Benson polymeric™

Catalogue

Resins and Columns

For

High Performance Liquid Chromatography

Updated August 11, 2008

PO Box 12812
Reno, NV 89510, USA
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1-775-356-6305 fax
www.bensonpolymeric.com

Contents

Benson Polymeric provides premium polymeric column packing materials and pre-packed columns for use in (HPLC) High Performance Liquid Chromatography.

Along with our product line, we custom manufacture column packing materials and different column formats. If you cannot find a product that meets your requirements in our catalog, please contact us.

! New for 2008 !

Celadon™ Brand columns from Benson Polymeric Inc.

A selection of silica and polymer columns to compete against other manufacturers for the **Quality and Price Conscience Customer**. Please see our web site for a separate catalogue on these exciting offerings!

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About Benson Polymeric Inc.

We wish to take this time to thank all of our customers over the years, and to invite you to look over our catalogue and website for information and/or products that will suit your applications.

During the past 30 years, as Benson Company and Benson Polymeric, Inc., we have provided premium column packing materials and pre-packed columns to the major chromatography equipment manufacturers and supply distributors in the industry as well as direct sales through dealers. The primary objective of our company is to provide the highest quality products and technical services to our customers.

The application of liquid chromatography has become a routine procedure in the scientific community, yet there still remains considerable technical "art" to achieving the accuracy and precision required by the bench scientist. While the scientist may control many of the test variables, the heart of the system remains the resin and column packing which play the most critical role in determining research results and ensuring test reproducibility. As one of the few companies that manufacture its own resins, Benson Polymeric optimizes quality control in resin and column production providing you with greater confidence in the results obtained at the bench level.

James V. Benson, PhD., founder of Benson Polymeric, has been at the forefront of the development of HPLC polymer application research. As a Senior Application chemist with Beckman, he developed the "first" polymer based, spherical chromatographic resins. Based on the rapidly evolving theory in liquid chromatography of the time, these high-performance column packing's led to the design of the first modern LC units. As a result, the resin technology created by Jim played a critical role in the development of rapid, high-performance separation of amino acids and related compounds.

Acting now as Director and Scientific Consultant to the company, Jim is committed to the future evolution of chromatography applications, and will continue his developmental research efforts on a perfect spherical chromatographic packing material superior to anything currently available in commercial markets.

As a result, customers of Benson Polymeric will benefit from Jim's extensive experience and knowledge in the chromatography field. Benson Polymeric produces and markets superior packing materials characterized by batch to batch reproducibility. These resins permit sample peak separations to be performed in a shorter time with improved peak resolution. In addition, the company offers a technical service program unique to the industry based on the knowledge and expertise of one of the industry's original pioneers.

Sincerely,

The Staff at Benson Polymeric

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Columns for Carbohydrate Analysis

Columns for Organic Acid Analysis

Porous Reverse Phase

BP-PRP - Discontinued until further notice

Column Repacking Service

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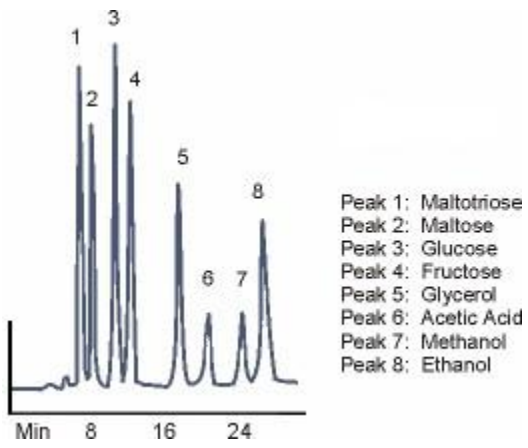
- ***USP L17***
- ***BP-100, H^+, 6% cross-linked resin in the H^+ form***
- ***UV, RI, Conductivity Detection***
- ***Unequaled peak resolution***
- ***Water or Dilute acid as the Mobile Phase***

The BP-100, H + carbohydrate column is used in the separation of carbohydrates, organic acids and alcohols, by the wine and dairy industry, in bio-reactions and in medical science applications.

