

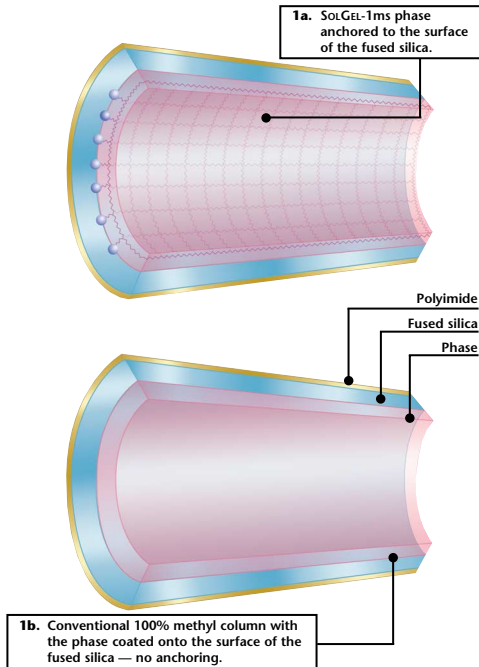
A NEW GENERATION 100% METHYL MS-GRADE COLUMN

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Introduction

SOLGEL-1ms™ is a new technology 100% methyl capillary column. The phase of this column has been custom designed for mass spectroscopy applications but can be used successfully with all other GC detectors. The upper maximum temperature of the column is 380°C and the column has extremely low bleed as shown in Figure 2b at 320°C. This column is a bonded polydimethylsiloxane stationary phase encapsulated in synthetic glass (sol-gel) material and the whole matrix is itself bonded to the surface of the fused silica capillary. The anchoring of the matrix to the glass surface using this unique technology leads to a very inert, high temperature column. The phase is schematically represented in Figure 1.

Figure 1. Schematic representation of SolGEL-1ms.



The low bleed of the SolGEL-1ms column gives rise to better sensitivity (increased signal-to-noise ratio) for compounds eluting at higher oven temperatures (Figure 2a). Also, lower bleed will result in less ion source maintenance of the mass spectrometer due to less phase deposition on mass spectrometer components. A comparison of the bleed of SolGEL-1ms column against a competitor's MS-grade column can be seen in Figure 2b.

Figure 2a. The effect of lower bleed can be seen in better sensitivity using a SolGEL-1ms column.

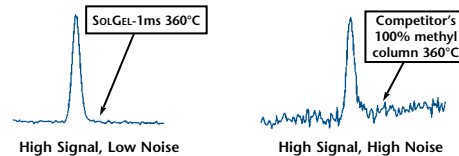
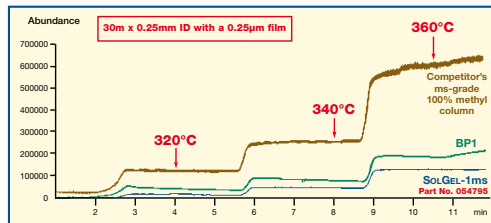


Figure 2b. Bleed profile of a competitor's ms-grade 100% methyl column, BP1 and SolGEL-1ms.

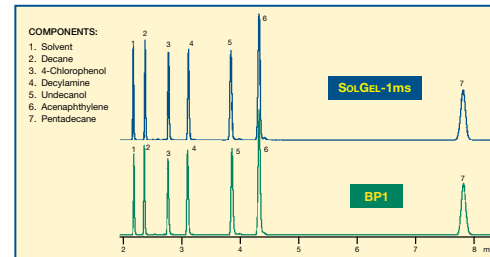


The sol-gel portion of the phase imparts no polarity to the phase. This is important as the column can be easily substituted for any 100% methyl column without a change of elution order. Figure 3 shows a comparison in elution order to a SGE BP1 column which is a conventional 100% methyl column. As can be seen from the chromatogram and the table containing Kovats data, the polarity of the two columns are matched exactly.

Figure 3. Polarity comparison of SolGEL-1ms vs BP1 (100% methyl column).

