Jordi Ion Chromatography Columns

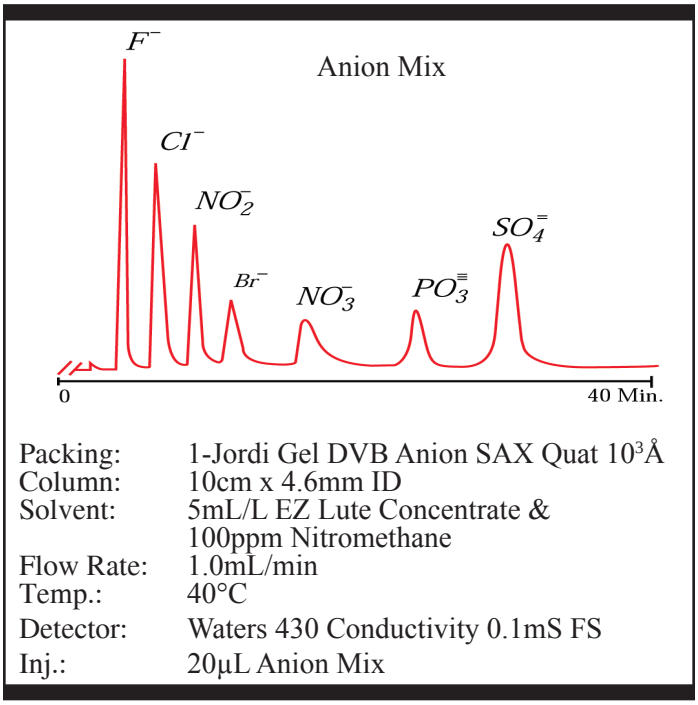
Jordi offers three different resins for ion exchange chromatography including a SAX, WAX, and SCX. Jordi SAX Quat columns contain a quaternated amino group covalently bound to our 100% DVB media. Sulfonated resins for strong cation exchange and secondary amino columns for weak anion exchange are also available upon request.

Jordi DVB SAX Quat Columns

Separation of a wide range of inorganic anions can be accomplished using Jordi DVB SAX Quat columns. These columns contain a quaternary amine functional group covalently bound to a 100% DVB resin. Fluoride, chloride, nitrate, nitrite, sulfate, and phosphate can be analyzed in a single analysis.

Advantages of Jordi DVB SAX Quat Columns:

- Rugged - high column stability compatible with nearly any solvent
- Solvents - can be changed without damaging the column
- Wide pH range - pH values from 0 to 14
- Efficient - high plate counts for sharp, symmetrical peaks
- Long column life - 3 month warranty standard



Packing:	1-Jordi Gel DVB Anion SAX Quat 10^3Å
Column:	10cm x 4.6mm ID
Solvent:	5mL/L EZ Lute Concentrate & 100ppm Nitromethane
Flow Rate:	1.0mL/min
Temp.:	40°C
Detector:	Waters 430 Conductivity 0.1mS FS
Inj.:	20µL Anion Mix

Jordi SAX Quat DVB Application and Solvent
Typical Application:
Inorganic Ions
Typical Solvent System:
5mL/L EZ Lute Concentrate and 25ppm Nitromethane

Jordi SAX Quat DVB

Cat. #	*Pore Size*	*Particle Size*	*Length*	*ID*	*Price*
18701	10^3Å	5µ	10cm	4.6mm	$765.00

Core Values

Innovation -

A company which brings new technology into the marketplace and which embraces change.

To see the next Jordi core value turn to page 86.