The BP-100, H^+ carbohydrate column is similar to the ion exchange (850, BP-OA, Organic Acids) column, except for a different degree of cross linking and sulfonation. The variation in cross-linking and sulfonation optimizes not only the separation of carbohydrates present in the sample but also the organic acids and alcohols which may be present. Only water or dilute acid is used as the mobile phase at ambient temperatures.

Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20µL
Flow Rate:	0.4 ml/min
Temperature:	Ambient
Eluent:	2.5 mM H_2SO_4



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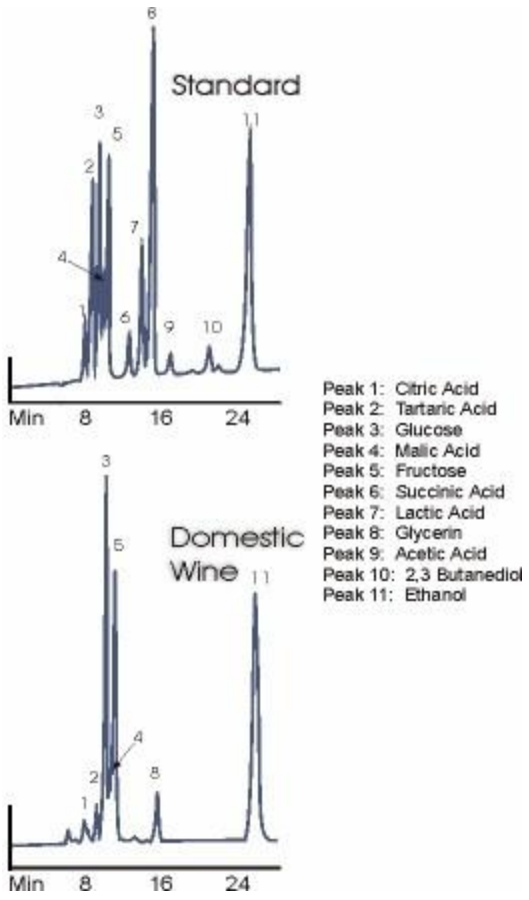
The analysis of organic acids and carbohydrates in wines and fruit juices provide information on fermentation processes and product quality. Control of organic acid peak elution times are affected by eluent pH and temperature.

Protonated molecular species are better retained by the resin column. A dilute solvent modifier such as acetonitrile, which can result in an increase in back pressure, will reduce the elution time of most sample species. This is especially true for those components which have a high resin interaction, e.g. phthalate.

Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.4 ml/min
Temperature:	60°C
Eluent:	2.5 mM H_2SO_4



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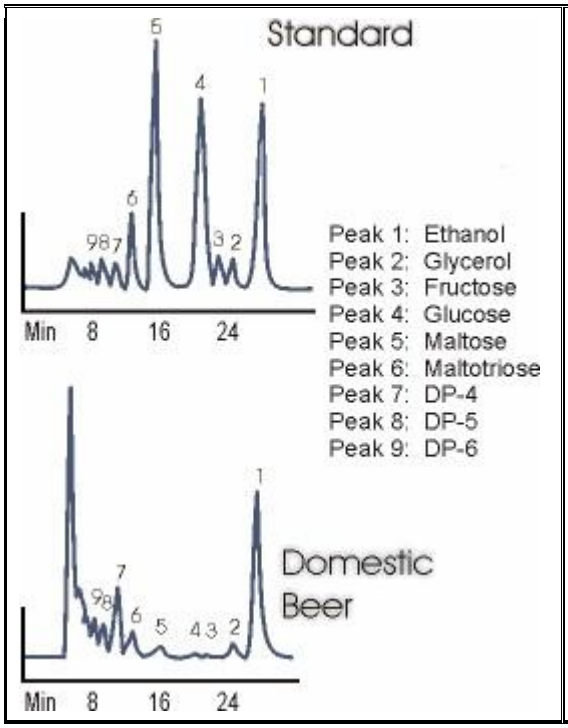
- ***BP-100 Carbohydrate Ag+ Columns***
- ***BP-100, Ag+, 6% cross-linked resin Great for Oligosaccharides***
- ***Unequaled peak resolution***
- ***Chemically stable***
- ***DI Water as the Mobile Phase***

