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## OPERATING CONDITIONS and SPECIFICATIONS

### TSKgel® UP-SW3000-LS Products

<b>Part Numbers:</b>	0023546	4.6 mm ID x 15.0 cm L	<b>TSKgel</b> UP-SW3000-LS	<b>2.0 µm</b>
	0023547	4.6 mm ID x 30.0 cm L	<b>TSKgel</b> UP-SW3000-LS	<b>2.0 µm</b>
<b>Guardcolumn:</b>	0023549	4.6 mm ID x 2.0 cm L	<b>TSKgel</b> Guard Column DC*	<b>2.0 µm</b>
	0023548	4.6 mm ID x 2.0 cm L	<b>TSKgel</b> Guard Column	<b>2.0 µm</b>

Both guard columns can be connected to either analytical column

\*The DC guard column can be directly connected to the analytical column without tubing between the two columns. A male-type outlet endfitting on the guard column enables the direct connection to the analytical column.

This sheet contains the recommended operating conditions and the specifications for **TSKgel UP-SW3000-LS** columns and guard columns. Installation instructions and column care information are described in a separate Instruction Manual.

#### A. OPERATING CONDITIONS

- Shipping Solvent: 20% Ethanol
- Standard Flow Rate: 0.10 - 0.35 mL/min
- Max. Flow Rate: 0.50 mL/min 15 cm Length  
0.35 mL/min 30 cm Length
- Max. Pressure: 25 MPa 15 cm Length  
34 MPa 30 cm Length
- Temperature: 10 – 30 °C Reduce flow rate when operating below 10° C
- pH Range: 2.5 – 7.5
- Organic Conc.: 0 - 30% for aqueous soluble organic solvents such as methanol or acetonitrile. Make gradual solvent changes using a shallow gradient at low flow rate.
- Cleaning Solvents
  - Turn the column in reverse flow direction and run at half the maximum flow rate
  - Clean with 5 column volumes (CV) of 1 mol/L sodium chloride, pH 7.0
  - Clean with 5CV of ultra-pure water.
  - Clean with 5CV of 20% acetonitrile.
  - Clean with 5CV of ultra-pure water.
  - Turn column in normal flow direction and equilibrate in mobile phase for at least 45 minutes
- Note:** Use the solvent replacement flow rate during cleaning and when replacing with the shipping solvent.  
Clean the columns with 5 to 10 column volume of cleaning solvents
  - Procedure:
    - After disconnecting the column from the instrument, wash the instrument tubing with distilled water or ion exchange water.
    - Replace the column contents with the shipping solvent, disconnect the column from the instrument, seal both ends with the end plugs, and store.
    - When not using TSKgel UP-SW3000-LS for more than 4 days after stopping pumping, store column with the shipping solvent. Accumulation of salt crystals or bacterial substances from the solvent used in the column may increase the noise in light scattering measurements

Use the solvent replacement flow rate during cleaning and when replacing with the shipping solvent.

  - Storage temperature: 15 to 30°C
- Column Protection: The use of guard columns is recommended to prolong the life of the analytical column. Guard column life depends greatly on various factors, including sample properties, sample loading, solvents, etc. As a general rule, guard columns should be replaced when there is an increase in pressure to some extent, when the peaks become excessively wide or when the peaks show splitting.

## B. SPECIFICATIONS

The performance of **TSKgel UP-SW3000-LS** 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):	$\geq$	25,000	4.6 mm ID x 15.0 cm L
	$\geq$	45,000	4.6 mm ID x 30.0 cm L

Asymmetry Factor (AF):		0.90 – 1.50	4.6 mm ID x 15.0 cm L
		0.90 – 1.50	4.6 mm ID x 30.0 cm L