

The TSK-GEL column line for gel filtration chromatography consists of two column types: TSK-GEL SW and TSK-GEL PW columns. TSK-GEL SW and TSK-GEL SW_{XL} columns contain silica-based, hydrophilic bonded phase packings that permit minimal interaction with protein samples. Polymer-based TSK-

GEL PW and TSK-GEL PW_{XL} columns are most suitable for analyzing water-soluble polymers, including oligosaccharides and many synthetic polymers. The table shows how to select the appropriate column for your sample.

TSK-GEL Column Selection Guide for High Performance GFC

Sample		Recommended TSK-GEL Column		Point in Selection
		First Choice	Second Choice	
Carbohydrates	polysaccharides	GMPW _{XL}	G5000PW _{XL} + G3000PW _{XL}	large pore size linear calibration curve
	oligosaccharides	G-Oligo-PW	G2000PW	resolving power
Nucleic acids	large DNA fragments	G-DNA-PW G5000PW _{XL}		large pore size resolving power
	medium & small DNA fragments	G4000SW _{XL} G3000SW _{XL}		suitable pore size resolving power
	RNA	G4000SW _{XL} G3000SW	G3000PW _{XL}	suitable pore size resolving power
	oligonucleotides	G2500PW _{XL}		small pore size ionic interaction
Proteins	normal size	G3000SW _{XL} G4000SW _{XL} G2000SW _{XL}	G3000PW _{XL} G4000PW _{XL}	resolving power
	large (low density lipoprotein)	G6000PW _{XL} G5000PW _{XL}		large pore size resolving power
	large (gelatin)	G5000PW _{XL} + G3000PW _{XL}	GMPW _{XL}	large pore size linear calibration curve
Peptides	large	G3000SW _{XL} G2000SW _{XL}	G3000PW _{XL}	
	small	G2500PW _{XL}	G2000SW _{XL}	linear calibration curve resolving power
Virus		G6000PW _{XL} G5000PW _{XL}	G4000SW _{XL}	large pore size resolving power
Synthetic polymers		GMPW _{XL}	G5000PW _{XL} + G3000PW _{XL}	large pore size linear calibration curve low adsorption
Synthetic oligomers	nonionic, cationic	G-Oligo-PW	G2500PW _{XL}	small pore size
	anionic	G2500PW _{XL}		resolving power ionic interaction

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TSK-GEL SW and TSK-GEL SW_{XL} columns are widely used for high performance separations of proteins by gel filtration chromatography. TSK-GEL SW columns contain spherical 10µm particles with 125, 250, or 450 angstrom pores. The standard column length is 30cm, but 60cm columns are available, to double column efficiency (which translates into a 1.4-fold improvement in sample resolution).

Results the same as, or similar to, results obtained on a 60cm TSK-GEL SW column can be achieved with a 30cm TSK-GEL SW_{XL} column packed with 5µm particles. TSK-GEL SW_{XL} columns also have nominal pore sizes of 125, 250, and 450 angstroms. Other properties of these popular protein gel filtration columns are shown in Table 1 (next page). A comparison of the resolution of common enzymes on 60cm TSK-GEL SW and 30cm TSK-GEL SW_{XL} columns is shown in Figure A. Better or comparable resolution is achieved in about half the analysis time by using an SW_{XL} column.

Protein calibration curves for the TSK-GEL SW_{XL} columns are shown in Figure B. Sample capacity for TSKgel G3000SW and TSKgel G3000SW_{XL} columns is displayed in Figure C. Approximately 1mg of BSA can be injected per 30cm of column before overloading significantly reduces efficiency, as expressed by the change in HETP (column length/plate number). The data in Table 2 demonstrate quantitative mass recovery on a TSKgel G3000SW_{XL} column. In general, recovery depends on the amount of protein injected, analysis conditions, and the column's history.

Because TSK-GEL SW and TSK-GEL SW_{XL} columns are silica-based, they must not be operated outside the recommended pH range of 2.5-7.5. Detailed operating conditions are described in the information accompanying the columns. We recommend protecting these columns with the appropriate SW or SW_{XL} guard column.