Applications for the BP-100 Carbohydrate Ag+ Columns include the brewing and corn syrup industries.

The BP-100, Ag+ carbohydrate column provides rapid oligosaccharide separations. This sulfonatd high cross-linked styrene-divinylbenzene copolymer resin in the silver form is stable and can resolve saccharides as large as DP-7.

Developed specifically for the separation of those saccharides found in beer and corn syrup and can be used to monitor starch hydrolysis. Note that glycerol, fructose and DP-4, DP-5 and DP-6 are well resolved in a sample of domestic beer.



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.3 ml/min
Temperature:	85°C
Eluent:	H_2O

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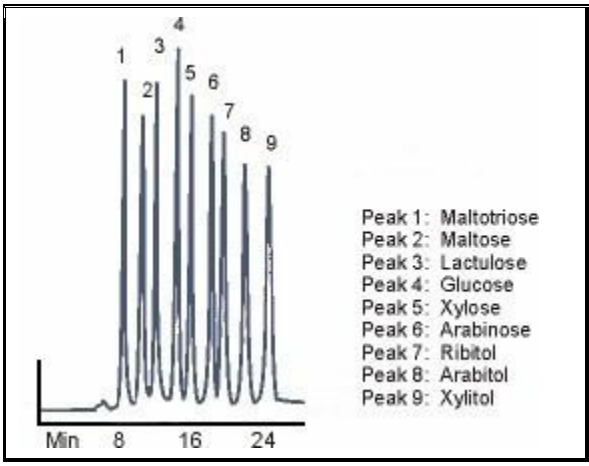
- ***BP-100 Carbohydrate Ca^{++} Columns***
- ***USP L19***
- ***BP-100, Ca^{++}, 6% cross-linked resin***
- ***Great for Monosaccharides and Sugar Alcohols***
- ***Unequaled peak resolution***
- ***DI Water as the Mobile Phase***

BP-100 Carbohydrate Ca^{++} Column is used for baked goods, vegetables, fruit juices, soft drinks, beer brewing and dairy products.

The BP-100, Ca++ carbohydrate column requires only water as the mobile phase and can be used in the food industry for the separation of sweeteners in baked goods and sugar alcohols such as sorbitol, mannitol and xylitol which are often used as sweeteners in fruit juices, soft drinks, and beer and dairy products.



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.4 ml/min
Temperature:	85°C
Eluent:	H_2O

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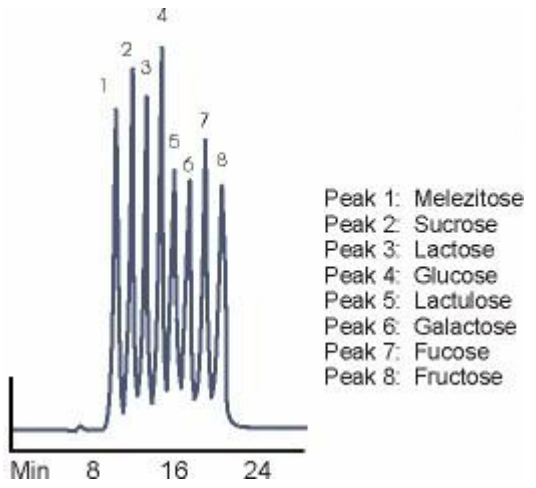
- ***BP-100 Carbohydrate Pb^{++} Columns***
- ***USP L34***
- ***BP-100, Pb^{++}, 6% cross-linked resin***
- ***Highest resolution and selectivity for monosaccharide and disaccharide separations***
- ***Unequaled peak resolution***
- ***DI Water as the Mobile Phase***

Our BP-100 Carbohydrate Pb^{++} Column can be utilized in the analysis of dairy and meat products, cereals and plant fibers.

