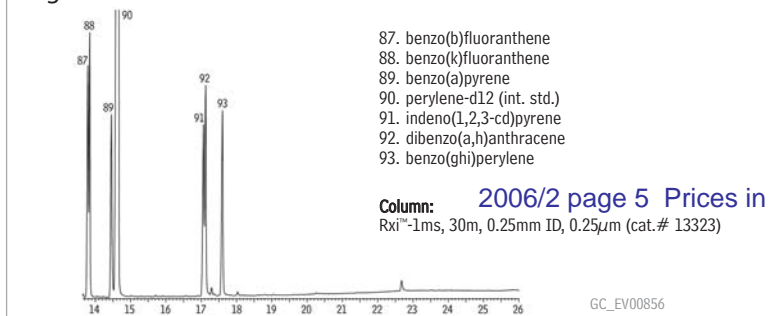


**Figure 3** Acidic analytes at 5.0ng on an Rxi™-1ms column (extracted ion chromatogram).



Column: Rxi™-1ms, 30m, 0.25mm ID, 0.25µm (cat.# 13323)  
 Sample: US EPA Method 528 Mix: Phenols Fortification Mix, EPA 528 (cat.# 31695), Internal Standard Mix, EPA 528 (cat.# 31696), Surrogate Standard Mix, EPA 528 (cat.# 31697)  
 Inj.: 1.0µL, 5µg/mL each analyte (internal standards 25µg/mL), split (10:1) 4mm Drilled Uniliner® inlet liner (hole at bottom) (cat.# 20771)  
 Instrument: Agilent 6890  
 Inj. temp.: 250°C  
 Carrier gas: helium, constant flow  
 Flow rate: 1.2mL/min.  
 Oven temp.: 70°C (hold 0.5 min.) to 130°C @ 8°C/min., to 300°C @ 50°C/min. (hold 1 min.)  
 Det.: Agilent 5973 MSD

**Figure 4** Bleed profile at 330°C of Rxi™-1ms at end of 5ng on-column standard.



Based on these results, we highly recommend the new Rxi™-1ms column for low-level analyses that require a 100% dimethylpolysiloxane phase.

### Rxi™-1ms Columns (fused silica)

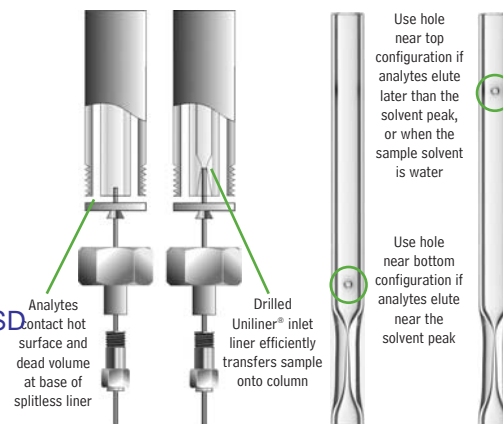
(Crossbond® 100% dimethylpolysiloxane)

ID	df (µm)	temp. limits	length	cat. #	price
0.18mm	0.18	-60 to 330/350°C	20-Meter	13302	\$370
0.20mm	0.33	-60 to 330/350°C	12-Meter	13397	\$230
0.20mm	0.33	-60 to 330/350°C	25-Meter	13398	\$365
0.20mm	0.33	-60 to 330/350°C	50-Meter	13399	\$630
0.25mm	0.25	-60 to 330/350°C	15-Meter	13320	\$260
0.25mm	0.25	-60 to 330/350°C	30-Meter	13323	\$435
0.25mm	0.25	-60 to 330/350°C	60-Meter	13326	\$780
0.25mm	0.50	-60 to 330/350°C	15-Meter	13335	\$260
0.25mm	0.50	-60 to 330/350°C	30-Meter	13338	\$435
0.25mm	0.50	-60 to 330/350°C	60-Meter	13341	\$780
0.25mm	1.00	-60 to 330/350°C	15-Meter	13350	\$260
0.25mm	1.00	-60 to 330/350°C	30-Meter	13353	\$435
0.25mm	1.00	-60 to 330/350°C	60-Meter	13356	\$780
0.32mm	0.25	-60 to 330/350°C	15-Meter	13321	\$280
0.32mm	0.25	-60 to 330/350°C	30-Meter	13324	\$460
0.32mm	0.25	-60 to 330/350°C	60-Meter	13327	\$820
0.32mm	0.50	-60 to 330/350°C	15-Meter	13336	\$280
0.32mm	0.50	-60 to 330/350°C	30-Meter	13339	\$460
0.32mm	0.50	-60 to 330/350°C	60-Meter	13342	\$820
0.32mm	1.00	-60 to 330/350°C	15-Meter	13351	\$280
0.32mm	1.00	-60 to 330/350°C	30-Meter	13354	\$460
0.32mm	1.00	-60 to 330/350°C	60-Meter	13357	\$820
0.53mm	0.50	-60 to 330/350°C	15-Meter	13337	\$310
0.53mm	0.50	-60 to 330/350°C	30-Meter	13340	\$515
0.53mm	1.00	-60 to 330/350°C	15-Meter	13352	\$310
0.53mm	1.00	-60 to 330/350°C	30-Meter	13355	\$515
0.53mm	1.50	-60 to 330/350°C	15-Meter	13367	\$310
0.53mm	1.50	-60 to 330/350°C	30-Meter	13370	\$515
0.53mm	1.50	-60 to 330/350°C	60-Meter	13373	\$880

### restek innovation!

#### The Drilled Uniliner®

To reduce the effects of surface activity in the injection port liner, and focus on the effects of the column on active analytes, we used a Drilled Uniliner® inlet liner for this work. This liner connects directly to the column, eliminating contact between the active compounds and active metal surfaces in the injector, and ensuring an inactive sample pathway for analyte transfer from the injection port to the column.



introducing...

# New Rxi™ GC Column Series

The Ultimate High Performance Fused Silica Capillary Column

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[www.restek.com/rxi](http://www.restek.com/rxi)