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## OPERATING CONDITIONS and SPECIFICATIONS

### TSK-GEL® Super HZ1000 Products

<b>Part Numbers:</b>	19309	4.6 mm ID x 15.0 cm L	TSKgel Super HZ1000	<b>3 µm</b>
	19302	6.0 mm ID x 15.0 cm L	TSKgel Super HZ1000	<b>3 µm</b>
	19314	4.6 mm ID x 2.0 cm L	Guard column SuperHZ-L	<b>4 µm</b>
	19666	4.6 mm ID x 3.5 cm L	Guard column SuperHZ-L	<b>4 µm</b>

This sheet contains the recommended operating conditions and the specifications for TSK-GEL Super HZ1000 columns and guard columns. SuperHZ type columns are used exclusively for Gel Permeation Chromatography and require a micro LC system. Installation instructions and column care information are described in a separate Instruction Manual.

#### A. OPERATING CONDITIONS

1 Shipping Solvent: Tetrahydrofuran (THF)  
Chloroform  
Dimethylformamide  
Cyclohexane  
AK-225

2 Max.Flow Rate: 0.40 ml/min for 4.6 mm ID columns  
0.70 ml/min for 6.0 mm ID columns

**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: 0.15 – 0.35 ml/min for 4.6 mm ID columns  
0.25 – 0.60 ml/min for 6.0 mm ID columns

4 Max. Pressure: 60 kg/cm<sup>2</sup> = 900 psi

5 Multiple Columns: Columns of the same or different pore size are often connected in series to improve resolution and/or to expand the linear portion of the calibration curve. Connect the columns in order of decreasing pore size to avoid overloading from the high MW components. Connect analytical columns using short pieces of 1/16" x 0.01" ID stainless steel tubing.

6 Compatible Solvents.: If shipping solvent is Tetrahydrofuran:  
Benzene, Toluene, Xylene, Dichloroethane and Dichloromethane

If shipping solvent is Chloroform, Dimethylformamide, Cyclohexane or AK-225:  
**NONE**

**Important:** Replacement to a different organic solvent must only be a one way solvent change  
During replacement flow rate should not exceed 0.1 ml/min

7 Temperature.: 25 – 60°C

8 Sample Size: 10 µl for 4.6 mm ID columns  
20 µl for 6.0 mm ID columns  
Concentration 0.5 - 10 g/L for samples with MW 1,000 - 1,000,000

9 Storage: The column can be left overnight in solvent in the LC system. When it will not be used for longer periods of time, remove the column from the equipment, seal the ends with the provided protective screws, and store it at laboratory temperature. At all times, prevent air from entering the column!

10 Column Protection: The use of guard columns is recommended to prolong the life of the analytical column. Guard columns are not for analysis, they do not improve resolution when connected to the main column. They are also not a substitute for filtering the mobile phase and the sample. A guard column does reduce pump pulsation, and further protects the main column by collecting highly adsorptive components and insoluble substances. 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 HZ1000 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):     $\geq$    16,000

Asymmetry Factor (AF):               0.7-1.4