The BP-100, Pb^{++} column is packed with a 10µm sulfonated styrene-divinylbenzene polymer resin in the lead form. Complex sugars are often used to add distinctive tastes to foods and beverages. Pentoses and hexoses found in cellulose products are well separated especially glucose, xylose, galactose, cellobiose, arabinose and mannose. This lead resin column is quite useful for the separation of xylose, galactose and mannose which are not completely resolved on the calcium column. In addition, the lead column resolves sucrose and lactose well if these two sugars are present in excess in some samples.



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.4 ml/min
Temperature:	85°C
Eluent:	H_2O

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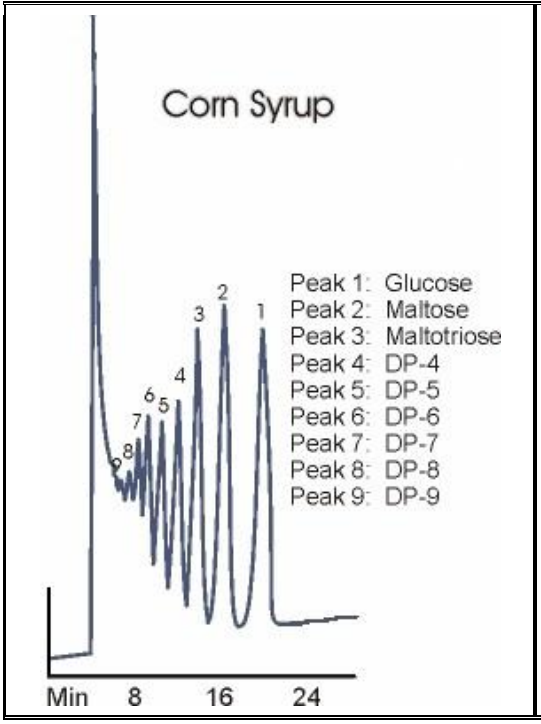
- ***BP-200 Carbohydrate Ag^+ Columns***
- ***BP-200, Ag^+, 4% cross-linked resin***
- ***Oligosaccharides***
- ***Unequaled peak resolution***
- ***Chemically stable***
- ***DI Water as the Mobile Phase***

The BP-200 Carbohydrate Ag^+ Column applications include the brewing and corn syrup industries.

The BP-200, Ag^+ column provides rapid oligosaccharide separations. This sulfonated low cross-linked styrene-divinylbenzene copolymer resin in the silver form is stable and can resolve saccharides as large as DP-12. This column is useful in the carbohydrate industry to determine hydrolyzates in the conversion of corn syrup to fermentable carbohydrates.



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.3 ml/min
Temperature:	85°C
Eluent:	H_2O

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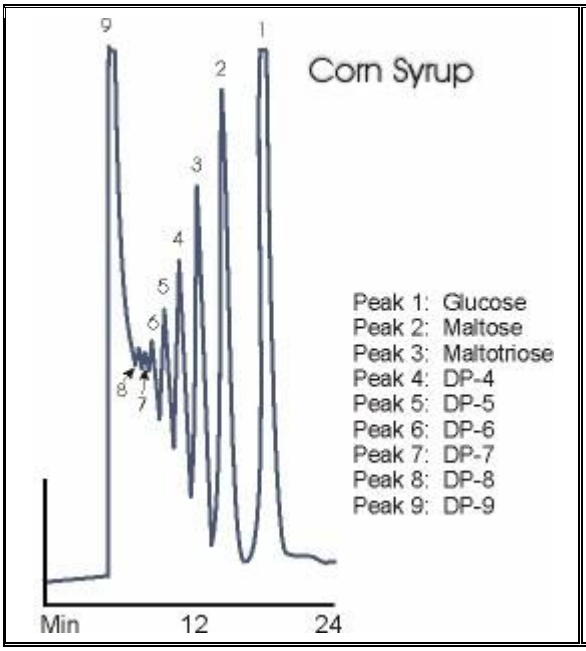
BP-200 Ca^{++} Carbohydrate Column

