

Size Exclusion Chromatography Phases (continued)

Polymer-based Phases (PW)

- Hydrophilic, rigid spherical porous methacrylate beads
- Excellent chemical and mechanical stability
- Stable from pH 2 – 12
- Wide molecular weight range
- Temperature stable up to 80°C

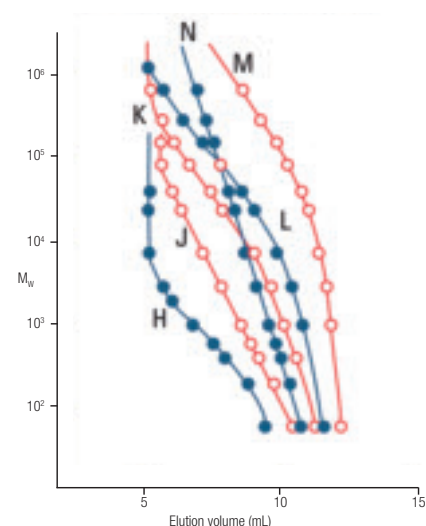
Polymeric TSKgel® PW and PW_{XL} columns are designed for GFC of water soluble organic polymers, polysaccharides, oligosaccharides, DNA and RNA. They are based on a hydrophilic polymethacrylate matrix, which is stable from pH 2 to 12 and in aqueous eluents with up to 50% polar organic solvent.

The TSKgel PW_{XL} range is preferred for analytical purposes, due to increased efficiency and resolution. Figure 2 shows typical polyethylene glycol and oxide calibration curves obtained with TSKgel PW_{XL} columns. For preparative work, the 600mm length TSKgel PW columns are recommended due to their increased loading capacity. The mixed bed TSKgel GMPW and GMPW_{XL} columns are useful for samples with a broad molecular weight range.

TSKgel PW_{XL}-CP columns are especially suited for the separation of cationic polymers (see below).

TSKgel® Polymeric SEC Phases

TSKgel PW Phase	Particle Size (µm)	Pore Size (Å)	Exclusion Limit (Da)	
			Polyethylene glycols and oxides	Dextrans
G1000PW	12	<100	< 1,000	-
G2000PW	12	125	< 2,000	-
G2500PW	12, 17	<200	< 3,000	< 3,000
G3000PW	12, 17	200	< 50,000	-
G4000PW	17	500	< 300,000	-
G5000PW	17	1,000	< 1,000,000	-
G6000PW	17	>1,000	< 8,000,000	-
GMPW	17	<100-1,000	500 – 8,000,000	-
G2500PW _{XL}	7	<200	< 3,000	-
G3000PW _{XL}	7	200	< 50,000	< 60,000
G4000PW _{XL}	10	500	< 30,000	1,000 – 700,000
G5000PW _{XL}	10	1,000	< 1,000,000	50,000 – 2,500,000
G6000PW _{XL}	13	>1,000	< 8,000,000	500,000 – 50,000,000
GMPW _{XL}	13	10-1,000	500 – 8,000,000	< 50,000,000
G3000PW _{XL} -CP	7	200	< 90,000	-
G5000PW _{XL} -CP	10	1,000	< 1,000,000	-
G6000PW _{XL} -CP	13	>1,000	< 20,000,000	-
SuperMultipore PW-N	4	N/A	300 – 50,000	-
SuperMultipore PW-M	5	N/A	500 – 1,000,000	-
SuperMultipore PW-H	8 (6-10)	N/A	1,000 – 10,000,000	-



TSKgel PW_{XL} columns (300 x 7.8mm)
 H: G2500PW_{XL} J: G3000PW_{XL}
 K: G4000PW_{XL} L: G5000PW_{XL}
 M: G6000PW_{XL} N: GMPW_{XL}
 Eluent: Distilled H₂O
 Flow rate: 1.0ml/min

Figure 2. TSKgel PW_{XL} columns

TSKgel PW_{XL}-CP Series

TSKgel PW_{XL}-CP columns are designed to facilitate the separation of water soluble cationic polymers by SEC. They are produced in three different pore sizes for different molecular weight ranges. By incorporating a cationic functionality on the polymethacrylate particle surface, ionic adsorption of the polymers is eliminated. This modification results in high recovery for anionic polymers and enables elution under low salt conditions.

Figure 3 shows successive injections (from red to black traces) of polyallylamine. Similar elution profiles were obtained with no loss of polymer due to adsorption.

