

## *Catalogue*



*Resins and Columns*

*For*

*High Performance Liquid Chromatography*

Updated August 11, 2008

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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](#).

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*Columns – [Page 4](#)*

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***! New for 2008 !***

***Celadon<sup>TM</sup> 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!

## *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*



## Columns for Carbohydrate Analysis

- BP-100, H<sup>+</sup>* - Wines, Dairy, Bio-reactions, Medical Science (USP L17) – [Page 5](#)
- BP-100, Ag<sup>+</sup>* - Specific for Oligosaccharides in beer and corn syrup – [Page 7](#)
- BP-100, Ca<sup>++</sup>* - Monosaccharide's, Sugar Alcohols, Fruit Juices, Soft Drinks, Dairy, Vegetables, Medical Sources (USP L19) – [Page 8](#)
- BP-100, Pb<sup>++</sup>* - Dairy, Cereals, Meat Products, Plant Fibers (USP L34) – [Page 9](#)
- BP-200, Ag<sup>+</sup>* - Oligosaccharides (DP10-12) – [Page 10](#)
- BP-200, Ca<sup>++</sup>* - Oligosaccharides (As large as DP8), Corn Syrup, Brewing (USP L19) – [Page 11](#)

## Columns for Organic Acid Analysis

- BP-OA* - 8% cross-linked resin in the H<sup>+</sup> form (USP L17) – [Page 12](#)
- BP-RA* - Rapid Alcohol (USP L17) Porous Reverse Phase – [Page 14](#)

## Porous Reverse Phase

- BP-PRP* - Discontinued until further notice

## Column Repacking Service

- BP-RS* - Discounts applied for repacking your spent column – [Page 16](#)

## BP-100 H<sup>+</sup> Carbohydrate Column

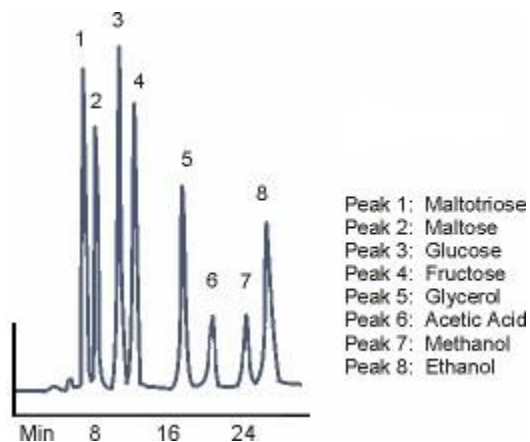
- **USP L17**
- **BP-100, H<sup>+</sup>, 6% cross-linked resin in the H<sup>+</sup> form**
- **UV, RI, Conductivity Detection**
- **Unequaled peak resolution**
- **Water or Dilute acid as the Mobile Phase**

The BP-100, H<sup>+</sup> 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<sup>+</sup> 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

