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## OPERATING CONDITIONS and SPECIFICATIONS

### TSKgel® HHR-HT Products

<b>Part Numbers:</b>	0018393	7.8 mm ID x 30.0 cm L	GMHHR-H(S)HT	<b>13 µm</b>
	0018397	7.5 mm ID x 7.5 cm L	GMHHR-H(S)HT Guard column	<b>30 µm</b>
	0018391	7.8 mm ID x 30.0 cm L	GMHHR-H(30)HT	<b>30 µm</b>
	0018392	7.8 mm ID x 30.0 cm L	GMHHR-H(20)HT	<b>20 µm</b>

This sheet contains the recommended operating conditions and the specifications for **TSKgel** G2000HHR-HT, and GMHHR-HT columns. GMHHR-HT columns are mixed-bed columns. They are prepared by combining packings of various pore sizes to obtain a column that has a linear calibration curve that spans a very wide molecular weight range. The HT columns are used exclusively for high temperature Gel Permeation Chromotography with o-dichlorobenzene as the mobile phase. Installation instructions and column care information are described in a separate Instruction Manual.

#### A. OPERATING CONDITIONS

- Shipping Solvent: o-dichlorobenzene (ODCB)
- Max.Flow Rate: 2.5 mL/min HHT + H(S) HT  
**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.
- Standard Flow Rate: 0.5 - 1.0 mL/min HHT + H(S) HT
- Max. Pressure: 2 MPa H(S) HT
- 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.
- Solvents: HT columns are only available packed in o-dichlorobenzene (ODCB), although other H-type columns are available packed in ODCB.
- Temperature: HT columns can be operated up to 140°C. There is limited evidence that HT columns may be operated at temperatures as high as 220°C in 1-chloronaphthalene.
- Sample Size: 0.001 - 0.5 mg
- 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!
- 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 **TSKgel** HT 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):	≥	8,000	GMHHR-H(S) HT
Asymmetry Factor (AF):		0.7 - 1.6	