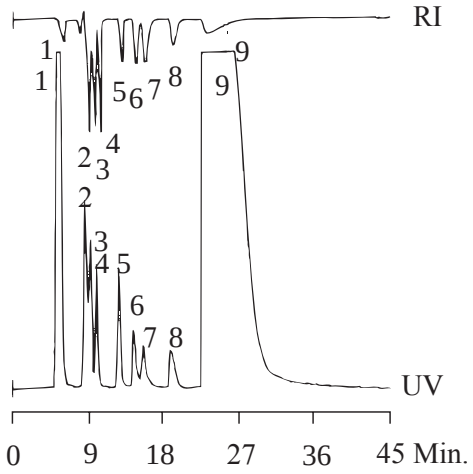
Jordi DVB Organic Acid Columns

Organic acid columns contain a 500Å sulfonated resin enabling the size based separation of organic acids. Sample-column interaction is prevented by charge-charge repulsion. Other types of acidic compounds can also be separated by size.

The following acids can be separated:

- Oxalic Acid
- Tataric Acid
- Citric Acid
- Malic Acid
- Formic Acid
- Lactic Acid
- Succinic Acid
- Acetic Acid
- Fumeric Acid

The ruggedness of the packing allows column clean-up with solvents which other packings cannot tolerate. Strong bases, acids or organic solvents can be used to remove contamination without damaging the packing material.



Separation of Organic Acids

1. Oxalic acid
2. Tataric acid
3. Citric acid
4. Malic acid
5. Formic acid
6. Lactic acid
7. Succinic acid
8. Acetic acid
9. Fumaric acid

Column: 50cm x 10mm
Packing: Jordi Sulfonated DVB
Mobile Phase: 0.01M Phosphoric acid, pH 3w/NaOH
Flow rate: 1.5mL/min
Detector: RI @ 4x, UV at 210nm

Jordi DVB Organic Acid Columns					
Cat. #	***Pore Size***	***Particle Size***	***Length***	***ID***	***Price***
17001	500Å	5µ	25cm	10mm	$1,095.00
17000	500Å	5µ	50cm	10mm	$2,195.00

Core Values

Teamwork -

We succeed when we work as a group. We grow when we share what we learn with one another.

Jordi NP DVB Polyamino Columns

Polyamino columns are designed for the separation of a broad range of sugars and higher molecular weight oligomers. Polyamino packings contain a high concentration of (NH and NH_2) functional groups bonded to a 500Å porosity, highly crosslinked, DVB bead. 5µ particle size is used to obtain high efficiency separations.

The strong amine bonding chemistry allows their application under highly acidic or basic conditions and in a wide range of solvents. They are also temperature stable up to 100˚C with no adverse effects.

Advantages of Jordi NP DVB Polyamino Columns:

- Efficient - high column plate counts
- Mixed-mode separations - combining ion exchange and normal phase
- Ease of Use - rapid recovery of the phase following gradient analysis
- Rugged – solvent changes will not damage columns
- Solvent compatibility - 100% organic to 100% aqueous buffers
- Wide pH range - pH values from 0 to 14
- Long column life – 3 month warranty standard

Jordi NP DVB Polyamino Applications and Solvents
Typical Application:
Sugar Separations
Typical Solvent System:
ACN
H_2O
Methanol

