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## OPERATING CONDITIONS and SPECIFICATIONS

### TSK-GEL® CM-5PW Products

<b>Analytical/Semi-Prep:</b>	13068	7.5 mm ID x 7.5 cm L		<b>10 µm</b>
	13069		Guardgel Kit	
	14021	21.5 mm ID x 15.0 cm L		<b>13 µm</b>
	02421		Prep Guardgel Kit for PN 14021	
	14010	5.0 mm ID x 5.0 cm L	Glass	<b>10 µm</b>
	14024		Guardgel Kit Glass	
	14011	8.0 mm ID x 7.5 cm L	Glass	<b>10 µm</b>
	14012	20.0 mm ID x 15.0 cm L	Glass	<b>13 µm</b>
	14468	20.0 mm ID x 2.0 cm L	Guardcolumn Glass	<b>13 µm</b>

**Small Ion Capacity:** > 0.1 meq/ml      **Counter Ion:** Na<sup>+</sup>

This sheet contains the recommended operating conditions and the specifications for TSK-GEL CM-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:
 

1.0 ml/min	5.0 mm ID x 5.0 cm L
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

**NOTE:** When a buffer with high viscosity is used, the maximum flow rate may have to be reduced so as not to exceed the maximum pressure drop. When changing solvents, use a flow rate equal to 25% of the maximum flow rate.
  
3. Standard Flow Rate:
 

0.5 - 0.8 ml/min	5.0 mm ID x 5.0 cm L
0.5 - 1.0 ml/min	7.5 mm ID x 7.5 cm L and 8.0 mm ID x 7.5 cm L Glass
4.0 - 6.0 ml/min	21.5 mm ID x 15.0 cm L and 20.0 mm ID x 15.0 cm L Glass
  
4. 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
  
5. pH Range: 2.0 - 12.0
  
6. Salt Conc.: ≤ 0.5 Molar
  
7. Organic Conc.: ≤ 20%
  
8. Temperature: ≤ 30°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 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 CM-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):	≥ 700	5.0 mm ID Glass
	≥ 1,300	7.5 mm ID, 8.0 mm ID Glass and 2.0 mm ID
	≥ 2,500	21.5 mm ID and 20.0 mm ID Glass
Asymmetry Factor (AF):	0.8 - 1.6	