Phase: SolGEL-1ms, 0.25µm film
Sample: 1000ppm in pentane
Column: 30m x 0.25mm ID
Isothermal Temp: 145°C, 9min
Detector Type: Mass Spectrometer
Carrier Gas: He, 34.5psi
Carrier Gas Flow: 1.6mL/min
Constant Flow: On

Average Linear Velocity: 35cm/sec at 50°C
Injection Mode: Splitless
Purge on Time: 0.5min
Purge on (Split) Vent Flow: 60mL/min
Injection Volume: 1µL
Injection Temperature: 250°C
Autosampler: No
Liner Type: 4mm ID Double Taper Liner



No.	Component	Kovats' Retention Index		
		SolGEL-1ms™	BP1	Competitors 100% methyl polysiloxane
2	Decane	1000	1000	1000
3	4-Chlorophenol	1165	1167	1164
4	Decylamine	1240	1241	1239
5	Undecanol	1357	1358	1356
6	Acenaphthylene	1433	1434	1434
7	Pentadecane	1500	1500	1500

Figure 4. Analysis of Organochlorine Pesticides (OCP) on SolGEL-1ms.

Phase: SolGEL-1ms, 0.25µm film
Sample: 1ppm in Dichloromethane
Column: 30m x 0.25mm ID
Initial Temp: 110°C, 1min
Rate 1: 25°C/min to 150°C
Rate 2: 12°C/min to 260°C
Final Temp: 300°C, 5min
Detector Type: Mass Spectrometer
Carrier Gas: He, 31.6psi
Carrier Gas Flow: 1.7mL/min
Constant Flow: On

Average Linear Velocity: 35cm/sec at 110°C
Injection Mode: Splitless
Purge on Time: 0.5min
Purge on (Split) Vent Flow: 60
Injection Volume: 1µL
Injection Temp: 250°C
Autosampler: No
Liner Type: 4mm ID Single Taper Liner

Liner Part No: 092017
Column Part No: 054795
ms-NoVent Part No: 113400
HP5973 Restrictor: 113409
Full Scan / SIM: Full scan 40-500

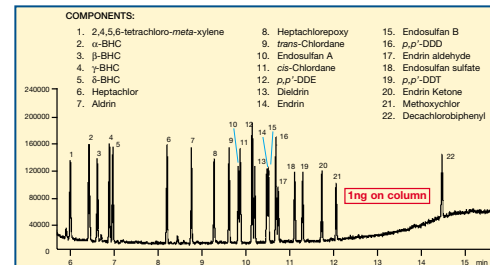
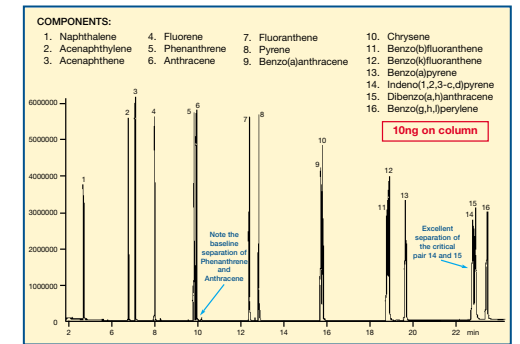


Figure 5. Analysis of Polynuclear Aromatic Hydrocarbons (PAH) on SolGEL-1ms.

Phase: SolGEL-1ms, 0.25µm film
Sample: 100ppm in Dichloromethane
Column: 30m x 0.25mm ID
Initial Temp: 65°C, 1min
Rate 1: 25°C/min to 140°C
Rate 2: 10°C/min to 240°C
Rate 3: 5°C/min to 300°C
Final Temp: 300°C, 2min
Detector Type: Mass Spectrometer
Carrier Gas: He, 27.8psi
Carrier Gas Flow: 1.7mL/min
Constant Flow: On

Average Linear Velocity: 35cm/sec at 65°C
Injection Mode: Split
Split Ratio: 50:1
Injection Volume: 1µL
Injection Temp: 250°C
Autosampler: No
Liner Type: 4mm ID Single Taper Liner

Liner Part No: 092017
Column Part No: 054795
ms-NoVent Part No: 113400
HP5973 Restrictor: 113409
Full Scan / SIM: Full scan 40-500



Figures 4 and 5 show some applications of SolGEL-1ms. Peak shape and bleed, as expected, are excellent on this column. As well as environmental applications, this column is also ideal for:

- Pharmaceuticals
- Food Additives
- Hydrocarbons (petroleum products)



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