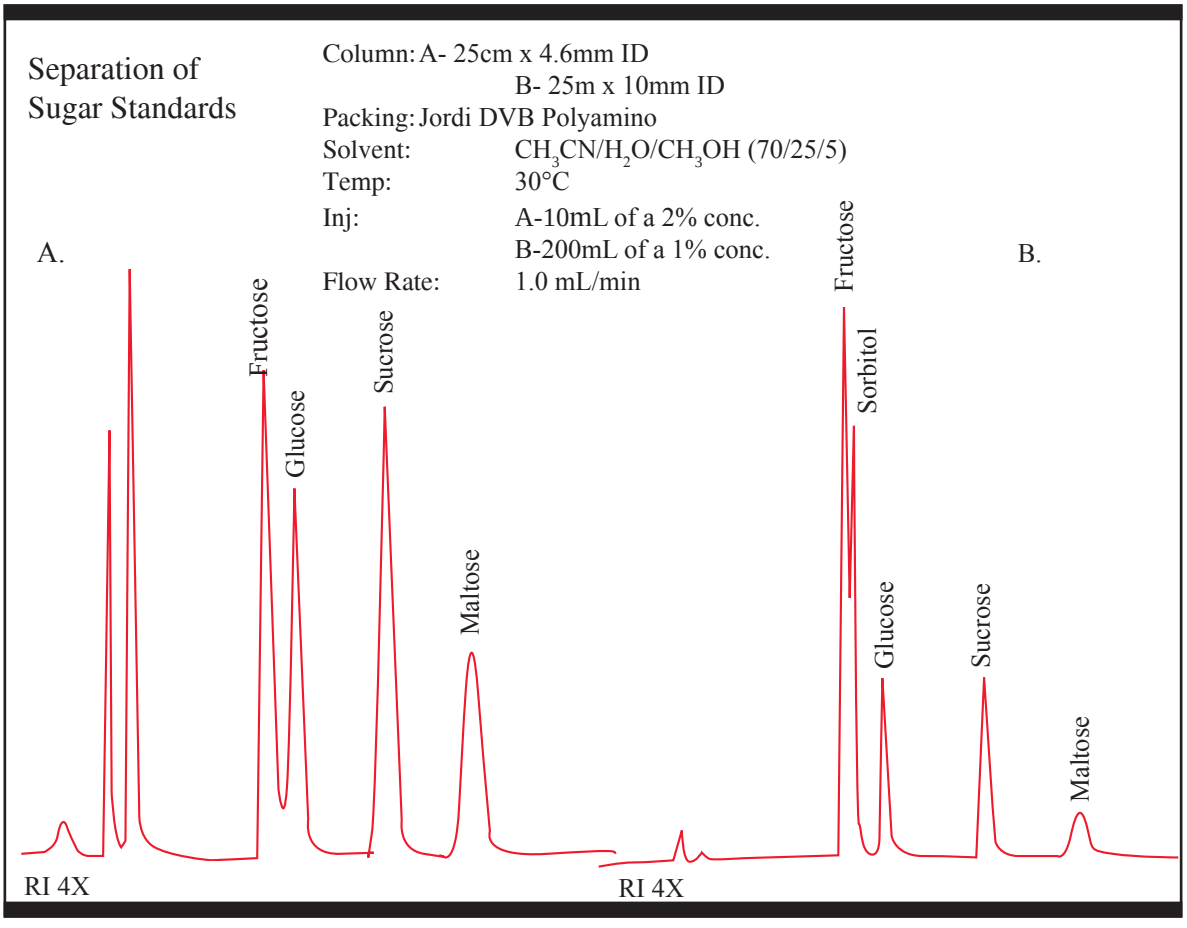
Select Jordi NP DVB Polyamino Applications

Jordi NP DVB Polyamino columns for the analysis of sugars utilizes a polyamine (NH and NH_2) bonded to the surface of a 500Å porosity, highly cross-linked, divinylbenzene polymer.

This unique combination of the polyamine surface functionality bonded to the extremely rugged base material provides the ability to separate a wide range of sugars. Higher molecular weight oligomers can be analyzed on the same column.

The particle size of the packing material averages 5 microns. This small particle size provides high efficiencies for modern HPLC. Because of the strength of the highly cross-linked DVB base material, the columns can be operated at pressures up to 30,000psig with no adverse effects.

The NH_2 functionality is chemically bonded to the surface of DVB; it remains on the surface, and the column retains the original separation characteristics for long periods of use. The column can also be cleaned and rejuvenated using strong acids, bases, or organic solvents to remove any adsorbed contaminants.



