CARE AND USE MANUAL

Ultisil PG-C18 HPLC Column Care and Use Manual

Welch

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Ultisil PG-C18 Column
Care and Use Manual

Dear User:

Ultisil PG-C18 is one of the specialized column series developed by Welch Materials, specifically optimized for the detection of saponins. It incorporates unique modifications that significantly enhance chromatographic performance compared to conventional C18 columns, delivering improved separation efficiency, higher column efficiency, and more balanced retention time.

The Ultisil PG-C18 features a novel column design that integrates the guard column and analytical column seamlessly. This innovation minimizes the dead volume caused by traditional guard column connections, reduces the risk of leakage, and effectively extends the analytical column's lifespan.

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Welch Materials has comprehensively validated the Ultisil PG-C18 for analyzing Panax notoginseng (Sanqi) raw materials and their formulations under pharmacopoeial conditions across various instruments. The column consistently meets regulatory testing requirements in pharmacopeia-specified workflows.

Rigorous quality control standards are applied to Ultisil PG-C18 columns during manufacturing. Each batch undergoes pre-shipment testing using total notoginseng saponins as a benchmark. Additionally, clients may provide specific sample solutions to establish customized pre-shipment testing criteria, ensuring the delivery of worry-free product tailored to user needs.

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.

Column Structure

The Ultisil PG-C18 Column features a column tube constructed from 316L stainless steel. The column head incorporates an integrated guard column and analytical column structure, which minimizes the extracolumn dead volume associated with traditional guard column usage. Its structural design is illustrated in Figure 1.

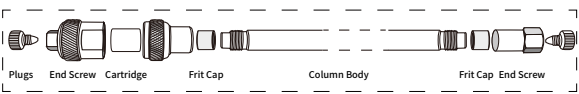


Figure 1. Column Structure

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 2.

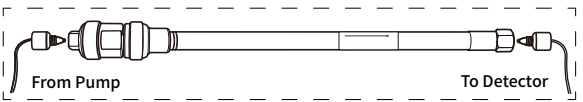


Figure 2. Column Installation

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 Standard Configuration

Products	Qty
Ultisil PG C18 Column	1 Pcs
Ultisil PG C18 Guard Cartridge	2 Pcs
10 mm Metric Wrench	1 Pcs
10 mm Metric Wrench	1 Pcs

Product Specifications

Column	Ultisil PG-C18
USP Code	L1
Pore Size	125 Å
Specific Surface Area	160 m^2/g
Carbon Loading	10 %
pH Range	2.0-8.0
Max. Temperature	60 °C
Max. Pressure Tolerance	40 MPa

Ultisil PG-C18 columns are shipped in a solution of 75% acetonitrile in water.

Equilibration of New Columns:

• **Step 1**: Flush the column with 80% acetonitrile/water at a flow rate of 0.5 mL/min for 4 hours to remove storage solvents and equilibrate the stationary phase.

• **Step 2**: Replace the initial solvent with 10% acetonitrile/water at a flow rate of 1 mL/min for 1 hour to ensure complete solvent transition and column stabilization.

• **Step 3**: Stabilize the system with the final mobile phase until a steady baseline is achieved, indicating equilibrium of the column and system.

Routine Column Washing:

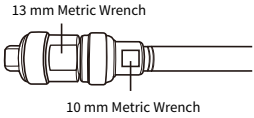
After analysis, flush the column with 10% acetonitrile at a flow rate of 1 mL/min for 40 mins, then 90% acetonitrile at a flow rate of 1 mL/min for 40 mins. Store the column in this solvent.

Warning: **This column must NOT be back-flushed!**

Column Regeneration:

If the column efficiency becomes too low or the column pressure rises excessively, it is generally considered that the column has reached the end of its service life.
As the guard column of this model is seamlessly integrated with the analytical column. To prolong the lifespan of the analytical column, it is recommended to replace the guard column cartridge under the following circumstances:

Replacement of the Guard Column Cartridge:
Use the wrench provided with the chromatographic column to gently rotate and loosen the corresponding locking tabs. Then manually unscrew and replace the guard column cartridge.



The guard column cartridge has no directional orientation and can be placed in any position during initial installation.
After replacement, first tighten by hand until it cannot rotate further. Then use the provided wrench to **rotate it 5°** (**DO NOT** apply excessive force, as over-tightening may cause thread jamming and permanently damage the column).

If issues persist after replacing the cartridge, perform column regeneration by flushing with 20-30 column volumes of each of the following solvents in sequence:

100% Methanol

→ 100% Acetonitrile

→ 100% Isopropanol

→ 75% Acetonitrile/25% isopropanol

→ 100% isopropanol

→ 100% methanol

Precautions:

· Use High-Purity Reagents:

Mobile Phase: Always prioritize HPLC-grade solvents for mobile phases. For less frequently used reagents, ensure a minimum purity of analytical-grade.

Water: Use ultrapure water (e.g., 18.2 MΩ·cm resistivity) or commercially available purified water.

· Filtration Requirements:

Mobile Phase: Filter through a 0.45 μm membrane to remove particulates that could clog column frits or damage pumps.

Samples: Always filter samples using a 0.45 μm syringe filter to eliminate insoluble impurities.

· Sample Pretreatment for Complex Matrices:

Use SPE (solid-phase extraction) cartridges to remove interfering substances (e.g., proteins, lipids) before injection.

If SPE is impractical, install a guard column compatible with the analytical column to protect against contamination.

· Solvent Compatibility:

Ensure the sample solvent is chemically and polarity-matched to the mobile phase. Mismatches (e.g., high organic solvent vs. aqueous mobile phase) can cause:

Peak distortion (tailing or fronting)

Ghost peaks (system peaks)

Precipitation (clogging frits or column channels)

Best Practice: Dissolve samples directly in the mobile phase to ensure compatibility.