

Agilent Zorbax SB-CN

datasheet

General Description

Zorbax SB-CN is a microparticulate column packing used primarily for reversed-phase high performance liquid chromatography. This StableBond packing is made by chemically bonding a sterically-protected cyano-propyl stationary phase to a specially prepared, ultra-high purity Zorbax Rx-SIL porous silica microsphere. The special Rx-SIL silica support is designed to reduce or eliminate strong adsorption of basic compounds. The densely covered, sterically protected, diisopropyl cyano-propyl stationary phase is chemically stable at low pH and gives longer column life. As a result, Zorbax SB-CN is a stable, reversed-phase packing that can be used for basic, neutral, or acidic samples. It is particularly well suited for use with aggressive mobile phases (e.g., pH < 2, high ionic strength, ion-pair additives, etc.). The steric protection of the bonded phase resists degradation caused by such mobile phases. This characteristic is particularly important for use in methods that need long-term stability and reproducibility. Zorbax SB-CN is especially suited in applications that utilize high-sensitivity detectors that require low backgrounds (e.g., mass spectrometers).

The uniform, spherical, Zorbax SB-CN particles have a controlled pore size of 80Å. Columns are loaded to a uniform bed density using a proprietary high-pressure slurry-loading technique to give optimum column efficiency.

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.

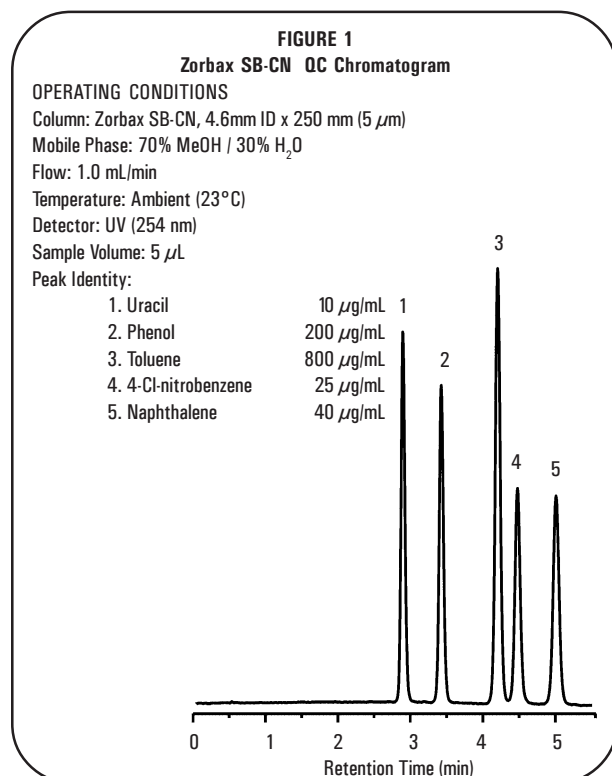
Safety Considerations

- 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 its 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 generally not harmful to the column, reversing flow should be avoided except to attempt removal of inlet pluggage (see "Column Care" section).
- A new column contains a mixture of methanol and water. Care should be taken not to pass any mobile phase through the column that might cause a precipitate.
- Zorbax SB-CN is compatible with water and all common organic solvents.
- The use of a guard column is recommended to protect the Zorbax SB-CN column and extend its useful lifetime.
- Avoid use of this column below pH 1.0 or above pH 8.
- Maximum operating pressure for columns up to 9.4 mm ID is 400 bar (6000 psi).
- Maximum operating temperature is 80°C.

NOTE: StableBond columns are designed for high stability at low pH (e.g., pH < 4). 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

The bonded stationary phase is moderately polar in nature and is best used with mobile phases such as methanol/water or acetonitrile/water mixtures. Increasing the amount of organic component usually reduces the retention time of the sample. Due to the relatively high viscosity of recommended mobile phases, increased efficiency can be achieved with the use of column temperatures in the range of 40-65°C. Gradient elution techniques for this packing often use 5% methanol or acetonitrile in water as the initial solvent and 100% methanol or acetonitrile as the final solvent. Non-aqueous solvents can also be used with the column for normal-phase separations. 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.L. Glajch, and J.J. Kirkland, (John Wiley & Sons, 1997).

Applications

Zorbax SB-CN is similar to Zorbax CN in retention of acidic and neutral compounds. However, the selectivity of Zorbax SB-CN may differ markedly from Zorbax SB-C8 as observed in the QC chromatogram (Figure 1) where toluene and 4-Cl-nitrobenzene elute in reverse order under similar mobile phase conditions. Zorbax SB-CN, like Zorbax SB-C8, provides better chromatographic performance with basic compounds, using the same buffers and organic modifiers employed in reversed-phase chromatography. For many basic compounds, it will normally not be necessary to use basic modifiers, such as triethylamine, to achieve efficient, symmetrical peaks. However, very basic compounds may require the addition of basic modifiers to the mobile phase, such as 10-20 mM dimethyloctyl-amine or 20-30 mM triethylamine. Basic compounds are often best chromatographed with mobile phases of $\text{pH} \leq 3$. One highly recommended mobile phase for very basic compounds is 0.1% trifluoro-acetic acid adjusted to $\text{pH} = 3$ with triethylamine, and an appropriate concentration of methanol or acetonitrile. The Zorbax SB-CN column can also be used in normal-phase applications with totally organic solvents.

Column Care

The inlet frit on these columns have a nominal porosity of 2 μm . Samples that contain particulate matter larger than 2 μm will plug the column inlet frit. Guard columns and a hardware kit are recommended for use with such samples.

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 turn the end fitting itself. Then carefully 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 remove strongly retained materials from the reversed-phase column, flush the column with stronger (less polar) solvents. Solvents such as methanol, acetonitrile, or a 95/5 mixture of dichloromethane and methanol should remove most highly retained compounds. In extreme cases, dimethyl sulfoxide or dimethylformamide at low flow rates may also be used for this purpose. When switching between solvents with vastly different polarities, it may be necessary to first purge the column with a mutually miscible solvent such as isopropanol.

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

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/H₂O 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.

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