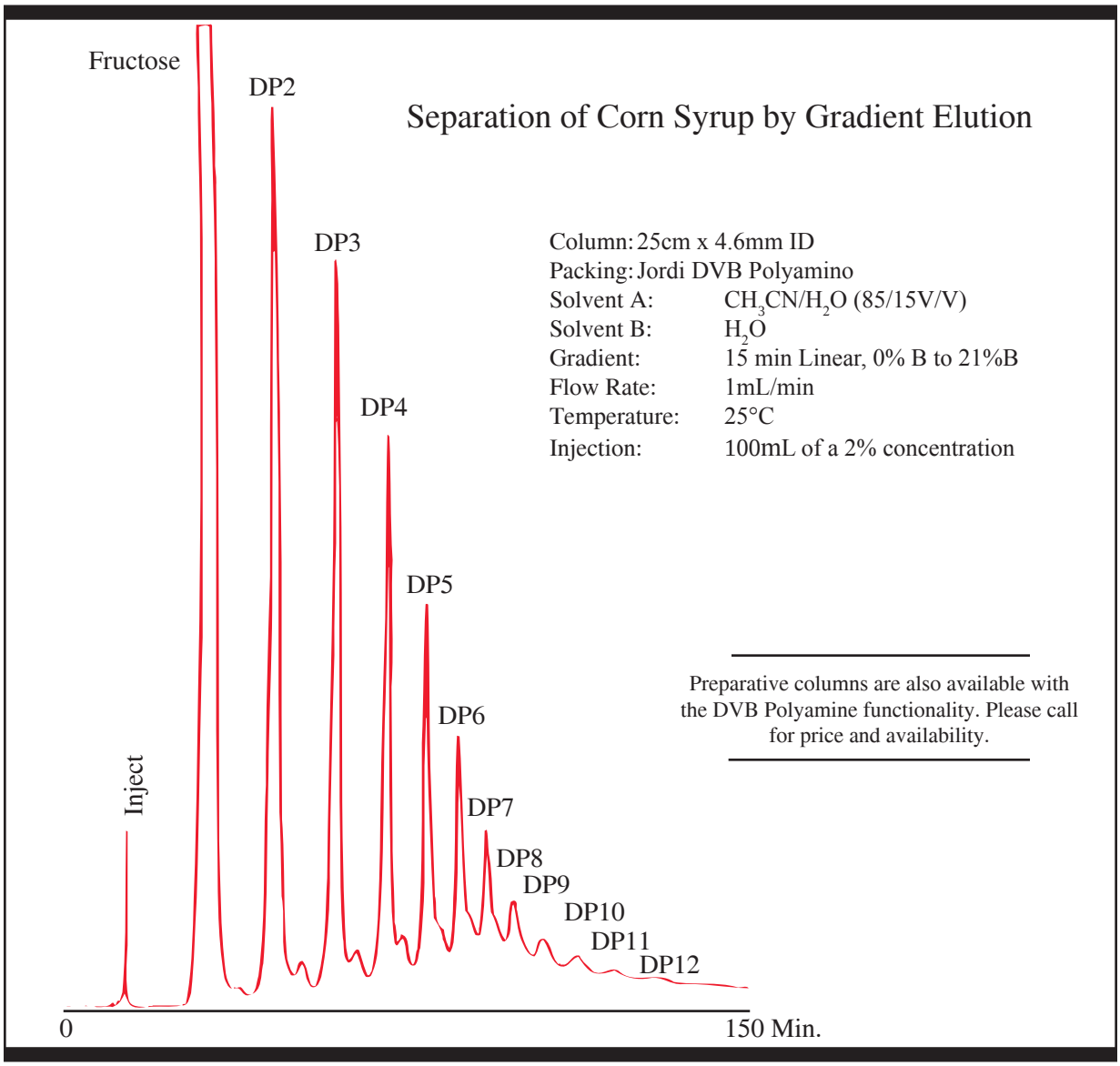
Polyamino Sugar Columns

Separation of Corn Syrup by Gradient Elution

Gradient elution provides increased separation capability for higher molecular weight sugars. The example below shows good resolution up to DP 12, although higher molecular weights could also be separated.

