TSKgel® SuperMultiporePW Columns

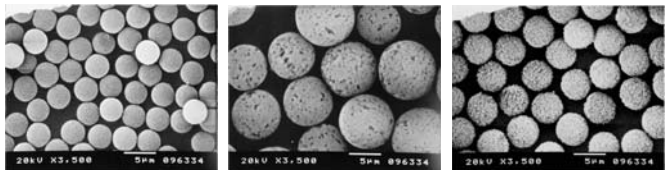
Semi-micro High Efficiency Multipore Gel Filtration Columns for Aqueous Polymer Analysis

TSKgel
PRODUCT OVERVIEW

Introduction

Since many polymers consist of a broad distribution of molecular masses, it usually requires multiple columns packed with different pore size particles to analyze polymer samples. When two (or more) columns of different pore sizes are coupled together, one or more mismatches may show up as inflection points in the chromatogram when the slopes of the individual calibration curves are not identical. To prevent such a mismatch, TSKgel SuperMultiporePW gel filtration columns are packed with particles containing a wide range of pore sizes (see the SEM photographs in *Figure 1*). The extended linear calibration curves of TSKgel SuperMultiporePW columns result in better accuracy when determining molecular mass and molecular mass distribution.

Figure 1.



TSKgel SuperMultiporePW-N | TSKgel SuperMultiporePW-H | TSKgel SuperMultiporePW-M

Three semi-micro (6.0mm ID x 15cm) columns are available within the TSKgel SuperMultiporePW series containing monodisperse 4, 5 or 8µm spherical particles. Each of these columns enables high speed separation with high resolution for aqueous polymers and low solvent consumption compared to conventional GFC columns. In addition, a wide molecular mass range can be analyzed with the three different columns, from high molecular mass aqueous polymers to oligomers. Since TSKgel SuperMultiporePW packings are more hydrophilic compared with the conventional TSKgel PW_{XL} series columns, adsorption of hydrophilic polymers can be avoided.

Product Highlights

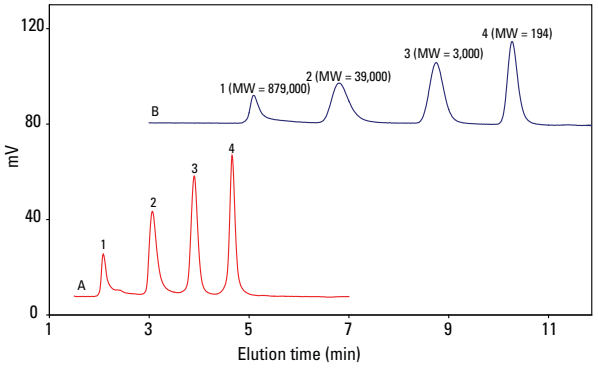
- **Small particle size packed in semi-micro columns: high throughput, high resolution, reduced solvent consumption**
- **Particles synthesized with range of pore sizes: no inflection points in calibration curve**
- **Linear calibration curve: more precise MW measurement**
- **Three columns, varying in linear range, allow separation of wide MW range of aqueous polymers**

Applications

Comparison with conventional GPC columns

A mixture of polyethylene oxide (PEO) and polyethylene glycol (PEG) was analyzed on a semi-micro TSKgel® SuperMultiporePW-M column and on conventional-sized TSKgel $G3000PW_{XL}$ and TSKgel $G5000PW_{XL}$ columns in series. As shown in *Figure 2*, the analysis using the TSKgel SuperMultiporePW-M column was completed in ½ the time and with higher resolution than the analysis performed using the TSKgel $G3000PW_{XL}$ and TSKgel $G5000PW_{XL}$ columns. This is due to the semi-micro dimensions (6.0mm ID x 15cm) and the smaller particle size (4µm) of the TSKgel SuperMultiporePW-M column compared to the 7.8mm ID x 30cm size and 7 and 10µm particle size of the TSKgel $G3000PW_{XL}$ and TSKgel $G5000PW_{XL}$ columns respectively.

Figure 2.



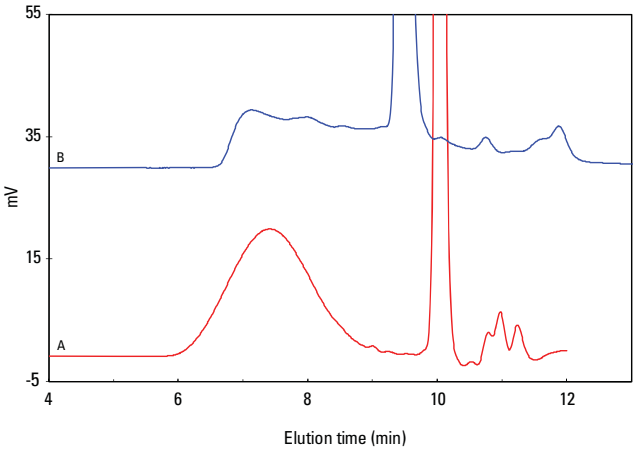
Columns: A: TSKgel SuperMultiporePW-M, 6.0mm ID x 15cm
B: TSKgel $G5000PW_{XL}$ + $G3000PW_{XL}$, each 6.0mm ID x 15cm
Mobile phase: H_2O
Flow rate: 0.6mL/min
Detection: RI
Temperature: 25°C
Injection vol.: A: 20µL B: 100µL
Samples: mixture of PEO and PEG

Resolution	TSKgel PW_{XL}	TSKgel SuperMultiporePW-M
Peak 1/Peak 2	3.45	4.25
Peak 2/Peak 3	3.29	3.17
Peak 3/Peak 4	3.30	3.39

Comparison of analysis of PVP

Figure 3 demonstrates the lower hydrophobicity of the TSKgel SuperMultiporePW columns compared to the conventional TSKgel PW_{XL} columns. Hydrophobic interaction causes partial adsorption of PVP-15 polymer on the TSKgel G3000PW_{XL} and TSKgel G2500PW_{XL} columns, while the absence of adsorption on the TSKgel SuperMultiporePW-N column suggests that the internal particle surface is more hydrophilic than the conventional columns.

Figure 3.



Columns:	A: TSKgel SuperMultiporePW-N, 6.0mm ID x 15cm x 2 B: TSKgel G3000PW_{XL}+G2500PW_{XL}, 6.0mm ID x 15cm x 2
Mobile phase:	100mmol/L $NaNO_3$
Flow rate:	0.60mL/min
Detection:	RI
Temperature:	40°C
Injection vol.:	20µL
Samples:	PVP(K-15)

Ordering Information

Part #	Description	Matrix	Housing	ID (mm)	Length (cm)
22789	TSKgel SuperMultiporePW-N, 4µm	Polymer	Stainless Steel	6	15
22790	TSKgel SuperMultiporePW-M, 5µm	Polymer	Stainless Steel	6	15
22791	TSKgel SuperMultiporePW-H, 8µm	Polymer	Stainless Steel	6	15
22793	TSKgel SuperMP(PW)-N Guard, 5µm	Polymer	Stainless Steel	4.6	3.5
22794	TSKgel SuperMP(PW)-M Guard, 8µm	Polymer	Stainless Steel	4.6	3.5
22795	TSKgel SuperMP(PW)-H Guard, 12µm	Polymer	Stainless Steel	4.6	3.5

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