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## OPERATING CONDITIONS and SPECIFICATIONS

### TSKgel® GPC HT and HT2 (High Temperature) Products

<b>Part Numbers:</b>	0018395	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> G2000H <sub>HR</sub> (20) HT	<b>20.0 µm</b>	
	0022890	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> G2000H <sub>HR</sub> (20) HT2	<b>20.0 µm</b>	
	0018393	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H(S) HT	<b>13.0 µm</b>	
	0018391	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H(30) HT	<b>30.0 µm</b>	
	0018392	7.8 mm ID x 30.0 cm L	TSKgel GMH <sub>HR</sub> -H(20) HT	<b>20.0 µm</b>	
	0018420	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H HT	<b>5.0 µm</b>	
	0022889	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H(S) HT2	<b>13.0 µm</b>	
	0022887	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H(30) HT2	<b>30.0 µm</b>	
	0022888	7.8 mm ID x 30.0 cm L	<b>TSKgel</b> GMH <sub>HR</sub> -H(20) HT2	<b>20.0 µm</b>	
	<b>Guardcolumn:</b>	0018396	7.5 mm ID x 7.5 cm L	For <b>TSKgel</b> GMH <sub>HR</sub> -H(30) HT and GMH <sub>HR</sub> -H(20) HT columns	<b>30.0 µm</b>
		0018397	7.5 mm ID x 7.5 cm L	For <b>TSKgel</b> GMH <sub>HR</sub> -HT & GMH <sub>HR</sub> -H(S) HT columns	<b>13.0 µm</b>
		0022892	7.5 mm ID x 7.5 cm L	For <b>TSKgel</b> GMH <sub>HR</sub> -H(S) HT2, 13 µm	<b>13.0 µm</b>
		0022891	7.5 mm ID x 7.5 cm L	For <b>TSKgel</b> GMH <sub>HR</sub> -H(30) HT2 and GMH <sub>HR</sub> -H(20) HT2 columns	<b>30.0 µm</b>

This sheet contains the recommended operating conditions and the specifications for **TSKgel** GPC HT and HT2 columns and guard columns. Installation instructions and column care information are described in a separate Instruction Manual.

#### A. OPERATING CONDITIONS

- Shipping Solvent: o-dichlorobenzene (ODCB)
- Standard Flow Rate: 0.50 - 1.00 mL/min
- Max. Flow Rate: 1.50 mL/min GMHXL-HT,  
2.00 mL/min GMHHR-HT
- Max. Pressure: 1.5 MPa GMHXL-HT, GMH<sub>HR</sub>-H(30) HT, GMH<sub>HR</sub>-H(30) HT2, GMH<sub>HR</sub>-H(20) HT,  
2.0 MPa GMH<sub>HR</sub>-H(20) HT2, G2000H<sub>HR</sub>(20) HT, G2000H<sub>HR</sub>(20)HT2  
3.5 MPa GMH<sub>HR</sub>-H(S) HT, GMH<sub>HR</sub>-H(S) HT2  
GMH<sub>HR</sub>-H 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: **TSKgel** HT and HT2 columns are only available packed in o-dichlorobenzene (ODCB).
- Temperature: up to 140°C **TSKgel** HT  
up to 220°C **TSKgel** HT2  
(Heat the column gradually to prevent damage. For example, it is recommended to ramp up the temperature from ambient to 140 °C at less than 50 °C/hour or to 220 °C at less than 25 °C/hour.)
- Sample Size: 0.001 - 0.5 mg (analytical)
- Storage: **TSKgel** HT and HT2 columns 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 suited for analysis. Their main function is to protect the analytical column; 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 and HT2 (High Temperature) 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):	≥ 5,500	<b>TSKgel</b> GMH <sub>XL</sub> -HT
	≥ 8,000	<b>TSKgel</b> GMH <sub>HR</sub> -H(S) HT; GMH <sub>HR</sub> -H(S) HT2
	≥ 4,000	<b>TSKgel</b> GMH <sub>HR</sub> -H(30) HT; GMH <sub>HR</sub> -H(30) HT2
	≥ 6,000	<b>TSKgel</b> GMH <sub>HR</sub> -H(20) HT; GMH <sub>HR</sub> -H(20) HT2; G2000H <sub>HR</sub> HT, G2000H <sub>HR</sub> HT2
	≥ 16,000	<b>TSKgel</b> GMH <sub>HR</sub> -H-HT
Asymmetry Factor (AF):	0.70 – 1.60	All columns