Figure A. Comparative Resolution on TSK-GEL SW and TSK-GEL SW_{XL} Columns

Column: **G2000SW**, 60cm x 7.5mm, 10µm particles
Cat. No.: **8-05102**

Column: **G3000SW**, 60cm x 7.5mm, 10µm particles
Cat. No.: **8-05103**

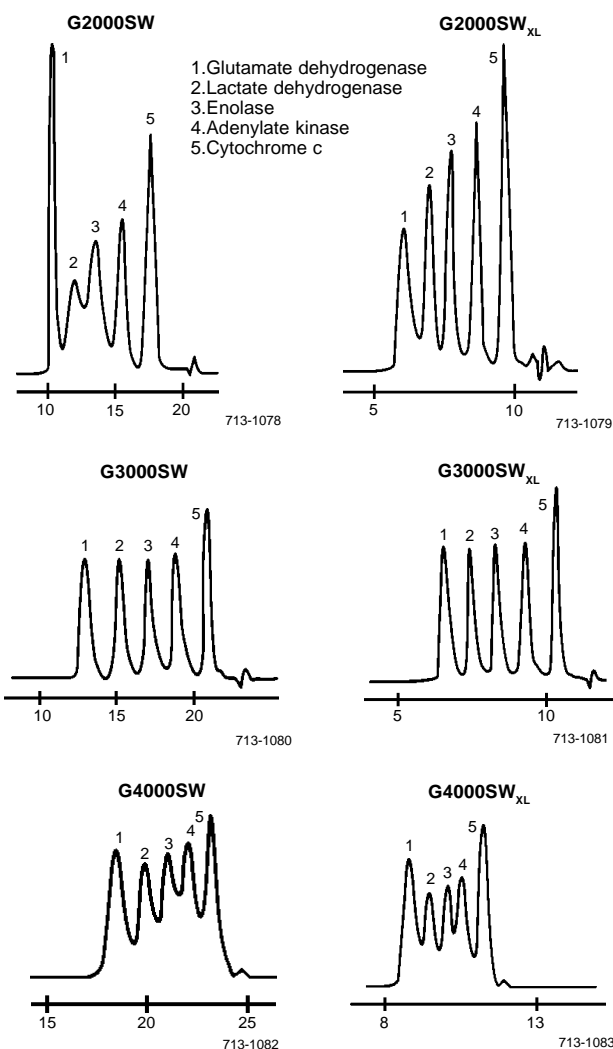
Column: **G4000SW**, 60cm x 7.5mm, 13µm particles
Cat. No.: **8-05104**

Column: **G2000SW_{XL}**, 30cm x 7.8mm, 5µm particles
Cat. No.: **8-08540**

Column: **G3000SW_{XL}**, 30cm x 7.8mm, 5µm particles
Cat. No.: **8-08541**

Column: **G4000SW_{XL}**, 30cm x 7.8mm, 8µm particles
Cat. No.: **8-08542**

Mobile Phase: 0.3M NaCl in 0.05M phosphate buffer, pH 6.9
Flow Rate: 1mL/min
Det.: UV, 220nm



FAX: 800-447-3044 or 814-359-3044

Table 1. Characteristics of TSK-GEL SW and TSK-GEL SW_{XL} Columns

Column	Particle Size (µm)	Pore Size (Å)	Sample MW (globular proteins)
G2000SW _{XL}	5	125	5000 - 150,000
G2000SW	10	125	5000 - 100,000
G3000SW _{XL}	5	250	10,000 - 500,000
G3000SW	10	250	10,000 - 500,000
G4000SW _{XL}	8	450	20,000 - 10,000,000
G4000SW	13	450	20,000 - 10,000,000

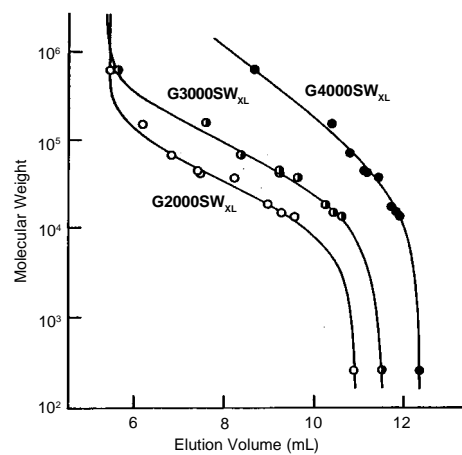
Mobile Phase: 0.03M NaCl in 0.1M phosphate buffer, pH 7.0