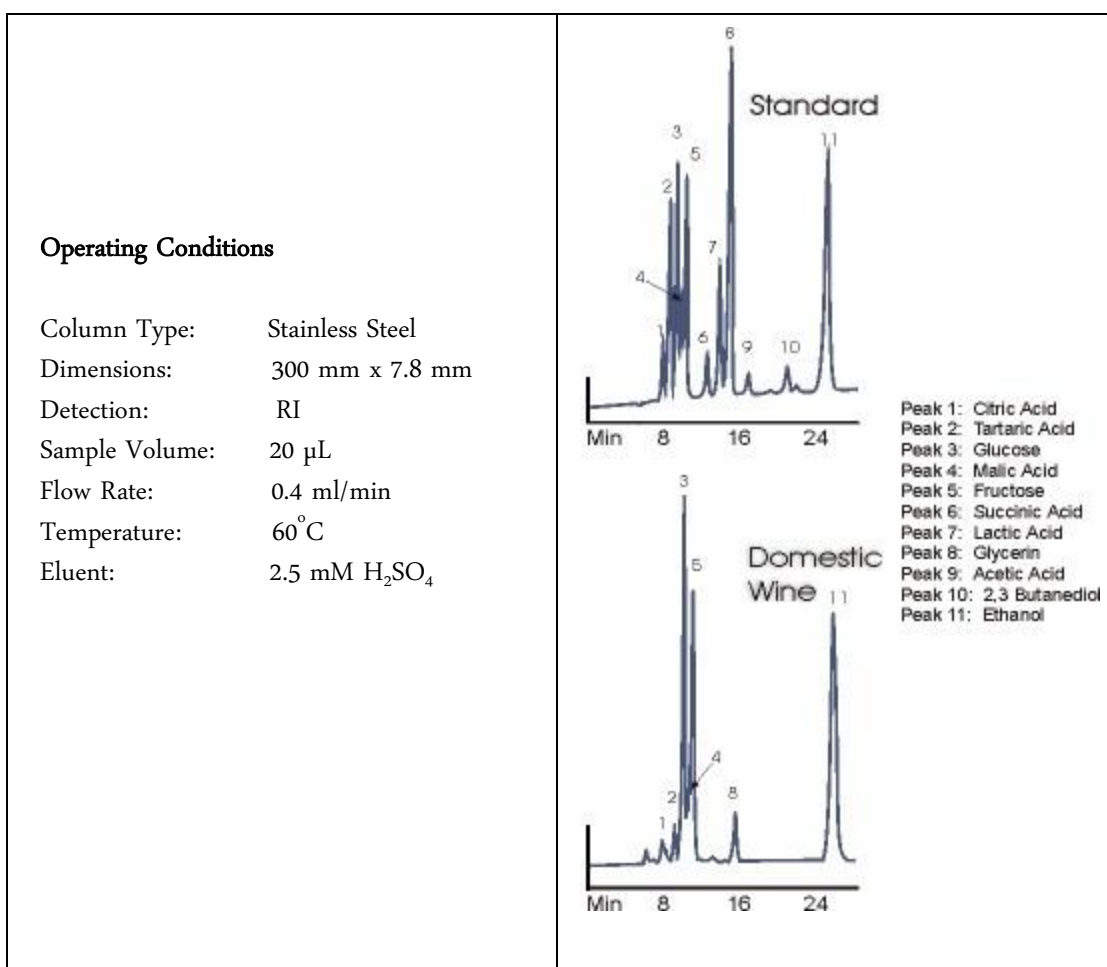
Column Type:	Stainless Steel
Dimensions:	300 mm x 7.8 mm
Detection:	RI
Sample Volume:	20 $\mu$ L
Flow Rate:	0.4 ml/min
Temperature:	Ambient
Eluent:	2.5 mM H <sub>2</sub> SO <sub>4</sub>



## BP-100 H<sup>+</sup> Carbohydrate Column

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.



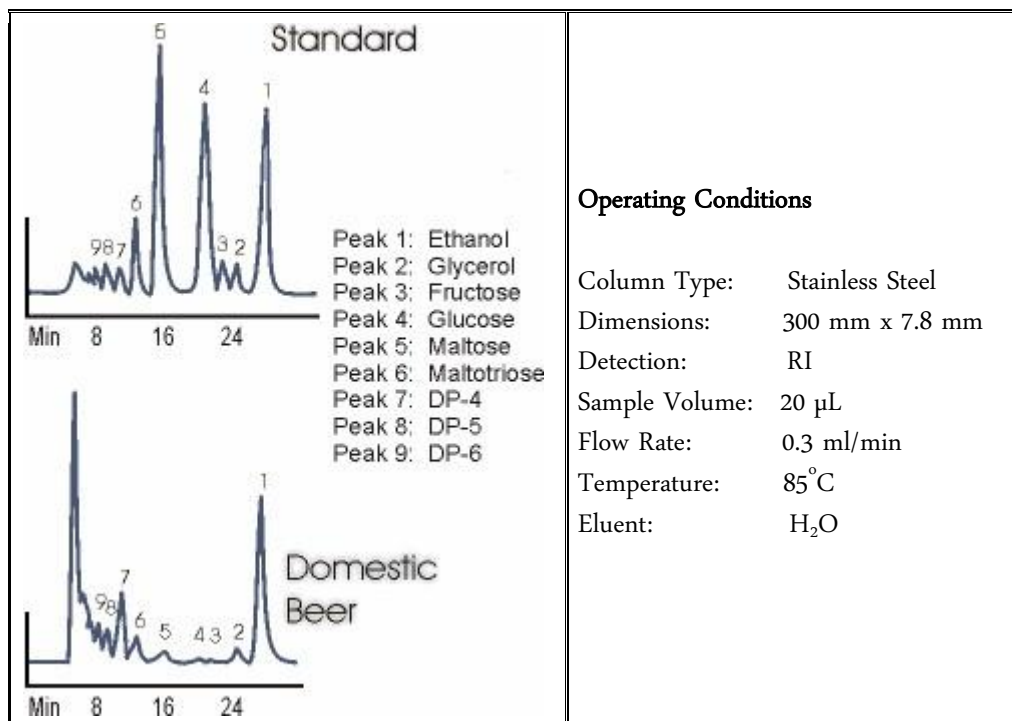
# BP-100 Ag<sup>+</sup> Carbohydrate Column

- **BP-100 Carbohydrate Ag<sup>+</sup> Columns**
- **BP-100, Ag<sup>+</sup>, 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<sup>+</sup> Columns include the brewing and corn syrup industries.