Temperature stability is excellent with the Jordi DVB polyamino columns and they can be readily operated up to 100°C with no adverse effects.

Jordi NP DVB Polyamino columns are available in two standard sizes, 25cm x 4.6mm ID and 25cm x 10mm ID. The 25cm x 10mm column provides greater resolving power with four times the sample loading capacity while the 25cm x 4.6mm column reduces analysis time.



Polyamino Sugar Columns

Jordi Polyamino Sugar					
Cat. #	***Pore Size***	***Particle Size***	***Length***	***ID***	***Price***
17013	500Å	5µ	15cm	4.6mm	$ 545.00
17010	500Å	5µ	25cm	4.6mm	$ 655.00

Jordi Polyamino - Microbore					
Cat. #	***Pore Size***	***Particle Size***	***Length***	***ID***	***Price***
17016	500Å	5µ	5cm	2.1mm	$ 545.00

Jordi Polyamino - Semi Prep					
Cat. #	***Pore Size***	***Particle Size***	***Length***	***ID***	***Price***
17012	500Å	5µ	30cm	7.8mm	$1,205.00
17011	500Å	5µ	25cm	10mm	$1,205.00

Jordi Guard Columns

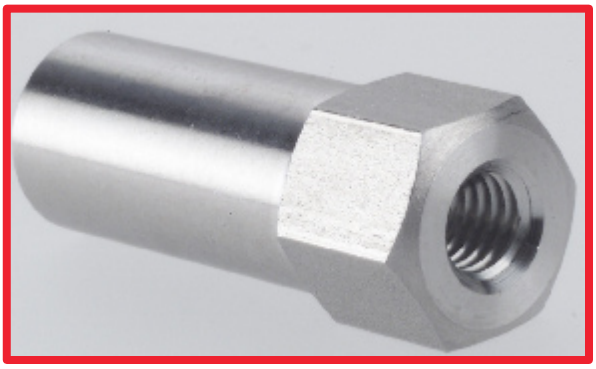
Guard columns are an excellent way to protect the investment you have made in your analytical columns. This is especially true when working with unknown samples which may contain reactive or adsorbable materials. A guard column is a shorter version of the analytical column which is sacrificed in order to protect your main column.

Jordi Guard columns are available for all GPC columns and most RP and NP columns. In all cases, your Guard column(s) will be packed with the same high quality gels used in your analytical column.

Jordi Guard Columns come in two porosities. Jordi 500Å guard columns protect porosities of 100Å, 500Å, and 10^3Å. Our mixed bed guard columns protect porosities of 10^4Å, 10^5Å, and Mixed Bed. For example, if you are purchasing P/N 15001 Jordi 500Å DVB Column, you can protect it with P/N 15001G5 Jordi 500Å DVB Guard Column. If you are purchasing P/N 15063 Jordi 10^4Å Glucose Column, you can protect it with P/N 15065G5 Jordi MB Glucose Guard Column. Jordi guard columns come in 10mm x 50mm and 7.8mm x 40mm sizes. Customized solutions are available if larger sizes are desired.

See our easy-to-use guide on the next page for the appropriate guard column. If you need additional assistance selecting the correct guard column, please contact customer service or use our Guard Column Finder at http://www.jordiflp.com/guard.php.