Table 2. Protein Mass Recovery from a TSKgel G3000SW_{XL} Column

Protein	Recovery (%)
Cytochrome c	107
Ribonuclease A	97
Lysozyme	108
Myoglobin	92
Trypsin Inhibitor	102
α-Chymotrypsinogen A	99
γ-Globulin	97
Thyroglobulin	101

Figure B. Protein Calibration Curves for TSK-GEL SW_{XL} Columns

Columns: 30cm x 7.8mm
 Mobile Phase: 0.3M NaCl in 0.05M phosphate buffer, pH 7.0
 Flow Rate: 1mL/min
 Det.: UV, 220nm
 Inj.: 10µg



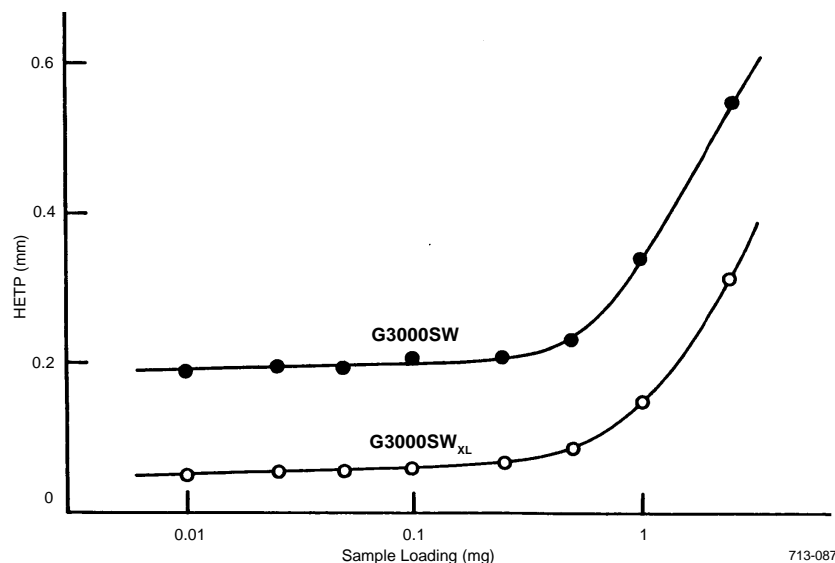
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Figure C. Effect of Sample Load on Plate Height for TSK-GEL SW and TSK-GEL SW_{XL} Columns

Column: SW, 30cm x 7.5mm,
 10µm particles
 Cat. No.: 8-05789

Column: SW_{XL}, 30cm x 7.8mm,
 5µm particles
 Cat. No.: 8-08541

Mobile Phase: 0.3M NaCl in 0.05M phosphate buffer, pH 7.0
 Flow Rate: 1mL/min
 Temp.: 25°C
 Det.: UV, 220nm
 Inj.: bovine serum albumin in 100µL mobile phase



713-0871

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TSK-GEL SW & SW_{XL} Silica-Based Columns

Column	Packing Particle Size (µm)	Column Dimensions		Cat. No.
		Length (cm)	Diameter (mm)	
TSKgel G2000SW _{XL}	5	30	7.8	8-08540
TSKgel G3000SW _{XL}	5	30	7.8	8-08541
TSKgel G4000SW _{XL}	8	30	7.8	8-08542
TSKgel SW _{XL} guard column	7	4.0	6.0	8-08543
TSKgel SW _{XL} packing (1g)	5	—	—	8-08544
TSKgel G2000SW	10	30	7.5	8-05788
TSKgel G2000SW	10	60	7.5	8-05102
TSKgel G3000SW	10	30	7.5	8-05789
TSKgel G3000SW	10	60	7.5	8-05103
TSKgel G4000SW	13	30	7.5	8-05790
TSKgel G4000SW	13	60	7.5	8-05104
TSKgel SW guard column	10	7.5	7.5	8-05371
TSKgel SW packing (1g)	10	—	—	8-06819
TSKgel QC-PAK GFC200 (stainless steel)	5	15	7.8	8-16215
TSKgel QC-PAK GFC200GL (glass)	5	15	8.0	8-16214
TSKgel QC-PAK GFC300 (stainless steel)	5	15	7.8	8-16049
TSKgel QC-PAK GFC300GL (glass)	5	15	8.0	8-16216

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