Agilent Zorbax 300-SCX

Datasheet

General Description

Zorbax 300-SCX is a polar bonded-phase column packing used for cation exchange high-performance liquid chromatography. This packing consists of an aromatic sulfonic acid moiety covalenty bonded to a nominal 5 µm Zorbax PSM 300 (300Å, porous silica microspheres) through Si-O-Si bonds. A trifunctional organosilane reagent is used in producing this packing to maximize bonded-phase stability with aqueous mobile phases. Uneven surface coverage can result in mixed mechanisms of separation and poor reproducibility. Therefore, the reaction conditions used to produce Zorbax 300-SCX were specifically developed to minimize stationary phase polymerization and to maximize surface coverage with a monolayer bonded-phase.

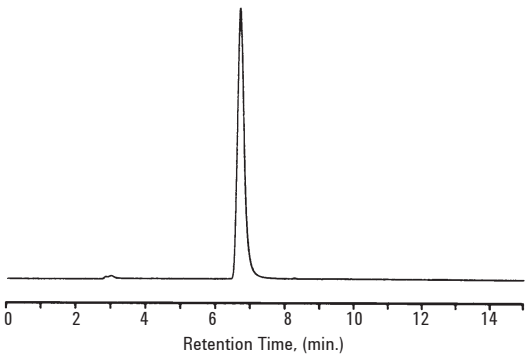
Zorbax 300-SCX particles provide optimum column efficiency because of their uniform spherical shape, size distribution and proprietary column loading techniques. Since column performance is directly related to uniform bed density, Zorbax 300-SCX is offered only in pre-packed, tested columns.

FIGURE 1

Zorbax 300-SCX QA Chromatogram

OPERATING CONDITIONS

Column: Zorbax 300-SCX 4.6 mm ID x 250 mm (5 µm)
Mobile Phase: 0.2M Sodium Phosphate, pH 3.0
Flow Rate: 1.0 mL/min
Temperature: Ambient (23°C)
Detector: UV (254 nm)
Sample Volume: 5 µL
Peak Identity: Cytidine - 500 µg/mL



Column Specifications

Typical quality assurance performance for Zorbax 300-SCX packing packed into a 4.6 mm ID x 250 mm column is shown in Figure 1. The chromatographic performance of your column, when quality control tested with an unretained, neutral sample (toluene) and 100% organic mobile phase (Methanol), is described on the enclosed Column Performance Report. This simple QC test ensures that the column has been properly manufactured. Because of the chemical nature of the Zorbax 300-SCX bonded phase, some conditions of use may alter the original chromatographic retention properties of the packing material. Therefore, the performance guarantee of this product is limited to the integrity of the packed bed as measured by the QC test.

Voids or channels in the packed bed caused by settling or shifting of the packing will significantly reduce the chromatographic performance of an unretained compound such as the toluene peak used in the QC test. Therefore, the integrity of the packed bed can be tested at any time usng the QC test conditions listed on the enclosed Column Performance Report.

Safety Conditions

- All points of connection in liquid chromatographic systems are potential sources of leaks. Users of liquid chromatographic equipment should be aware of the possible toxicity or flammability of mobile phases.
- Because of its small particle size, dry Zorbax packings are respirable. Columns should only be opened in a well ventilated area.

Operational Guidelines

- **This column is shipped containing Methanol solvent. Purge with 5 to 10 column volumes of deionized water before using with mobile phases containing salts.**
- The direction of flow is marked on the column.
- While generally not harmful to the column, reverse flow should be avoided except to attempt removal of inlet pluggage (see Column Care section).
- Maximum operating pressures for these columns is 400 bar (6000 psi).
- The use of a guard column is recommended to protect the 300-SCX column and extend its useful lifetime.
- Avoid use of this column below pH 2.0 or above pH 6.5.
- Zorbax 300-SCX is compatible with water and all common organic solvents.
- Maximum operating temperature is 60° C.

NOTE: Zorbax columns are designed for high stability

at low pH (e.g., pH < 5). However, all silica-based packings have some solubility in pH > 6 aqueous mobile phases. Therefore, when using silica-based columns under conditions of pH > 6, maximum column lifetime is obtained by operation at low temperatures (< 40°C) using low buffer concentrations in the range of 0.01 to 0.02M. Column stability at pH > 6 is also enhanced by avoiding phosphate and carbonate buffers [ref.: H.A. Claessens, M.A. van Straten, and J.J. Kirkland, *J. Chromatogr.*(A), 728 (1996) 259].