Jordi Guard Columns					
Gel Type	***Cat. #***	***Main Column***	***Porosity Guarded***	***Sizes Guarded***	***Price***
DVB	15001G5	15000, 15001, 15002, 15020, 15021, 15022	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	15071G4	15070, 15071, 15072		7.8mm x 300mm	
	15005G5	15003, 15004, 15005, 15023, 15024, 15025	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	15075G4	15073, 15074, 15075		7.8mm x 300mm	
Fluorinated	90011G5	90000, 90001, 90002, 90010, 90011, 90012	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	90061G4	90060, 90061, 90062		7.8mm x 300mm	
	90015G5	90003, 90004, 90005, 90013, 90014, 90015	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	90065G4	90063, 90064, 90065,		7.8mm x 300mm	
Glucose	15061G5	15050, 15051, 15052, 15060, 15061, 15062	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	30061G4	30060, 30061, 30062		7.8mm x 300mm	
	15065G5	15053, 15054, 15055, 15063, 15064, 15065	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	30065G4	30063, 30064, 30065		7.8mm x 300mm	
Hydroxylated	20001G5	19000, 19001, 19002, 20000, 20001, 20002	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	20011G4	20010, 20011, 20012		7.8mm x 300mm	
	20005G5	19003, 19004, 19005, 20003, 20004, 20005	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	20015G4	20013, 20014, 20015		7.8mm x 300mm	
Sulfonated	15041G5	15030, 15031, 15032, 15040, 15041, 15042	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	15721G4	15720, 15721, 15722		7.8mm x 300mm	
	15045G5	15033, 15034, 15035, 15043, 15044, 15045	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	15725G4	15723, 15724, 15725		7.8mm x 300mm	
Polar Pack WAX	15091G5	15080, 15081, 15802, 15090, 15091, 15092	100Å, 500Å, 10^3Å	10mm x 250mm	$435.00
	15701G4	15700, 15701, 15702		7.8mm x 300mm	
	15095G5	15083, 15084, 15085, 15093, 15094, 15095	10^4Å, 10^5Å, Mixed Bed	10mm x 250mm	
	15705G4	15703, 15704, 15705		7.8mm x 300mm	



Thank you for purchasing a Jordi column. We strive to provide the highest quality HPLC columns on the market. Our goal is to make you successful. If you experience any problems or need any technical advice, please call or email us; we are here to help you. All Jordi columns are warranted for 90 days from the date received.

For technical support, Jordi customer service is available at:

Email: techsupport@jordiflp.com
Phone: 508-966-1301

Installation

Jordi recommends the use of stainless steel tubing of 1/16" OD and 0.010" ID for column connections of analytical columns. Preparative columns 22mm and greater require 0.020" ID tubing. Excessive tubing volume should be avoided by minimizing the tubing length between the column, detector and injector. The use of Jordi Column Connectors is recommended when connecting multiple columns in series. These connectors come preassembled and ready to use. For more information, see the Jordi Column Accessories on page 115.

General Guidelines for All Jordi Columns

In an effort to maximize column life expectancy and performance, steps should be taken to prepare each sample before injection. This should include sample filtration to remove particulates, and possibly, solid phase extraction (SPE) to remove highly retained sample components. Jordi offers a complete line of SPE products for sample cleanup.

Jordi recommends using a guard column to protect your analytical column. The guard column will help protect your analytical column from particulate matter and highly retained sample components. The guard column should be changed when performance measures decline, such as plate count, pressure, or resolution. A list of Jordi guard columns is found on page 92.

Optimum sample injection volumes and concentrations are best determined for each type of analysis and are dependent on sample MW. Broad distribution polymers can generally be injected at higher concentrations than lower polydispersity samples. Overloading will not damage the Jordi column, but distorted peaks and questionable results may occur.

Tips For Best Results with GPC Columns

1. Run your column at 0.5-2.0mL/min for maximum life and best results. Our recommended flow rates for organic GPC columns are 1.5mL/min for 10mm sizes and 1.0mL/min for 7.8mm columns. Aqueous phases should be run at .6ml/min for 10mm sizes.

2. For use in TCB at 140-150°C, we recommend purging the columns at 0.2mL/min for 10-12hr with TCB at 40°C and then ramping up to your desired temperature over 6 hours.