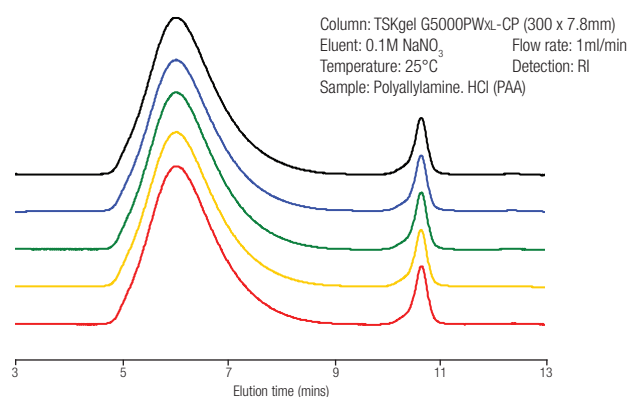


Figure 3. Elution profiles of PAA on TSKgel G5000PW_{XL}-CP

Size Exclusion Chromatography Phases (continued)

Polymer-based Phases (PW) (continued)

TSKgel® SuperMultiporePW Series

TSKgel® SuperMultiporePW columns are packed with monodisperse polymethacrylate particles, each containing a wide range of pore sizes to cover different molecular weight ranges (see Figure 4). Multi-pore particle technology is the best way to achieve near linear SEC calibration curves, without the peak disturbances which typically occur due to a mismatch of pore sizes from coupled columns with different molecular weight ranges. This is illustrated in Figure 5 for the analysis of polyvinylpyrrolidone.

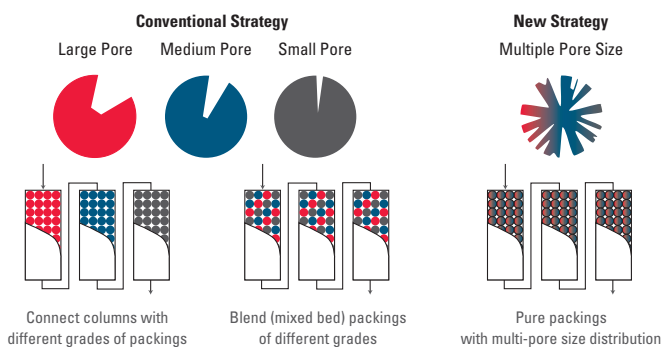


Figure 4. Strategy for wide range separation using SEC

Columns: TSKgel SuperMultiporePW-M (150 x 6.0mm) (red)
 TSKgel G3000PW_{XL} and G5000PW_{XL}
 (each 300 x 7.8mm) in series (blue)
 Eluent: 0.1M NaNO₃
 Flow rate: 0.6ml/min

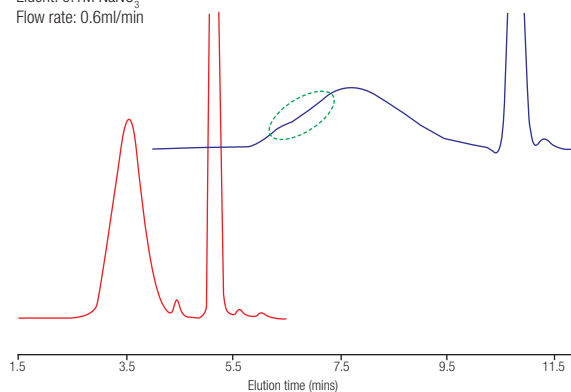


Figure 5. Analysis of polyvinylpyrrolidone

Ordering Information – Polymeric SEC Phases

TSKgel PW Phase	Column Dimensions (mm)					Guard Column	
	Analytical			Preparative		Analytical	Preparative
	150 x 6.0	300 x 7.5	300 x 7.8	600 x 7.5	600 x 21.5		
G1000PW	-	5760	-	-	-	6763 ¹	-
G2000PW	-	5761	-	5105	-	6762 ¹	6758 ⁵
G3000PW	-	5762	-	5106	-		
G4000PW	-	5763	-	5107	-		
G5000PW	-	5764	-	5108	-		
G6000PW	-	5765	-	5109	-		
G2500PW	-	8028	-	8029	8030 (17µm)		
GMPW	-	8026	-	8027	-		
G2500PW _{XL}	-	-	8020	-	-		
G3000PW _{XL}	-	-	8021	-	-		
G4000PW _{XL}	-	-	8022	-	-		
G5000PW _{XL}	-	-	8023	-	-		
G6000PW _{XL}	-	-	8024	-	-		
GMPW _{XL}	-	-	8025	-	-		
G3000PW _{XL} -CP	-	-	21873	-	-	21876 ³	
G5000PW _{XL} -CP	-	-	21874	-	-		
G6000PW _{XL} -CP	-	-	21875	-	-		
SuperMultipore PW-N	22789	-	-	-	-	22793 ⁴	
SuperMultipore PW-M	22790	-	-	-	-	22794 ⁴	
SuperMultipore PW-H	22791	-	-	-	-	22795 ⁴	

¹ 13µm. Dimensions 75 x 7.5mm ² 12µm. Dimensions 40 x 6.0mm ³ 13µm. Dimensions 40 x 6.0mm ⁴ Dimensions 35 x 4.6mm ⁵ 17µm. Dimensions 40 x 6.0mm