The BP-100, Ag<sup>+</sup> carbohydrate column provides rapid oligosaccharide separations. This sulfonated 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.

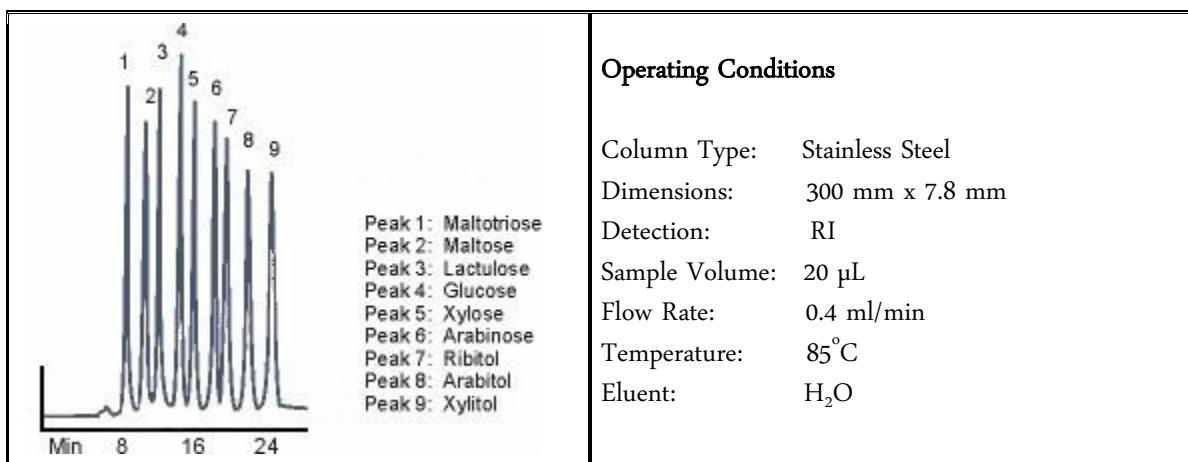


## BP-100 Ca<sup>++</sup> Carbohydrate Column

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

BP-100 Carbohydrate Ca<sup>++</sup> Column is used for baked goods, vegetables, fruit juices, soft drinks, beer brewing and dairy products.

The BP-100, Ca<sup>++</sup> 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.

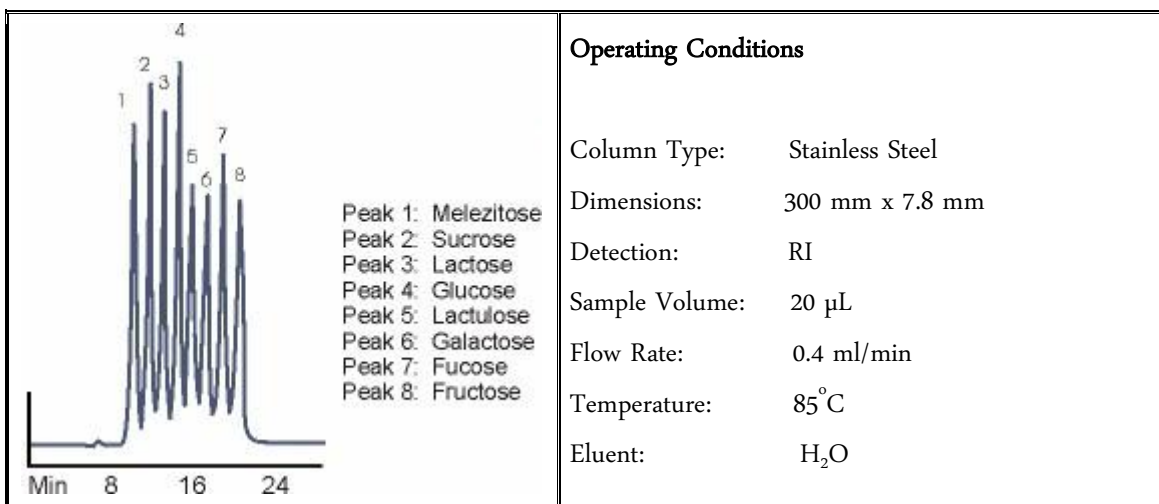


# BP-100 Pb<sup>++</sup> Carbohydrate Column

- **BP-100 Carbohydrate Pb<sup>++</sup> Columns**
- **USP L34**
- **BP-100, Pb<sup>++</sup>, 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<sup>++</sup> Column can be utilized in the analysis of dairy and meat products, cereals and plant fibers.

The BP-100, Pb<sup>++</sup> 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.