Jordi GPC Specifications

Description	*MW Range*
GPC Solid Bead	2,000-400,000,000
GPC 100Å	<50-5,000
GPC 500Å	<50-10,000
GPC 10^3Å	<100-50,000
GPC 10^4Å	100-100,000
GPC 10^5Å	10,000->10,000,000
GPC Mixed Bed	100->10,000,000

3. If you notice a calibration change after significant use, you may need a clean frit(s) particularly on the column inlet. If the original inlet frit clogs, it will contribute to shearing of high MW polymer and thus, must be changed.

4. For special solvents, i.e. DMSO/H_2O, MeOH, Acetone, please call a Jordi technician.

5. For any solvent changeover involving miscible solvents, it is best to purge with the new solvent at 0.2mL/min for 10-12hr. Immiscible solvents require an intermediary solvent that both the initial and final solvent are miscible with.

6. The Jordi Mixed-Bed, 10^4Å and 10^5Å materials should never exceed 2000psig as this will crush the gel. For solid bead, 100Å, 300Å, 500Å and 10^3Å gels you may run pressures up to 8000psig without damaging the column.

7. If you have any specific questions, please contact us. We are here to serve you.

Tips for Best Results with Reverse Phase Columns

1. The flow rate ranges for various reverse phase columns are shown in the table to the right:

2. Do not worry about high back pressures. Jordi columns are packed at 8,000psig and can run for months at pressures in the 3,000-5,000psig range without damage.

Jordi RP Flow Rate Range

Column ID	*Flow Rate Range*
4.6mm	0.5-1.5mL/min.
10mm	1.0-2.0mL/min.
22mm	3.0-6.0mL/min.

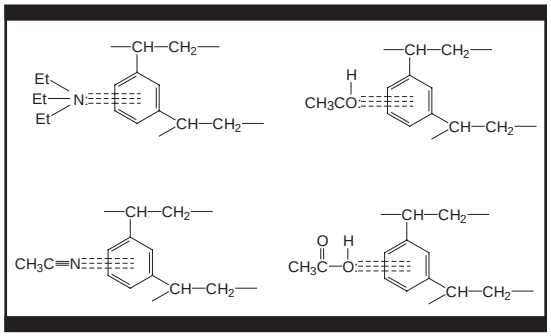
3. If you notice a change in plate count or resolution after significant use, you may need a clean frit(s), particularly on the column inlet.

4. Try to keep at least 5% organic in your solvent when using Jordi DVB and Fluorinated DVB columns. Jordi gel is very hydrophobic and will not wet in water. A premature loss in column efficiency can occur when 100% water or buffer solutions are used.

Avoiding Tailing and/or Adsorption Phenomena

Because of the large number of aromatic rings inherent in the packing's structure, Jordi Gel columns based on divinylbenzene will give unique responses to certain types of samples.

If your samples contain aromatic rings or atoms such as O or N with unshared electron pairs, they have the potential to be strongly retained and/or tail on the Jordi Gel columns. To avoid this we recommend the use of a competing electron-rich solvent in the mobile phase.



Solvents which are commonly used for this purpose include acetonitrile, triethylamine (TEA), or n-butylamine as they coordinate with the aromatic rings on the packing material creating a less electron-dense surface chemistry.

For certain separations, it is also possible to use sodium acetate to modify peak shape and retention. In like manner, using low percentages of glycerol, 2-propanol, or other similarly hydrophilic hydroxylated solvents reduces the net effective surface hydrophobicity. The diagram above indicates several possible interactions of the mobile phase modifiers with the aromatic rings of the DVB gel.

In our experience, it is best to use quantities of 0.5-2.0% of TEA or ethylene glycol, or 0.01M Na Acetate, and anywhere from 2.0-100% of solvents such as CH_3CN, CH_3OH, or 2-propanol. We have also found that a 50/50 V/V CH_3CN/CH_3OH mixture as strong solvent is better than either used alone.

For samples containing the piperazine group, such as hindered amine light stabilizers, we have found that 98/2 V/V $CHCl_3$ /TEA or 75/25 V/V THF/ MeOH with 0.01 M NaAc are excellent mobile phases and yield high quality GPC results on the Jordi Gel DVB columns.

