CARE AND USE MANUAL

Xtimate Sugar-H HPLC Column Care and Use Manual

Welch

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Dear User:

Thank you for choosing our liquid chromatography column products! This manual is designed to help you use our products under optimal conditions and maximize column lifespan. Please read the usage instructions carefully before operation.

Xtimate Sugar-H column is a strong cation exchange column packed with sulfonated polystyrene/divinyl-benzene (PS/DVB) hydrogen-form resin. It offers excellent acid resistance and high-temperature stability, allowing for enhanced analytical efficiency by increasing column temperature. This column is ideal for the separation of organic acids and sugars and can be used as a dedicated column for ribavirin analysis in accordance with the Chinese Pharmaco-poeia.

Preparation Before Use

Column Identification

To ensure the quality of every column, each column sold by Welch Materials is assigned a unique identification code. This code allows us to trace quality-related issues. Upon receiving your column, please follow these steps:

1. Verify that the packaging is intact and matches the ordered column model.
2. Ensure the package contains a COA report with the inspector's signature.
3. Check the column surface for any damage and confirm that the protective plugs on both ends are intact.
4. Verify that the column body bears a Welch Materials identification label. Confirm that the model and serial number on the box match those on the column label.

Note:

The packing material inside the column is composed of fine particles. Do not attempt to open the column arbitrarily, as the material may become airborne and pose a health risk. If opening is necessary, use appropriate protective measures.

Installation

To achieve optimal column efficiency, use narrow-diameter tubing for connections. The connections to the column inlet and outlet must be tightly sealed, with the tubing ends polished and free of burrs or bevels. Use professional tools to cut and trim tubing.

1. Remove the column from its packaging. Check the direction of the eluent flow indicated by the arrow on the column body. Unscrew the protective plugs at both ends of the column. Position the column so that the eluent flow aligns with the direction indicated, as shown in Figure 1.

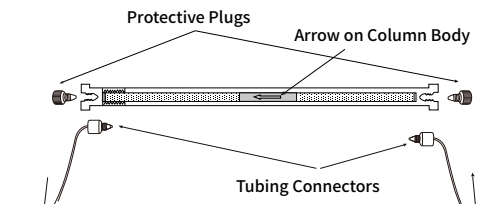


Figure 1. Column Installation

2. Carefully screw stainless steel or other compatible material fittings into both ends of the column. Ensure tight, zero-dead-volume connections to prevent leakage during operation.

Product Specifications

Column	Xtimate Sugar-H
USP Code	L17
Degree of Cross-linking	8%
Counterion	H^+
pH Range	1.0-3.0
Max. Temperature	95 °C
Max. Pressure Tolerance	14 MPa

Column Activation

(Recommended for new columns or those unused for over a month)

Xtimate Sugar-H columns are shipped in a solution of 100% water. Activation should follow these steps:

Step 1: Activation

Activation Procedure		
Specification	ID≤4.6 mm	ID>4.6 mm
Flow Rate	0.1 mL/min	0.5 mL/min
Mobile Phase	Sulfuric acid in water, pH 2.5	
Time	12 hours	
Temperature	80 °C	

Step 2: Transition

Transition Procedure		
Specification	ID≤4.6 mm	ID>4.6 mm
Flow Rate	Method Flow Rate	
Mobile Phase	Method Mobile Phase	
Time	4 hours	
Temperature	80 °C	

Routine Column Washing

Washing Mobile Phase	Water
Flow Rate	Method Flow Rate
Time	30 mins each (Column Length ⩽100mm)
	50 mins each (Column Length >100mm)
Storage	Store the column in water. Place in a refrigerator at a temperature of 4 °C.

Column Regeneration:

If the column exhibits increased pressure, abnormal peak shapes, reduced efficiency, or decreased resolution, regenerate as follows:

Flow Rate	Method Flow Rate
Mobile Phase	Sulfuric acid in water, pH 2.5
Temperature	85 °C
Time	8 hours each (Column Length ⩽100mm)
	12 hours each (Column Length >100mm)

Precautions:

This series of columns is packed with resin in its expanded form. If the sample has been properly pre-treated, most issues that arise are related to the resin used as packing material. Damage to check valves or sudden increases in back pressure can cause fluctuations from the pump, potentially displacing the fragile resin towards the rear frit and damaging the column. Therefore, it is essential to regularly check the instrument's operational status and ensure that online filters and guard columns effectively capture particulates. Significant polarity differences between solvents, excessive temperature variations in the packing material, and large pressure pulses are common causes of column bed damage. To minimize these risks, avoid improper operations.

1. Before the column temperature reaches the set value, set the flow rate to 0.2–0.3 mL/min to prevent excessive column pressure.

2. Once the column temperature stabilizes, gradually increase the flow rate to the target analytical flow rate in 0.1 mL/min increments. Wait for the pressure to stabilize before further increasing the flow rate to avoid large pressure pulses that could damage the column. Similarly, when decreasing the flow rate, reduce it in 0.1 mL/min increments.

Precautions (continued):

3. The maximum flow rate should not generate a pressure exceeding 14 MPa.
4. After use, always lower the column temperature to room temperature before stopping the pump and removing the column. Store the column at 4°C in a refrigerator.
5. When taking the column out of storage, allow it to reach room temperature before placing it on the instrument and increasing the column temperature to prevent column bed damage due to sudden temperature changes.
6. Fully degas the mobile phase to ensure a stable baseline.

Glossary of Terms:

pH Range: The pH range tolerable for the column' s mobile phase and sample solutions.

USP Code: Universal code for bonded phases in the USP chromatography column database.

Transition Procedure: A procedure to ensure miscibility between activation mobile phase and method mobile phases using transition mobile phase.

Maximum Pressure Tolerance: The upper pressure limit the column can withstand. Long-term use is recommended at pressures below 30 MPa. Monitor the instrument' s pressure for safe operation.

Storage Solvent: Solvent used during storage or transport to maintain the activity of packing material. Handle with appropriate protective measures.