- ***BP-200 Carbohydrate Ca^{++} Columns***
- ***USP L19***
- ***BP-200, Ca^{++}, 4% cross-linked resin***
- ***Oligosaccharides***
- ***Unequaled peak resolution***
- ***DI Water as the Mobile Phase***

The BP-200, Ca^{++} column finds wide use in the corn syrup industry.

The BP-200, Ca^{++} column is packed with a sufonated low cross-linked 10µm styrene-divinylbenzene polymer resin in the calcium form. The large pores of the resin resolve oligosaccharides as large as DP-8. This resin also resolves mono and disaccharides in samples such as starch hydrolyzates.



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.3 ml/min
Temperature:	90°C
Eluent:	H_2O

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- ***USP L17***
- ***BP-OA, 8% cross-linked resin in the H^+ form***
- ***Stable pH 0-14***
- ***Conductivity, UV or RI detection***
- ***Water or dilute acid eluent***

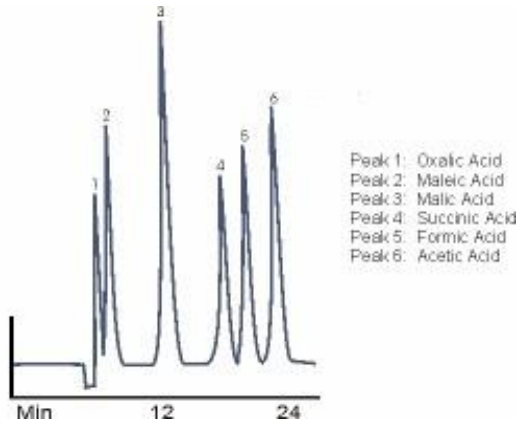
The BP-OA columns are for use on biological fluids, beverages, foods, industrial chemicals and fermentation processes

Our BP-OA columns are used for determining the anions of weak organic and inorganic acids. Anions of organic acids include acetate, formate, oxalate and others. Anions of inorganic acids include fluoride, bicarbonate, borate, silicate and others.

Acids are eluted usually in order of acid strength with the stronger acids eluting last (in order of increasing pKa values). Retention times of the organic acids may be controlled through adjustment of the eluent pH.

Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	Conductivity
Sample Volume:	20 µL
Flow Rate:	0.6 ml/min
Temperature:	Ambient
Eluent:	0.003 NH_2SO_4



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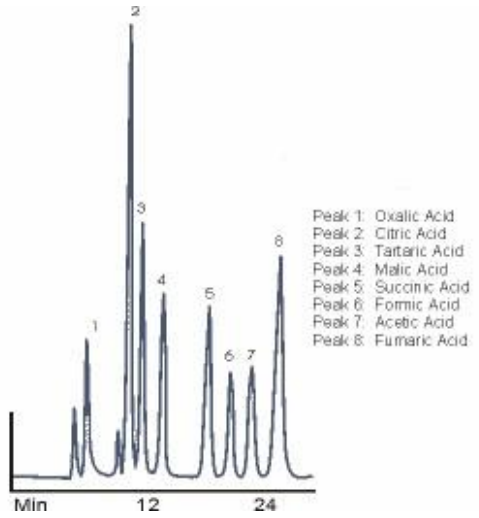
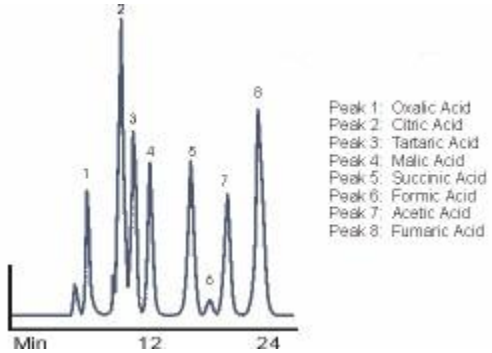
Operating Conditions

Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	UV 210nm
Sample Volume:	20 µL
Flow Rate:	0.5 ml/min
Temperature:	Ambient
Eluent:	0.10% Phosphoric Acid



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	50 mm x 4.6 mm
Detection:	UV 210nm
Sample Volume:	20 µL
Flow Rate:	0.1 ml/min
Temperature:	Ambient
Eluent:	0.10% Phosphoric Acid



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- ***USP L17***
- ***Sulfonated styrene-divinylbenzene resin, 6% cross-linked in the H + form***
- ***Separations in less than 6 minutes***
- ***Stable from pH 0-14***
- ***Dilute sulfuric acid eluent***

The BP-RA Rapid Alcohol (and carbohydrate) Analysis column will separate the more hydrophobic components in the sample giving an accurate determination of the ethanol present. In most cases only minimal sample preparation required. The undiluted or diluted sample need only be filtered and injected on the column. Use of a short, large diameter, column gives vastly improved peak resolution resulting in high narrow peaks which improve detection limits.

Operating Conditions

Column Type:	Stainless Steel
Dimensions:	100 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 µL
Flow Rate:	0.7 ml/min
Temperature:	50°C
Eluent:	0.003 NH_2SO_4

Peak 1: Glycerol
Peak 2: Acetic Acid
Peak 3: Ethanol

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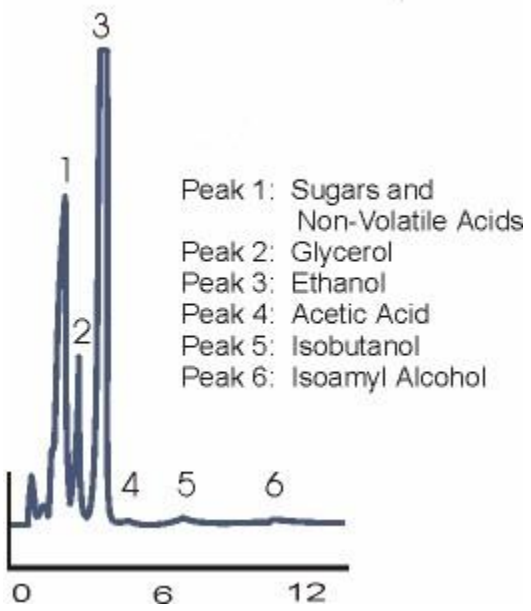
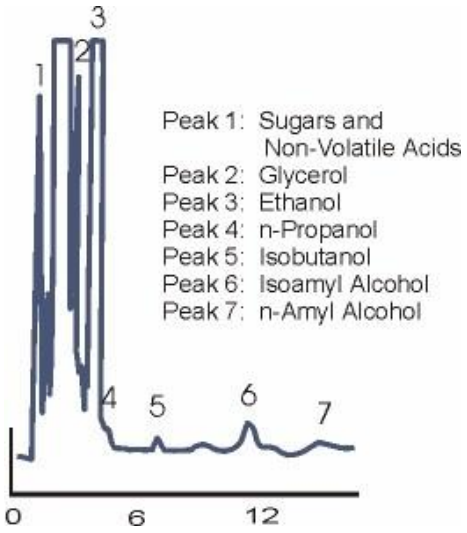
Operating Conditions

