CARE AND USE MANUAL

# Ultisil Amy-D HPLC Column Care and Use Manual

Welch

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# Ultisil Amy-D HPLC Column
## Care and Use Manual

**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.

Ultisil Amy-D is a highly versatile chiral column designed for the separation of chiral compounds containing functional groups such as aromatic, nitro, carbonyl, amide, amino, carboxyl, cyano, hydroxyl, and sulfonyl. It is also suitable for the chiral separation of large molecular compounds exhibiting steric hindrance due to asymmetric points.

# 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.

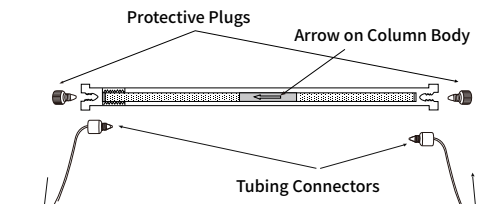



Figure 1. Column Installation

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 | Ultisil Amy-D |
| USP Code | L51 |
| Pore Size | 120 Å |
| Specific Surface Area | 320 $m^2/g$ |
| pH Range | 2.0-9.0 |
| Max. Temperature | 5°C–40°C |
| Max. Pressure Tolerance | 7 MPa |
| | 5 MPa (for long-term use) |

## Column Activation

(Recommended for new columns or those unused for over a month)
Ultisil Amy-D columns are shipped in a solution of 90% hexane and 10% isopropanol.

**Activation should follow these steps:**

| Activation Procedure | | |
|---|---|---|
| Specification | ID⩽3 mm | ID＞3 mm |
| Flow Rate | 0.1 mL/min | 0.5 mL/min |
| Mobile Phase | N-hexane : Isopropanol = 90:10 | |
| Time | 4 hours | |
| Temperature | 25 °C | |

## Operating Conditions

| | | | |
|---|---|---|---|
| Column Dimension | 150 × 4.6 mm | 250 × 4.6 mm | 250 × 10 mm |
| Typical Flow Rate | 1.0 mL/min | 1.0 mL/min | 5.0 mL/min |
| Maximum Flow Rate | 1.5 mL/min | 1.5 mL/min | 7.0 mL/min |

## Recommended Mobile Phases

| Alkane / Isopropanol | Alkane / Ethanol | Alkane / Methanol | Methanol | Acetonitrile |
|---|---|---|---|---|
| Ratio: 100/0 to 0/100 | Ratio: 100/0 to 0/100 | Ratio: 100/0 to 0/100 | May contain 0-100% isopropanol or ethanol in methanol | May contain 0-100% isopropanol in acetonitrile |

## Note:

1. Alkane refers to n-hexane, isohexane, or n-pentane in the table above.
2. The elution strength of alcohol in the mobile phase generally follows the order: Ethanol > Isopropanol. As the alcohol content increases, the retention time of sample peaks decreases.
3. Methanol has poor solubility in alkanes, and the maximum concentration of methanol in n-hexane is 5%. If using methanol in alkane, it is advisable to also add a certain amount of ethanol.
4. The column can be used with 100% methanol or acetonitrile. When replacing n-hexane with methanol or acetonitrile, or switching to a different polar solvent, it is strongly recommended to use 100% isopropanol as a transition solvent and reduce the flow rate (as isopropanol has higher viscosity).
5. For acidic samples, acidic additives like trifluoroacetic acid (TFA), acetic acid, or formic acid are recommended to add in the mobile phase. For basic compounds, basic additives such as diethylamine, butylamine, or ethanolamine are suggested. The typical concentration of organic acids or bases is 0.1-0.3%, with a maximum of 0.5%.

## Column Maintenance:

1. It is recommended to use a guard column when analyzing samples with high impurity content.
2. Dissolve samples as much as possible in the mobile phase and filter them through a 0.45 µm membrane filter.
3. If the column is to be stored for more than a week, replace the solvent in the column with a storage solvent (n-hexane/isopropanol = 90/10). For storage under a week, use a mobile phase without additives as the storage solvent.
4. After using acidic or basic additives, thoroughly wash the column with either an additive-free solvent or n-hexane / isopropanol (90/10), and store the column in this solvent.

## Glossary of Terms:

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

**Specific Surface Area:** The surface area per gram of silica.

**Pore Size:** The diameter of pores within silica particles, selected based on analyte molecular weight.

**Carbon Loading:** The percentage of carbon content in bonded functional groups relative to the total silica mass.

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

**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.