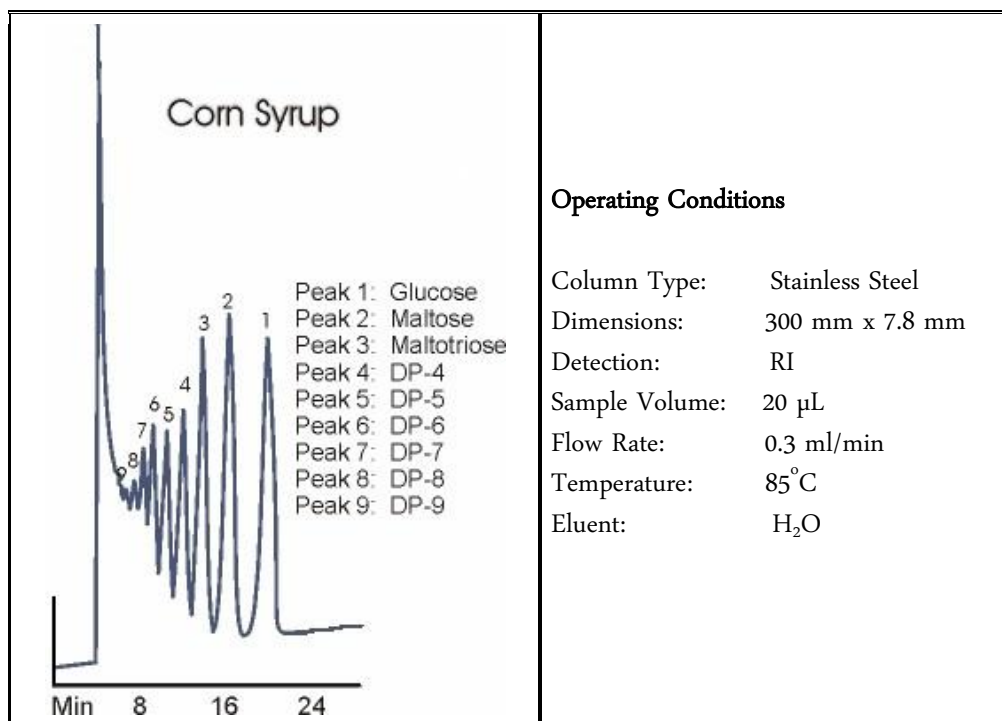


## BP-200 Ag<sup>+</sup> Carbohydrate Column

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

The BP-200 Carbohydrate Ag<sup>+</sup> Column applications include the brewing and corn syrup industries.

The BP-200, Ag<sup>+</sup> 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.

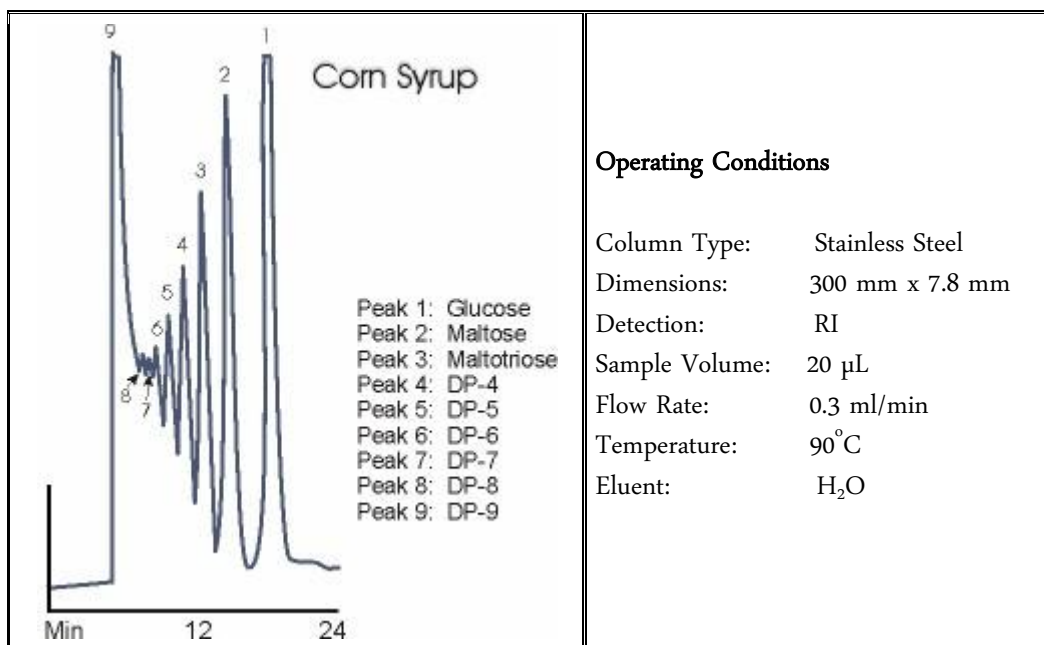


## BP-200 Ca<sup>++</sup> Carbohydrate Column

- **BP-200 Carbohydrate Ca<sup>++</sup> Columns**
- **USP L19**
- **BP-200, Ca<sup>++</sup>, 4% cross-linked resin**
- **Oligosaccharides**
- **Unequaled peak resolution**
- **DI Water as the Mobile Phase**

The BP-200, Ca<sup>++</sup> column finds wide use in the corn syrup industry.