Solvent Changeover

Jordi columns are some of the most durable in the industry tolerating a very wide range of solvents. When purging your column into a new solvent, it is important to keep in mind the following facts:

Column Size	*Volume*
10mm x 25cm	40ml
7.8mm x 30cm	40ml
10mm x 50cm	80ml
4.6mm x 15cm	15ml
4.6mm x 25cm	25ml

1. Before changing solvents, please confirm that your column is compatible with your new mobile phase. The solvent compatibility of Jordi columns is so broad that it is easier to list which solvents should not be used. Jordi DVB and Jordi Fluorinated DVB columns should not be used in 100% water or buffer solutions. At least 5% organic solvent should be maintained at all times. All other columns have no known solvent limitations.

2. Always purge your column into a new solvent at 0.2ml/min until two full column volumes have passed through the column.

Frit Replacement

Changing column frits is simple and can be accomplished using the Jordi Frit Removal Tool, see pg 116 for ordering information.

To change a column frit, please follow these steps:

1. Clamp the column, with outlet and inlet plugs in place, in a ring stand or a bench vice with the column inlet pointing up.

2. Allow the column to equilibrate to room temperature before removing the column end fitting.

3. Carefully loosen and remove the column end fitting. Hold the column end fitting steady with one wrench while loosening the column nut with another wrench until it drops away from the end fitting.

4. Remove the column distributor frit using a frit removal tool or by pulling up on the plastic housing. Be careful when removing the frit to prevent the loss of significant gel from the tube end.

5. Clean the top surface of the column by gently scraping a flat spatula or a razor blade across the gel surface. Be sure to avoid disturbing the packing material in the column. To get the surface even, you may have to wet the packing with the solvent that the column is conditioned in or another miscible solvent.

6. Place a new distributor frit cap on top of the cleaned surface of the column. Press the frit firmly down onto the column end.

7. Rinse all residual packing material from the column end fitting and frit. Failure to remove packing material from threads and sealing surfaces, e.g. frit, may result in leaks or clogging.

8. Replace the column end fitting. Use wrenches to tighten the end fitting nut approximately 1/4 turn past finger tight. Do not over tighten.

9. Connect the column to the HPLC system and check for leaks.

10. If the column leaks, turn the pump flow off; allow the pressure to bleed off, and then tighten the end-fitting nut slightly more, approximately 1/8 of a turn.

Quality Assurance

Jordi has a strict quality assurance program designed to provide our customers with a product they can trust every time.

All Jordi columns come with a Quality Assurance Certificate to ensure customer satisfaction. This certificate provides the customer with performance information for the specific column received. Performance measures included are plate count, back pressure, resolution and symmetry. Since instrumentation, tubing, and other elements can alter performance, your results may vary slightly from the results shown on the Jordi certificate. Taking care to follow the instructions outlined in this guide will help ensure the highest product performance.

Storage

Jordi end plugs should be used to cap the column when not in use. Jordi columns should be stored at room temperature; preferably in the box they were originally shipped in for safekeeping. Jordi columns can be stored in many solvents without concern. However, reactive solvents such as unstabilized tetrahydrofuran (THF) should not be used to store columns for extended periods. If you have any questions regarding a specific solvent, please contact a Jordi representative for technical advice.

Warranty

Jordi columns come with a 90 day warranty from the date of delivery. This warranty does not cover: installation or service of product, conditions resulting from consumer mishandling such as improper maintenance or misuse, abuse, accident, or alteration.

Return Policy

Jordi products can be returned within 30 days of delivery. There is a 15% restocking fee on list price for all orders. All returned products must be accompanied by a Return Merchandise Authorization (RMA) number. To obtain an RMA number, please contact the Jordi representative from which the items were originally purchased. You may also contact Jordi customer service directly at:

Email: info@jordiflp.com Phone: 508-966-1301