Applications

Zorbax 300-SCX is chromatographically a classical strong cation-exchange packing. Typical applications would include those normally used in separating basic, water soluble compounds. The retention of basic substances is governed by both pH and ionic strength. In general, a decrease in either or both will increase sample retention.

Common buffered elements (e.g., citrate, phosphate) can be used. Mobile phase pH should be maintained in the range of 2.0 to 6.5. Since Zorbax 300-SCX is a bonded cation exchanger, organic modifiers (e.g., methanol) can be used in combination with aqueous solutions to improve sample solubility and effect better separations. Caution should be taken when using aqueous buffers mixed with organic solvents to ensure that the salts remain solubilized. Additional information on solvent selection may be found in Chapter 10, *Introduction to Modern Liquid Chromatography*, Second Edition, L. R. Snyder and J. J. Kirkland, (John Wiley & Sons, 1979), and Chapter Six, Seven and Eight, *Practical HPLC Method Development*, Second Edition, L.R. Snyder, J.J. Kirkland, and J.L. Glajch, (John Wiley & Sons, 1997).

Since buffer solutions may be relatively viscous, increased column efficiency can be obtained by operating at an elevated temperature. Selectivity also may be improved at higher temperatures in some separations.

Column Care

Proprietary column packing techniques produce high-performance columns with homogeneous, dense, and compacted beds. Removal of column end fittings could disturb the beds, possibly leading to reduced column performance and life. To minimize the need to open columns, guard columns and pre-columns are recommended to protect the analytical system from blockage by particulate matter in the mobile phase and samples.

The inlet frit on these columns has a nominal porosity of 2 µm. Samples that contain particulate matter larger than 2 µm may plug the column inlet frit. Zorbax 300-SCX guard columns and hardware kit are recommended for use with such samples (see Part Numbers).

If solvent flow appears to be restricted (high column back-pressure), check first to see that solvent flow is unobstructed up to the column inlet. If the column has the restriction, there may be particulate matter on the inlet frit. An initial attempt should be made to remove an inlet debris by back-flushing 25-30 mL of mobile phase through the column. If this fails to return the column to near its original back-pressure, the inlet frit should be changed. To remove the frit, loosen the nut at the column inlet, taking care not to turn the end fitting itself. Then remove the fitting, taking care not to disturb the column bed. The frit should drop out when the fitting is tapped sharply on a hard surface. Install a new frit and carefully tighten the fitting.

To clean strongly retained materials from the column, flush the column with stronger eluting solvents. High ionic strength buffered solutions (e.g., 1 M $NaClO_4$, pH<4) will remove most strongly retained cationic substances. Flushing the column with 20-30 mL of distilled water then 100 mL of methanol is the recommended procedure for removing strongly retained materials of a non-ionic nature. Use caution when mixing organic solvents with buffered aqueous mobile phases to avoid precipitation of salts.

Since columns have 1/16-inch terminations, a short 1/4-inch wrench should be used in assembling fittings to prevent overtightening the ferrules. Overtightening can damage the fitting and necessitate replacement.

Storage Recommendations

Long term storage of silica-based, bonded phase columns should be in a pure organic solvent, preferably an aprotic liquid such as 100% acetonitrile. If the column has been previously used with a buffered mobile phase, the buffer should first be removed by purging the column with 20-30 column volumes of a 50/50 mixture of methanol or acetonitrile and water, followed by 20-30 column volumes of the pure solvent. Before storing the column, the end-fittings should be tightly capped with end-plugs to prevent the packing from drying out.

Columns may be safely stored for short periods in most mobile phases. However, to protect equipment, it is desirable to remove salts from the instrument and column by purging the column with the same mobile phase without the buffer (e.g. using 60/40 ACN/H_2O to remove a 60/40 ACN/0.02 M phosphate buffered mobile phase). Re-equilibration is rapid with the original mobile phase when using this approach, and any danger of corrosion from the salts is eliminated.

Ordering Information	**Agilent**
Zorbax 300-SCX Columns (5 µm)	**Part No.**
2.1 mm ID x 50 mm	860700-704
2.1 mm ID x 150 mm	883700-704
3.0 mm ID x 50 mm	860700-304
4.6 mm ID x 50 mm	846952-704
4.6 mm ID x 150 mm	883952-704
4.6 mm ID x 250 mm	880952-704
9.4 mm ID x 250 mm	880952-204
Guard Column	
4.6 mm ID x 12.5 mm (4 Pack)	820950-904
Guard Column Hardware Kit	820888-901

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