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## OPERATING CONDITIONS and SPECIFICATIONS

### TSK-GEL® SP-5PW Products

<b>Analytical/Semi-Prep:</b>	18758	2.0 mm ID x 7.5 cm L		<b>10 µm</b>
	07161	7.5 mm ID x 7.5 cm L		<b>10 µm</b>
	07211		Guardgel Kit for PN 07161	<b>20 µm</b>
	07575	21.5 mm ID x 15.0 cm L		<b>13 µm</b>
	16093		Prep Guardgel Kit for PN 07575	<b>20 µm</b>
	13062	5.0 mm ID x 5.0 cm L	Glass	<b>10 µm</b>
	08803	8.0 mm ID x 7.5 cm L	Glass	<b>10 µm</b>
	08807		Guardgel Kit Glass for PN 13062 & 08803	<b>20 µm</b>
	14017	20.0 mm ID x 15.0 cm L	Glass	<b>13 µm</b>
	14467	20.0 mm ID x 2.0 cm L	Guardcolumn, ,Glass for 14017	<b>13 µm</b>
	<b>Preparative Columns:</b>	07934	55.0 mm ID x 20.0 cm L	
07932		45.0 mm ID x 5.0 cm L	Guardcolumn for PN 07934	<b>20 µm</b>
<b>Small Ion Capacity:</b>		>0.1meq/ml	<b>Counter Ion: Na<sup>+</sup></b>	

This sheet contains the recommended operating conditions and the specifications for TSK-GEL SP-5PW columns and guard columns. Installation instructions and column care information are described in a separate Instruction Manual.

#### A. OPERATING CONDITIONS

- Shipping Solvent: Distilled and Deionized Water
- Max.Flow Rate:
 

0.12 ml/min	2.0 mm ID x 7.5 cm L
1.0 ml/min	5.0 mm ID x 5.0 cm L, Glass
1.2 ml/min	7.5 mm ID x 7.5 cm L and 8.0 mm ID x 7.5 cm L Glass
8.0 ml/min	21.5 mm ID x 15.0 cm L and 20.0 mm ID x 15.0 cm L, Glass
50 and 150 ml/min	for 55.0 mm and 108.0 mm ID respectively.

**NOTE:** When changing solvents, use a flow rate equal to 50% of the maximum flow rate (20% for prep columns).

- Standard Flow Rate:
 

0.05 - 0.10 ml/min	2.0 mm ID x 7.5 cm L
0.50 - 0.80 ml/min	5.0 mm ID x 5.0 cm L, Glass
0.50 - 1.00 ml/min	7.5 mm ID x 7.5 cm L and 8.0 mm ID x 7.5 cm L Glass
4.00 - 6.00 ml/min	21.5 mm ID x 15.0 cm L and 20.0 mm ID x 15.0 cm L, Glass
20.00 - 40.00 ml/min	55.0 mm ID
70.00 - 120.00 ml/min	108.0 mm ID
- Max. Pressure:
 

10 kg/cm <sup>2</sup> = 150 psi	8.0 mm ID x 7.5 cm L and 2.0 mm ID x 7.5 cm L
15 kg/cm <sup>2</sup> = 215 psi	7.5 mm ID, 5.0 mm ID Glass and 20.0 mm ID Glass
25 kg/cm <sup>2</sup> = 350 psi	21.5 mm ID x 15.0 cm L
4 kg/cm <sup>2</sup> = 57 psi	55.0 mm and 108.0 mm ID
- pH Range: 2.0 - 12.0
- Salt Conc.: < 1.0 Molar
- Organic Conc.: ≤ 20%
- Temperature: 10 - 45 °C Reduce flow rate when operating below 10 °C.

9. Cleaning Solvents: (1) 0.1 - 0.2 M NaOH, and, if not successful,  
 (2) 20 - 40% acetic acid aq., or  
 (3) Aqueous buffer in organic solvent, or, if nothing else was successful,  
 (4) Urea or nonionic surfactant in buffer.
- NOTE:** Clean the column regularly by injecting up to one column volume of 0.1 - 0.2 N NaOH in 250 $\mu$ l increments.  
 Use proportionally larger volumes for (semi-) prep columns.
10. Storage: Store the column in DI water when it will not be used the next day or 20% ethanol or methanol in DI water for longer term storage. For overnight storage flush the column with the low salt concentration mobile phase at low flow rate. Prevent air from entering the column!
11. Column Protection: The use of guard columns is recommended to prolong the life of the analytical column. Guard column life depends greatly on sample cleanliness. As a general rule, guard columns should be replaced when the peaks become excessively wide, or when the peaks show splitting.

## B. SPECIFICATIONS

The performance of TSK-GEL SP-5PW columns is tested under the conditions described in the Data Sheet. All columns have passed the following quality control specifications

Number of Theoretical Plates (N):	$\geq$	700	5.0 mm ID Glass
	$\geq$	1,300	7.5 mm ID, 8.0 mm ID Glass and 2.0 mm ID
	$\geq$	3,000	21.5 mm ID and 20.0 mm ID Glass
	$\geq$	1,500	55.0 mm ID and 108.0 mm ID
Asymmetry Factor (AF):		0.8 - 1.6	for all analytical/semi-prep columns; no spec for prep columns