The BP-200, Ca<sup>++</sup> column is packed with a sulfonated 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.



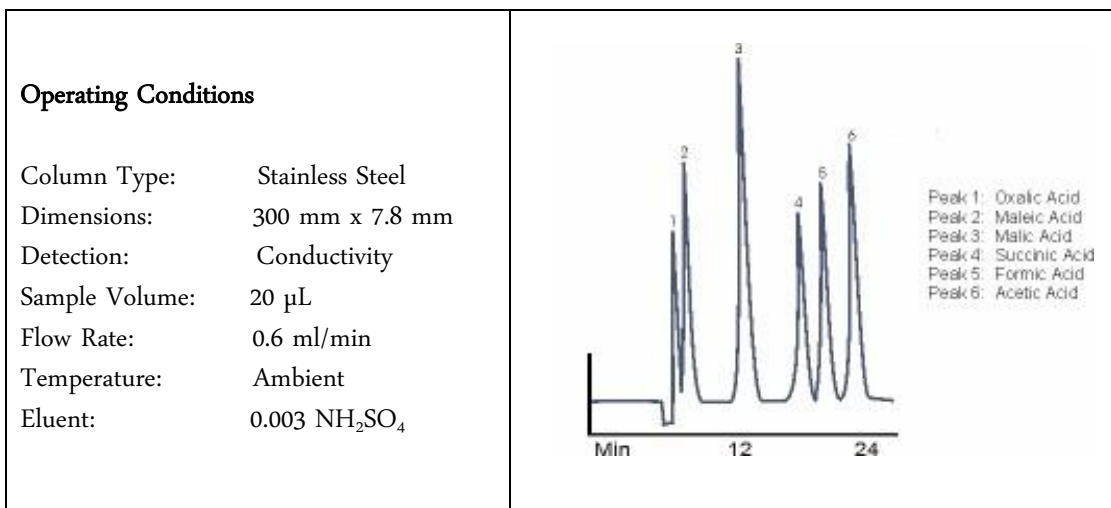
## BP-OA Organic Acid Column

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

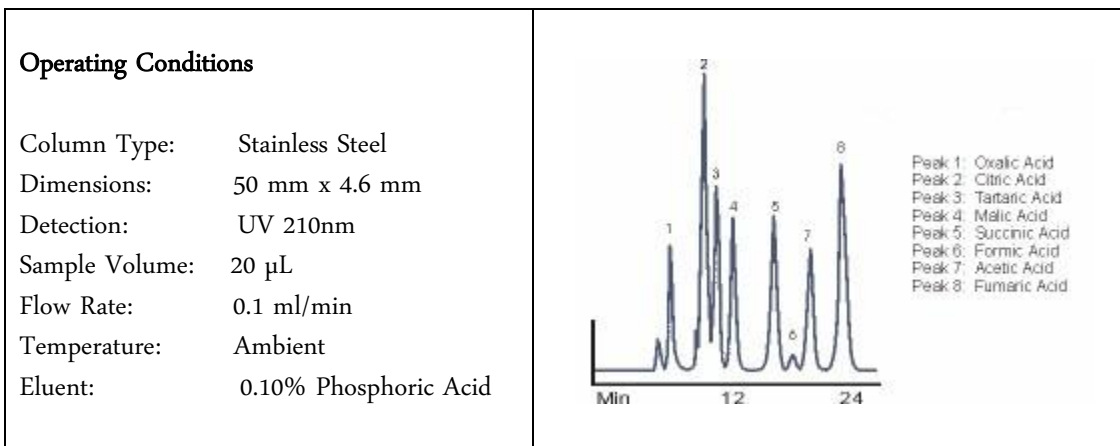
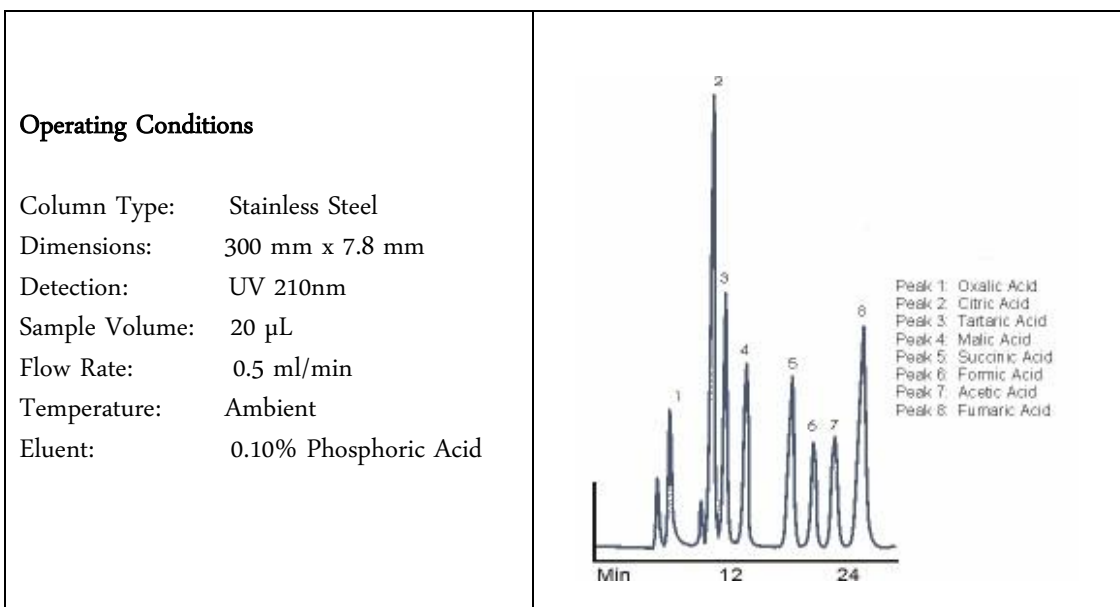
The BP-OA columns are for use on biological fluids, beverages, foods, industrial chemicals and fermentation processes

