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OPERATING CONDITIONS and SPECIFICATIONS

TSKgel ® HXL Guardcolumn Products

Part Numbers:	0007113	6.0 mm ID x 4.0 cm L	Guardcolumn HXL-L	**7 µm**
	0013727	6.0 mm ID x 4.0 cm L	Guardcolumn HXL-H	**13 µm**

This sheet contains the recommended operating conditions and the specifications for **TSKgel** HXL-type guard columns.
H-type columns are used exclusively for Gel Permeation Chromatography.
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:	5	MPa
5.	Solvents.:		Turn this page over for a list of solvents that are compatible with this H_{XL}-type column. Most H_{XL}-type columns are supplied in THF because of its high dissolving power for polymers and oligomers. Preparative columns contain chloroform since it can easily be removed after fractionation. Besides in THF, H_{XL}-type columns are also available packed in acetone, chloroform, dimethylformamide and o-dichlorobenzene (ODCB).
6.	Temperature.:		Up to a maximum of 80°C depending on the limit of the analytical column it is paired with
7.	Storage:		The column can be left overnight in solvent in the LC/GPC 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!
8.	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.

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C. SOLVENT COMPATIBILITY for H_{XL} COLUMNS

Standard HXL-type columns are packed (and shipped) in tetrahydrofuran, with the exception of GMHXL-HT columns which are only shipped in o-dichlorobenzene. H_{XL}-type columns are also available per special order packed in acetone, chloroform, dimethylformamide, or o-dichlorobenzene. The table below lists the solvents that may be 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 G1000H6, G1000H8, and in G1000H_{XL} 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 $\leq$ 0.5 mL/min for 7.5 and 7.8 mm ID columns.
3. Use half the normal flow rate for (semi-) prep columns.

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