



# TSK-GEL® PWXL-CP

Size Exclusion Chromatography Columns for Cationic Polymer Analysis

## PRODUCT HIGHLIGHTS

- ❖ High recoveries for cationic polymers (see Table 2)
- ❖ High reproducibility over time without adsorption (see Figure 1)
- ❖ Column offering allows separation of wide MW range of polymers
- ❖ Elution under low salt conditions

## INTRODUCTION

TSK-GEL PWXL-CP size exclusion columns were specifically developed for the analysis of water soluble cationic polymers. Three columns are available within the TSK-GEL PWXL-CP series, each with a different particle size, separation range and exclusion limit, allowing polymers within a wide molecular mass range to be separated and characterized.

The analysis of cationic polymers requires a high salt concentration in the mobile phase to prevent adsorption of the polymers onto the particles in SEC columns. As a result, many polymer researchers encounter low recovery when analyzing cationic polymers, as well as poor reproducibility from run to run.

The TSK-GEL PWXL-CP columns eliminate ionic adsorption onto the particle by incorporating a cationic functionality on the particle surface. This modification results in high recovery for cationic polymers and enables elution under low salt conditions.

## PROPERTIES OF TSK-GEL PWXL-CP COLUMNS

	G3000 PWXL-CP	G5000 PWXL-CP	G6000 PWXL-CP
Base material	Poly methacrylate	Poly methacrylate	Poly methacrylate
Particle size	7 µm	10 µm	13 µm
Exclusion limit (Da)	100 000	1 000 000	20 000 000
Separation range (Da), (PEO, PEG)	200 - 50 000	400 - 500 000	1 000 - 10 000 000
Theoretical plates	16 000	10 000	7 000

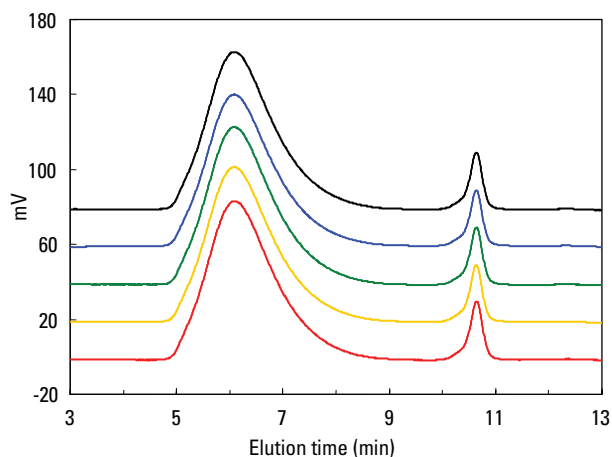
➤ **TABLE 1**

Column	Recovery
G3000 PWXL-CP	100,2%
G5000 PWXL-CP	98,8%
G6000 PWXL-CP	97,4%

➤ **TABLE 2**

These columns show high theoretical plate values, linear calibration curves and high durability because the base resin is the same as that used in the TSK-GEL PWXL series columns.

PAA was injected onto a TSKgel G5000PWXL-CP column. Each chromatogram, from the first injection (red) to the fifth injection (black), showed similar elution profiles without any adsorption of the polymer.

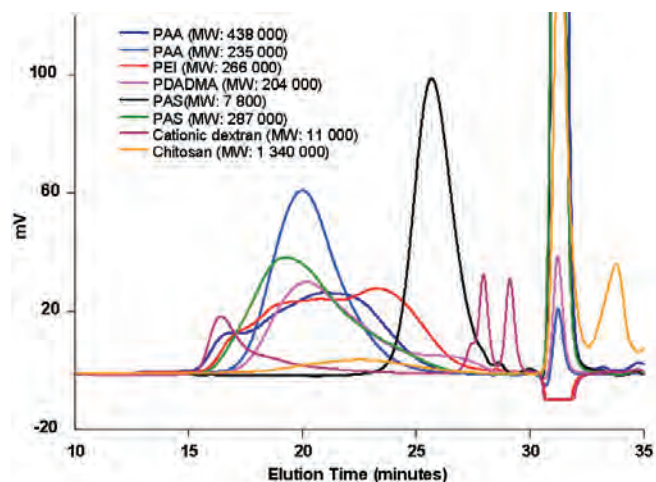


➤ **FIGURE 1**

Column: TSKgel G5000PWXL-CP  
 Eluent: 0.1 mol/l NaNO<sub>3</sub>  
 Flow rate: 1.0 ml/min  
 Detection: RI  
 Temperature: 25°C  
 Sample: polyallyamine-HCl (PAA)  
 Sample load: 3 g/l, 100 µl

## Application

Various cationic polymers with different functional groups and molecular weights were injected on the TSK-GEL PWXL-CP columns (TSKgel G6000PWXL-CP, G5000PWXL-CP and G3000PWXL-CP, connected in series). Figure 2 demonstrates that these new SEC columns can be utilized for the analysis of a wide variety of cationic polymers.



➤ **FIGURE 2**

Column: TSKgel G3000PWXL-CP, 7  $\mu$ m,  
7.8 mm ID X 30 cm L  
TSKgel G5000PWXL-CP, 10  $\mu$ m,  
7.8 mm ID X 30 cm L  
TSKgel G6000PWXL-CP, 13  $\mu$ m,  
7.8 mm ID X  
30 cm L  
Eluent: 0.1 mol/l NaNO<sub>3</sub>  
Flow rate: 1.0 ml/min  
Detection: RI  
Temp.: 25°C  
Sample load: 3 g/l, 100  $\mu$ l

**For further details of choice and selection of the TSK-GEL® column  
that best suits your particular process purification needs,  
please contact us:**

**Tel. + 49 (0) 711 13257 0**

**or**

**info.sep.eu@tosoh.com**

**or**

**www.tskgel.com**

## Ordering information

### TSKgel PWXL-CP

Part-No	Description	Matrix	Housing	Dimensions
21873	TSKgel G3000PWXL-CP, 7 $\mu$ m, 200 Å	Polymer	Stainless steel	7.8 mm ID x 30 cm L
21874	TSKgel G5000PWXL-CP, 10 $\mu$ m, 200 Å	Polymer	Stainless steel	7.8 mm ID x 30 cm L
21875	TSKgel G6000PWXL-CP, 13 $\mu$ m, 200 Å	Polymer	Stainless steel	7.8 mm ID x 30 cm L
21876	TSKgel PWXL-CP Guardcolumn	Polymer	Stainless steel	6.0 mm ID x 4.0 cm L