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 pK<sub>a</sub> values). Retention times of the organic acids may be controlled through adjustment of the eluent pH.



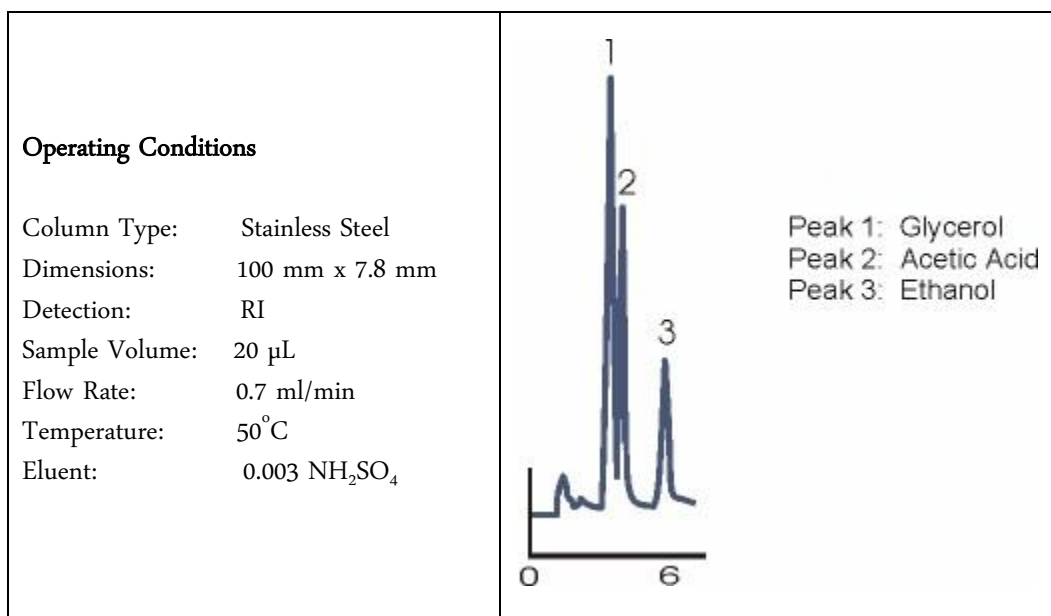
## BP-OA Organic Acid Column



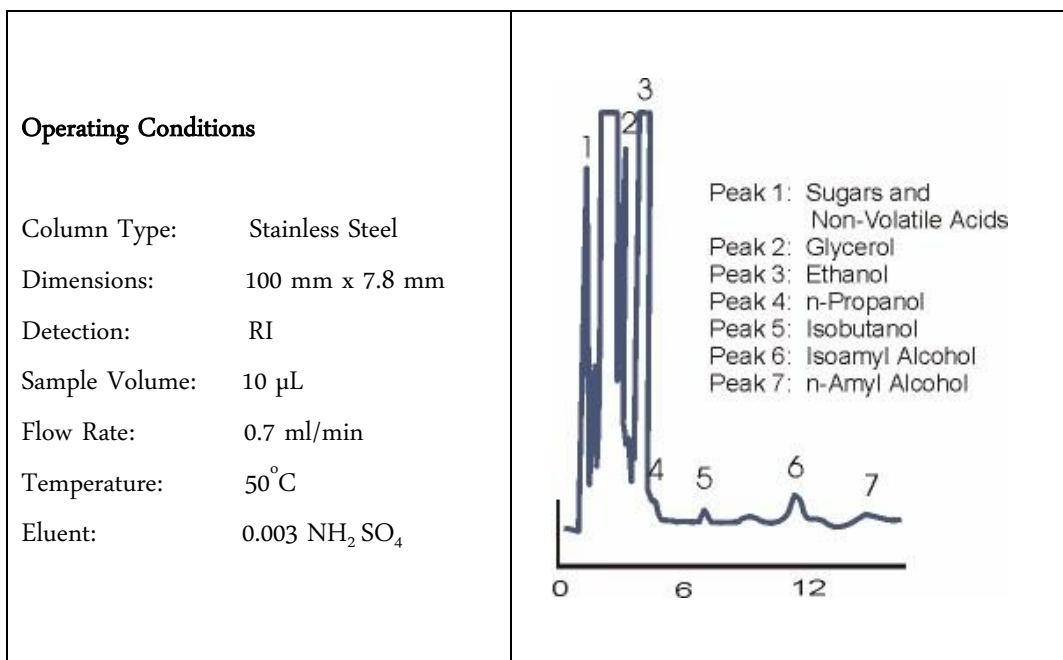
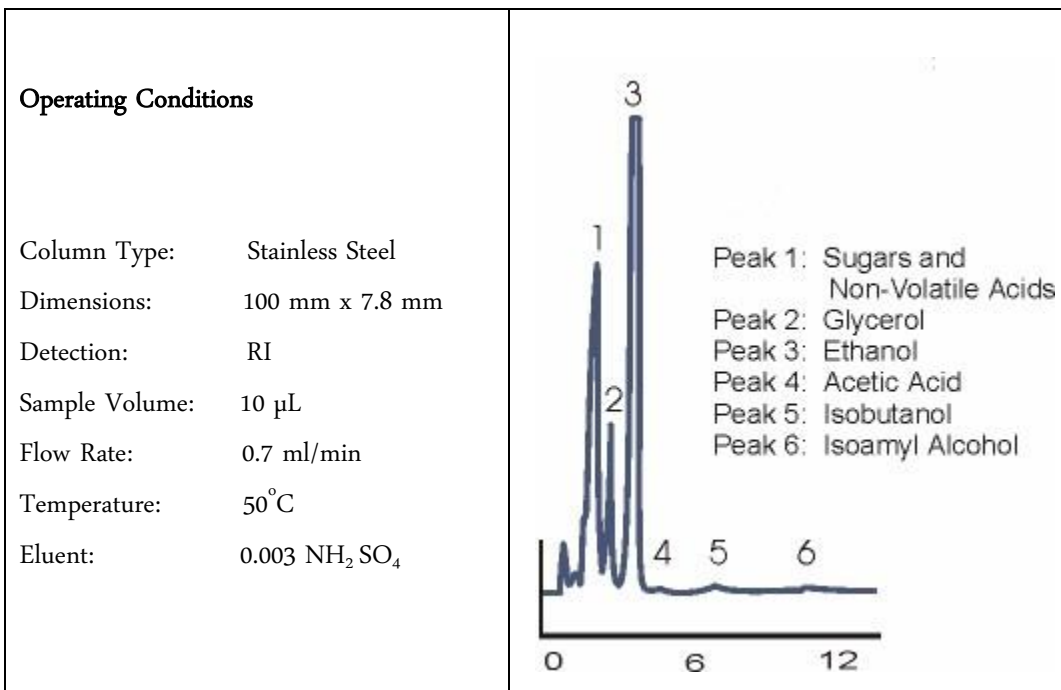
## *BP-RA Rapid Alcohol Column*

- **USP L17**
- **Sulfonated styrene-divinylbenzene resin, 6% cross-linked in the H<sup>+</sup> 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.*



## BP-RA Rapid Alcohol Column



## ***BP-RS Column Repacking Service***

*Want to stretch your budget dollars? Try our column repacking service. Just return one of our Benson Columns for repacking. We will remove the old spent resin, clean your column and replace the frits. Normal turn-around is two days.*

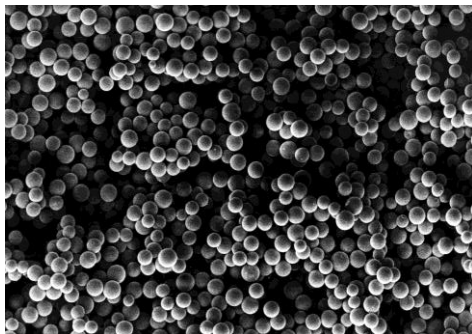
*You will save \$100.00 off the price of any Benson Analytical Column and/or \$50.00 on a Benson Guard Column. Plus, we pay for the return shipping to you!*

