OPERATING CONDITIONS and SPECIFICATIONS

TSK-GEL® SP-5PW Products

Analytical/Semi-Prep:	18758, 2.0mm ID x 7.5cm, 10μm	42153, Guard Cartridge, 2mm ID x 1cm, 10μm
		19308, Guard Cartridge Holder, for 2mm ID cartridges
	13062, 5.0mm ID Glass x 5cm, 10μm	08807, Guardgel Kit ,Glass for PN 13062 & 08803, 20μm
	08803, 8.0mm ID Glass x 7.5cm, 10μm	
	07161, 7.5mm ID x 7.5cm, 10μm	07211, Guardgel Kit for PN 07161, 20μ
	14017, 20.0mm ID Glass x 15cm, 13μm	14467, Guardcolumn 20mm ID Glass x 2cm for 14017, 20μm
	07575, 21.5mm ID x 15cm, 13μm	16093, Prep Guardgel Kit for PN 07575, 20μm
Preparative Columns:	07934, 55mm ID x 20cm, 20μm	07932, Guardcolumn, 45mm ID x 5cm, for PN 07934, 20μ
Small Ion Capacity:	> 0.1 meq/ml	14594, Pre-injector membrane filter holder, SS
Counter Ion:	Na^+	03409, 13mm Nylon Membrane filter, 0.45μm, for PN 14594

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

1. Shipping Solvent: Distilled and Deionized Water

2. Max. Flow Rate:
   0.12mL/min (2.0mm ID x 7.5cm)
   1.0 mL/min (5.0mm ID Glass x 5.0cm)
   1.2 mL/min (7.5mm ID x 7.5cm and 8.0mm ID Glass x 7.5cm)
   8.0 mL/min (21.5mm ID x 15cm and 20mm ID Glass x 15cm)

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

3. Standard Flow Rate:
   0.05 - 0.10 mL/min (2.0mm ID x 7.5cm)
   0.5 - 0.8 mL/min (5.0mm ID Glass x 5.0cm)
   0.5 - 1.0 mL/min (7.5mm ID x 7.5cm and 8.0mm ID Glass x 7.5cm)
   4.0 - 6.0 mL/min (21.5mm ID x 15cm and 20mm ID Glass x 15cm)

4. Max. Pressure:
   10 MPa (8.0mm ID x 7.5cm and 2.0mm ID x 7.5cm)
   15 MPa (7.5mm ID, 5.0mm ID Glass and 20.0mm ID Glass)
   25 MPa (21.5mm ID x 15cm)

5. pH Range: 2.0 - 12.0

6. Salt Conc.: $<$ 1.0 mol/L

7. Organic Conc.: $\leq$ 20%

8. Temperature: 10 - 45 °C Reduce flow rate when operating below 10 °C.

9. Cleaning Solvents:
   (1) 0.1 - 0.2mol/L NaOH, and, if not successful,
   (2) 20 - 40% acetic acid aq., or
   (3) Aqueous buffer in organic solvent, or
   (4) Urea or nonionic surfactant in buffer.

   NOTE: Clean the column regularly by injecting up to one column volume of 0.1 - 0.2mol/L NaOH in 250μl 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:

1. Number of Theoretical Plates (N):
   $\geq$ 700 (5mm ID Glass)
   $\geq$ 1,300 (7.5mm ID, 8.0mm ID Glass and 2.0mm ID)
   $\geq$ 3,000 (21.5mm ID and 20.0mm ID Glass)

2. Asymmetry Factor (AF): 0.8 - 1.6 (for all analytical/semi-prep columns; no spec for prep columns)