Agilent Zorbax SAX

Datasheet

General Description

Zorbax SAX is a polar bonded-phase column packing used for anion exchange high performance liquid chromatography. This packing consists of an ammonium functionalized silane chemically bonded to Zorbax SIL particles through Si-O-Si bonds. A trifunctional organo silane reagent is used to produce this packing in order to maximize bonded phase stability with aqueous mobile phases. The reaction conditions used to produce Zorbax SAX were specifically developed to minimize reagent polymerization and to maximize surface coverage with a monolayer bonded phase.

Zorbax SAX particles provide optimum column efficiency because of their uniform spherical shape and size distribution. This permits a more uniform bed density to be achieved, particularly with proprietary loading techniques.

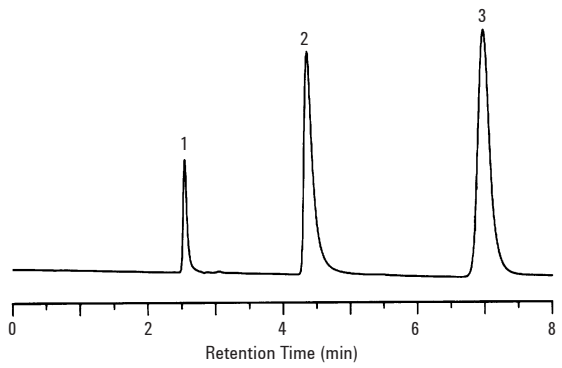
Column Characteristics

Zorbax SAX columns are currently available in several diameters and lengths. Typical QA chromatographic performance for a 4.6mm ID x 250 mm column is shown in Figure 1. The actual QC performance of your column is described on the Column Performance Report enclosed with your column.

FIGURE 1
Zorbax SAX QA Chromatogram

OPERATING CONDITIONS
Column: Zorbax SAX, 4.6 mm ID x 250 mm (5 µm)
Mobile Phase: 0.1 M KH_2PO_4, pH 3.0 in H_2O
Flow: 1.0 mL/min
Temperature: Ambient (23°C)
Detector: UV (254 nm)
Sample Volume: 5 µL
Peak Identity:

1. p-Aminophenol	20 µg/mL
2. Isonicotinic Acid	8 µg/mL
3. 5'-Uridine Monophosphate	20 µg/mL



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 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).
- A new column contains a mixture of sodium phosphate and water. Initially, care should be taken not to pass any mobile phase through the column that might cause a precipitate.
- Zorbax SAX is compatible with water and all common organic solvents.
- The use of a guard column is recommended to protect the Zorbax SAX column and extend its useful lifetime.
- Avoid use of this column below pH 2.0 or above pH 7.0.
- Maximum operating pressure for the 4.6 and 9.4 mm ID columns is 400 bar (6000 psi).
- Maximum operating temperature is 40°C.

Mobile Phase Selection

Retentivity of anionic species is dependent on the pK of the compound and mobile phase variables: pH, ionic strength and temperature. Common buffers (e.g. citrate, phosphate) can be used to adjust both pH and ionic strength in obtaining the desired retentivity. Mobile phase pH should be maintained in the range of 2 to 7.0. Since Zorbax SAX is a bonded anion exchanger, organic modifiers (e.g. acetonitrile) can be used in combination with aqueous solutions to improve solubility and effect better separations. Caution should be taken when using aqueous buffers mixed with organic solvents in order that solubility of the salts is maintained in the mobile phase.

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 SAX is most useful for compounds that form anions in aqueous solutions. Typical applications include several classes of organic acids such as aromatic and aliphatic carboxylic acids and sulfonic acids. Specific areas of application involve pesticides, herbicides, pharmaceutics and biological species such as nucleotides.

Column Care

This inlet frit on these columns has a nominal porosity of 2 µm. Samples containing particulate matter which is larger than 2 µm may plug the column. Samples may be filtered with syringe filters. Precolumns and guard columns are also recommended to extend column life.

If solvent flow appears to be restricted, check first to see that flow is free up to the column inlet. If the column has the restriction, there may be particulate matter on the inlet frit. First, backflush the column with about 30 mL of mobile phase. If this does not reduce the operating pressure, replacement of the inlet frit may be necessary.

To remove the frit on a column, 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. If not, a length of stiff wire may be used to push out the frit. Install a new frit and carefully tighten the fitting.

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

With this column, many column volumes of mobile phase are necessary for equilibration. The number of column volumes required depends on the system in use and can be as high as 50 to 100.

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.

Buffer solutions should not be left in Zorbax SAX columns during long-term storage. Flushing the column with distilled water then methanol prior to storage is recommended.

Ordering Information	Agilent Part No.
Zorbax SAX Columns (5 µm)	
4.6 mm ID x 150 mm	883952-703
4.6 mm ID x 250 mm	880952-703
9.4 mm ID x 250 mm	880952-203
Guard Column	
4.6 mm ID x 12.5 mm (4 pack)	820950-903
Guard Column Hardware Kit	820888-901

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