Agilent Zorbax Rx-SIL

Datasheet

General Description

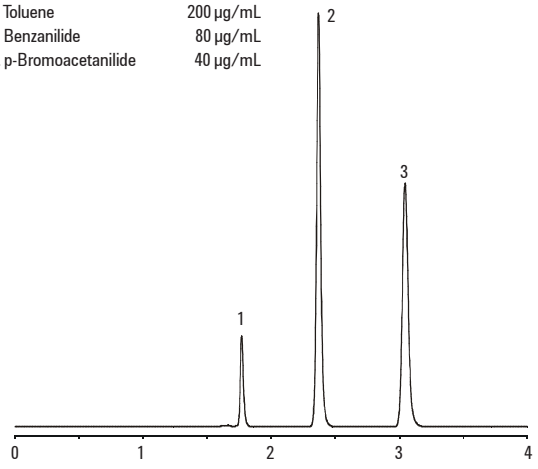
Zorbax Rx-SIL is a small diameter (5 µm) totally porous silica particle that is used for high performance liquid-solid adsorption chromatography. Like Zorbax SIL, Zorbax Rx-SIL particles are produced by the agglutination of colloidal silica to form spherical particles of uniform diameter and pore size. However, Zorbax Rx-SIL is specially treated to create a highly homogeneous surface throughout the silica support. This homogeneity is achieved by utilizing ultra-high purity silica (less than 100 ppm total of impurities such as sodium, aluminum, iron, etc.) and by applying patented technology for fully hydroxylating the silica surface. As a result, Zorbax Rx-SIL can be used for basic, neutral, or acidic samples. It is particularly well suited for use with basic samples, since these solutes can be chromatographed without peak tailing or irreversible adsorption.

The uniform, spherical, Zorbax Rx-SIL particles are nominally 5 µm in diameter, and have a controlled pore size of 80Å and have a surface area around 180 m^2/g. Columns are loaded to a uniform bed density using a proprietary, high-pressure, slurry-loading technique to give optimum column efficiency.

FIGURE 1
Zorbax Rx-SIL QC Chromatogram

OPERATING CONDITIONS
Column: Zorbax Rx-SIL, 4.6 mm ID x 250 mm (5 µm)
Mobile Phase: 8% MeOH / 0.2% H_2O / 91.8% 1-Cl-Butane
Flow Rate: 1.5 mL/min
Temperature: Ambient (23°C)
Detector: UV (254 nm)
Sample Volume: 5 µL
Peak Identity:

1. Toluene	200 µg/mL
2. Benzanilide	80 µg/mL
3. p-Bromoacetanilide	40 µg/mL



Column Characteristics

A typical Quality Control test chromatogram for a 4.6 mm ID x 250 mm column is shown in Figure 1. The actual QC test and performance of your column is described on the Column Performance Report enclosed with your column.

Safety Considerations

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

Operational Guidelines

- The direction of flow is marked on the column.
- While it is not harmful to the column, reverse flow should be avoided except to attempt removal of inlet pluggage (see "Column Care" section).
- Zorbax Rx-SIL columns are shipped containing hexane. Care should be taken not to pass any mobile phase through the column that might cause a precipitate.
- Zorbax Rx-SIL is compatibile with water and all common organic solvents.
- The use of a guard column is recommended to protect the Rx-SIL column and extend its useful lifetime.
- Avoid use of this column below pH 0.8 or above pH 8.
- Maximum operating pressure for columns up to 9.4 mm ID is 400 bar (6000 psi).
- Maximum operating temperature of unbonded silica columns is typically limited only by the temperature limits of the mobile phase with the exception of the following note.
- **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].

Mobile Phase Selection

Zorbax Rx-SIL is compatibile with all common organic solvents. When switching between solvents with vastly different polarities, it is advisable to first rinse the column with a mutually miscible solvent such as isopropanol. The eluotropic solvent series described by Snyder is helpful in selecting mobile phases that will elute compounds in the proper retention range (normally, k' between 1-10) and with the highest selectivity. To maintain a reproducible activity of the silica surface, it is often desirable to employ water-modified mobile phases. Snyder and Kirkland describe a method for adjusting the water content for non-polar solvents in a convenient and reproducibile manner. Alternatively, it is often possible to help maintain reproducibility by adding 0.1-1% alcohol (such as methanol) or 1-3% acetonitrile to the primary solvent. In the case of methylene chloride, a methanol concentration of about 0.15% (v/v) is equivalent to 50% water saturation in deactivation of the packing. When gradient elution is employed, both primary and secondary solvents should be modified with alcohol or acetonitrile and at least 30 column volumes of solvent should be allowed to flow through the column after the completion of each run to allow the the column to re-equilibrate to its original activity level. Additional information on solvent selection may be found in Chapters Six and Seven, *Introduction to Modern Liquid Chromatography*, Second Edition, L.R. Snyder and J.J. Kirkland, (John Wiley & Sons, 1979), and Chapters Six, Seven and Eight, *Practical HPLC Method Development*, Second Edition, L.R. Snyder, J.J. Kirkland, and J.L. Glajch, (John Wiley & Sons, 1997).

Column Care

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 and should be filtered before injection into the column. Zorbax Rx-SIL guard column and a 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 any 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, carefully loosen the nut at the inlet, 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 packing, rinse the column with increasingly stronger (more polar) solvents. Even water may be used without damaging the column. The column should be flushed with mobile phase after cleaning (40 column volumes) to equilibrate the column. Continue to pump mobile phase through the column until reproducible k' values are obtained for a test sample.

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

Storage Recommendations

To avoid potential metal corrosion, long-term storage of any HPLC column in halogenated solvents (e.g., butyl chloride, methylene chloride, etc.) should be avoided. If the column has been used with a buffered mobile phase, the column should be purged with 20-30 column volumes of acetonitrile and water followed by 20-30 column volumes of the pure organic solvent. Storage of unbonded silica columns in most other liquids is typically acceptable.

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Printed in USA 7/21/03 Part No. 820644-001 F