

TSK-GEL® GMH_{HR}-L,N,M,H,H(S), and M(S) Products

Part Numbers:	17362, GMH _{HR} -L, 5µm, mixed bed, 7.8mm ID x 30cm	18398, GMH _{HR} -H, 30µm, mixed bed, 7.8mm ID x 30cm
	18055, GMH _{HR} -N, 5µm, mixed bed, 7.8mm ID x 30cm	18399, GMH _{HR} -H, 20µm, mixed bed, 7.8mm ID x 30cm
	17392, GMH _{HR} -M, 5µm, mixed bed, 7.8mm ID x 30cm	17361, GMH _{HR} -H(S), 13µm, mixed bed, 7.8mm ID x 30cm
	17360, GMH _{HR} -H, 5µm, mixed bed, 7.8mm ID x 30cm	17393, GMH _{HR} -M(S), 13µm, mixed bed, 7.8mm ID x 30cm
	17369, Guard column H _{HR} -H, 6mm ID x 4cm for P/N 18055, 17392, 17360	18402, Guard column, 7.5mm ID x 7.5cm for P/N 18398, 18399
	17368, Guard column H _{HR} -L, 6mm ID x 4cm for P/N 17362	17367, Guard column, 7.5mm ID x 7.5cm for P/N 17361, 17393

This sheet contains the recommended operating conditions and the specifications for TSK-GEL GMH_{HR}-L, N, M, H, H(S), and M(S) columns and guard columns. H-type columns are used exclusively for Gel Permeation Chromatography. Installation instructions and column care information are described in a separate Instruction Manual.

A. OPERATING CONDITIONS

- Shipping Solvent: Tetrahydrofuran (THF)
- Standard Flow Rate: 0.5 - 1.0mL/min
- Max. Pressure: 5MPa (GMH_{HR}-L,N,M,H)
2MPa (GMH_{HR}-H(S),M(S))
1.5MPa (GMH_{HR}-H[30µm], -H[20µm])

- 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.

benzene, chloroform, toluene, dichloromethane, carbon tetrachloride*, o-chlorophenol/chloroform, m-cresol/chloroform, o-dichlorobenzene, dimethylformamide (DMF), dimethylsulfoxide (DMSO), dioxane, n-hexane, hexafluoroisopropanol/chloroform, methylethylketone, N-methylpyrrolidine, acetone, ethanol, 1-chloronaphthalene, trichlorobenzene, decahydronaphthalene (Decalin), methanol, pyridine, quinoline

*Prolonged exposure to carbon tetrachloride can corrode the stainless steel parts of a column and an HPLC system.

Important:

- After the first solvent exchange, exchanges should be limited to similar polarities.
- The volume of new solvent should be more than three times the column volume.
- Never let bubbles into the column.
- Use a linear gradient at a rate of change of 2% per minute.

Recommended flow rates (mL/min) for solvent exchange TSK-GEL GMH_{HR}- columns

Solvent	Flow Rate, mL/min
n-Hexane	0.9
methyl ethyl ketone	0.7
dichloromethane, ethyl acetate	0.6
toluene, chloroform	0.5
dimethylformamide	0.4
carbon tetrachloride, pyridine	0.3
dimethyl sulfoxide, dioxane, ethanol, N-methylpyrrolidone, o-dichlorobenzene	0.2
quinoline, hexafluoroisopropanol, 1-chloronaphthalene	0.1

- Temperature: 25° - 80°C
- Sample Size: 0.001 - 0.5mg

- 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.

DS1150 Revised 13JULY2009

www.tosohbioscience.com

Tosoh Bioscience LLC
3604 Horizon Drive, Suite 100
King of Prussia, PA 19406
Phone: (484) 805-1219
Orders and Technical Service: (800) 366-4875
FAX: (610) 272-3028

Tosoh Bioscience GmbH
Zettachring 6
D-70567 Stuttgart
Germany
Phone: 0711/13257 0
FAX: 0711/13257 89

B. SPECIFICATIONS

The performance of TSK-GEL GMHhr-L, N, M, H, H(S), and M(S) columns is tested under the conditions described in the Data Sheet. All columns have passed the following quality control specifications:

- | | | |
|----|-----------------------------------|--|
| 1. | Number of Theoretical Plates (N): | >16,000 (GMHhr-L, N, M, H)
>4,000 (GMHhr-H [30um])
>6,000 (GMHhr-H [20um])
>8,000 (GMHhr-H(S), -M(S)) |
| 2. | Asymmetry Factor (AF): | 0.7 - 1.6 |

DS1150 Revised 13JULY2009

Tosoh Bioscience LLC
156 Keystone Drive
Montgomeryville, PA 18936
Phone: (215) 283-5000
Orders & Technical Service: (800) 366-4875
FAX: (215) 283-5035

Tosoh Bioscience GmbH
Zettachring 6
D-70567 Stuttgart
Germany
Phone: 0711/13257 0
FAX: 0711/13257 89