Column Type:	Stainless Steel
Dimensions:	100 mm x 7.8 mm
Detection:	RI
Sample Volume:	10 µL
Flow Rate:	0.7 ml/min
Temperature:	50°C
Eluent:	0.003 NH_2SO_4



Operating Conditions

Column Type:	Stainless Steel
Dimensions:	100 mm x 7.8 mm
Detection:	RI
Sample Volume:	10 µL
Flow Rate:	0.7 ml/min
Temperature:	50°C
Eluent:	0.003 NH_2SO_4



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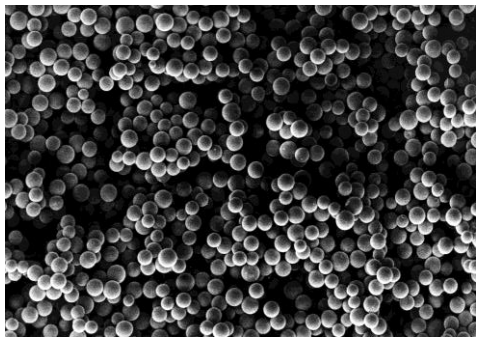
- ***Uniformly sized spherical bead***
- ***Batch to batch reproducibility***
- ***Easy to pack in a column (density 1.05 to 1.30 g/cc)***
- ***Low operating pressures***
- ***Long term stability***



Benson Polymeric offers a complete range of high performance column packing materials which have been polymerized from pre-purified monomers (styrene-divinylbenzene) by controlled processes. Unlike other ion-exchange resins, most of which were made for water conditioning applications and adapted to chromatography, Benson Polymeric resins are made specifically for high performance liquid chromatography (HPLC) use. These resins have been processed to leave no linear material residue on the surface of the beads, thus minimizing bed compression and expansion commonly found in other resinous materials.

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Typical applications include:

- ***Carbohydrates - corn syrup (BP-100 and BP-200)***
- ***Organic Acids (BP-OA)***
- ***Polynuclear Aromatic Hydrocarbons (BP-CX8, 10µm)***
- ***Analgesics (BP-CX10, 10µm)***
- ***Pharmaceuticals***
- ***Chlorinated Biphenyls (BP-CX4, 10µm)***
- ***Nucleosides / Amines***

The strongly acidic, nuclear sulfonic acid, cation exchange resins are supplied in the fully hydrated sodium form, unless indicated otherwise.

- *pH range 1-14.*
- *Density: 1.28g/cc*
- *Typical capacities are 1.8 meq/ml*

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Anion Exchange Resins

Typical applications include:

- ***Sugars (BP-AX4, 10µm)***
- ***Carbohydrates (BP-AX4, 10µm)***
- ***Nucleotides/Phenols/Aromatic and Aliphatic Acids***

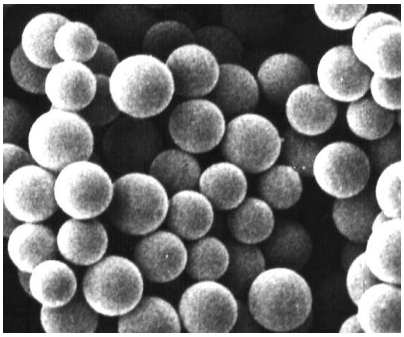
The strongly basic anion exchange resins have quaternary ammonium functional groups attached to the styrene-divinylbenzene lattice. They are supplied in the fully hydrated chloride form.

- *pH range of 1-12.*
- *Exchange capacity ~ 1.5 meq/ml*
- *Density: 1.12 g/cc.*

Neutral Resins

These polymers are nonionic spherical styrene-divinylbenzene beads. Operating efficiencies of 16,000 plates per meter have been obtained. Benson neutral resins have exclusion limits of 1500 MW for the 4% cross-linked beads and 500 MW for the 7% cross-linked beads.

- *Density: 1.05 g/cc.*



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