TOSOH BIOSCIENCE

Im Leuschnerpark 4, 64347 Griesheim, Germany
Tel: +49 6155-7043700 Fax: +49 6155-8357900
E-Mail: info.tbg@tosoh.com
Web: www.tosohbioscience.de

3604 Horizon Drive, Suite 100, King of Prussia, PA 19406, USA
Tel: +1 800-366-4875 Fax: +1 610-272-3028
E-Mail: info.tbl@tosoh.com
Web: www.tosohbioscience.com

OPERATING CONDITIONS and SPECIFICATIONS

TSKgel ® GMHXL Products

Part Numbers:	0016141	7.8 mm ID x 30.0 cm L	GMHXL	**9 µm**
	0016652	7.8 mm ID x 30.0 cm L	GMHXL-L	**6 µm**
	0013727	6.0 mm ID x 4.0 cm L	Guardcolumn HXL-H	**13 µm**
	0007113	6.0 mm ID x 4.0 cm L	Guardcolumn HXL-L	**7 µm**

This sheet contains the recommended operating conditions and the specifications for **TSKgel** GMH columns and guard columns. GMH-type 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.
As other H-type columns, GMH-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

1	Shipping Solvent:		Tetrahydrofuran (THF)	
2	Max.Flow Rate:	1.2	mL/min	
	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:	0.5 - 1.0	mL/min	
4.	Max. Pressure:	1.5	MPa	7.8 mm ID x 30.0 cm L HXL
		3.5	MPa	7.8 mm ID x 30.0 cm L HXL-L
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:	Turn this page over for a list of solvents that are compatible with this H-type column. Most H-type columns are supplied in THF because of its high dissolving power for polymers and oligomers. Besides in THF, H-type columns are also available packed in acetone, chloroform, dimethylformamide and o-dichlorobenzene (ODCB).		
7.	Temperature.:	It is recommended that GMH-type columns be used above room temperature and up to a maximum of 80°C.		
8	Sample Size:	0.001 - 0.5 mg		
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.		

Note our technical hotline tel +49 6155 70437-36
and e-mail, techsupport.tbg@tosoh.com

DS 1218 / Aug 15/ AX

B. SPECIFICATIONS The performance of **TSKgel** GMHXL 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): ≥ 16,000

Asymmetry Factor (AF): 0.7 - 1.6

C. SOLVENT COMPATIBILITY for H6, H8 and H_{XL} COLUMNS

Standard H-type columns are packed (and shipped) in tetrahydrofuran, with the exception of GMHXL columns which are only shipped in o-dichlorobenzene. H-type columns are also available per special order packed in acetone, chloroform, dimethylformamide, or o-dichlorobenzene.
The table below lists the solvents that may used to replace the original shipping solvent.

Note: **Only one solvent substitution can be made.**

SHIPPING SOLVENT:	**CAN BE REPLACED BY:**
Tetrahydrofuran	benzene, chloroform, toluene, xylene, dichloromethane, dichloroethane
NOTE	**THF in GMHXL columns cannot be substituted with dichloromethane or dichloroethane.**
Acetone	carbon tetrachloride, o-chlorophenol/chloroform, m-cresol / chloroform, o-dichlorobenzene, dimethylformamide (DMF), dimethylsulfoxide (DMSO), dioxane, ethylacetate, FC-113, hexane, hexafluoroisopropanol / chloroform, methylethylketone, N-methylpyrrolidine, methanol / chloroform (up to 60% MeOH), pyridine, quinoline.
Chloroform	m-cresol / chloroform, hexafluoroisopropanol / chloroform, 0 to 20% methanol in chloroform.
Dimethylformamide	dimethylsulfoxide, dioxane, tetrahydrofuran, toluene,
o-dichlorobenzene	1-chloronaphthalene, trichlorobenzene

Important:

1. Carbon tetrachloride can corrode stainless steel parts in an HPLC system and in the column.
2. Methanol cannot be used with H-Type columns; use PW columns with this solvent.

How to Change Solvents:

1. Use a linear gradient at a rate of change of 2% per minute.
2. Use a flow rate of ≤ 0.5 mL / min for 7.5 and 7.8 mm ID columns.
.

Note our technical hotline tel +49 6155 70437-36
and e-mail, techsupport.tbg@tosoh.com