*Benson Polymeric is committed to your success by providing you with the best available products and opportunities for our customers to stretch their research/operating dollars.*

*Due to the high cost of shipping internationally, this service is limited to domestic customers only.*



- *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.*

**Typical applications include:**

- **Carbohydrates - corn syrup (BP-100 and BP-200)**
- **Organic Acids (BP-OA)**
- **Polynuclear Aromatic Hydrocarbons (BP-CX8, 10 $\mu$ m)**
- **Analgesics (BP-CX10, 10 $\mu$ m)**
- **Pharmaceuticals**
- **Chlorinated Biphenyls (BP-CX4, 10 $\mu$ m)**
- **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*



## *Anion Exchange Resins*

### *Typical applications include:*

- *Sugars (BP-AX4, 10 $\mu$ m)*
- *Carbohydrates (BP-AX4, 10 $\mu$ m)*
- *Nucleotides/Phenols/Aromatic and Aliphatic Acids*

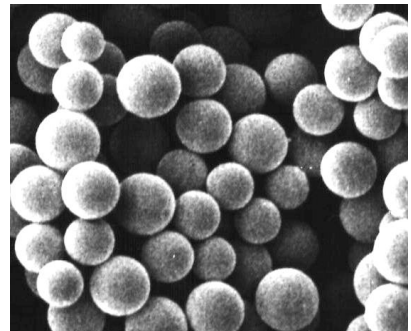
*The strongly basic anion exchange resins have quaternary ammonium functional groups attached to the styrene-divinylbenzene lattice. They are supplied in the fully hydrated chloride form.*

- *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.*



## Contact and Ordering Information

Please contact one of our [distributors](#) for orders. If a distributor is not available in your area, you may reach us at:

### Mailing Address:

Benson Polymeric Inc.  
P O Box 12812  
Reno, NV 89510  
USA

### Shipping Address:

Benson Polymeric Inc.  
73 Glen Carran Cr.  
Sparks, NV 89431  
USA

**Customer Service: 1 – 775 – 376 – 1482**

**E-mail: [service@bensonpolymeric.com](mailto:service@bensonpolymeric.com)**

**Phone: 1 - 775 - 356 - 5755**

**Fax: 1 - 775 - 356 - 6305**

**E-mail: [sales@bensonpolymeric.com](mailto:sales@bensonpolymeric.com)**

**Web Site : [www.bensonpolymeric.com](http://www.bensonpolymeric.com)**

*The products offered by Benson are intended for laboratory or manufacturing use only. They are not intended for medicinal or food use. Benson assumes no responsibility or liability should its products be used for medicinal or food purposes or are misused in any way.*

***Please call or write for current pricing.** In addition to the prices listed, shipping and handling charges will apply based upon the total amount purchased. Additionally, domestic purchases are shipped UPS Standard (Ground) unless other carriers or services are requested.*

*International purchases are shipped UPS Expedite (Blue), freight collect. Consignee pays all duty and value added taxes (V.A.T.), upon receipt of products.*

## Credit Cards Accepted



## List of Distributors

<p><b>BUJNO Chemicals Sc.</b> 36 Rakowiecka St., PL-02-532 Warsaw, Poland</p> <p>Tel: (48-22) 606 3958 Fax: (48-22) 606 3956 Email: <a href="mailto:bcj@bujnochem.com">bcj@bujnochem.com</a> Website: <a href="http://www.bujnochem.com">http://www.bujnochem.com</a></p>	<p><b>Grace Davison Discovery Sciences</b> 2051 Waukegan Road Deerfield, IL 60015, USA</p> <p>Tel: 847-948-8600 Fax: 847-948-1078 Email: <a href="mailto:contact.alltech@grace.com">contact.alltech@grace.com</a> Web Site: <a href="http://www.alltechweb.com">www.alltechweb.com</a></p>
<p><b>Chrom Tech, Inc.</b> P.O. Box 240248 Apple Valley, MN 55124, USA</p> <p>Tel: 800/822-5242 Fax: 952/431-6345 Email: <a href="mailto:sales@chromtech.com">sales@chromtech.com</a> Web Site: <a href="http://www.chromtech.com">www.chromtech.com</a></p>	<p><b>International Co. for Lab. Instruments Egypt</b> 45 Shalhoub St. Ain Shams Cairo, Egypt Cairo post no. 11311, Egypt</p> <p>Tel: 202 24916139 Fax: 202 24953441 Email: <a href="mailto:dawliahassan@gmail.com">dawliahassan@gmail.com</a></p>
<p><b>Chromatech Ltd.</b> Iassen Hristov 6, Kestenova Gora Street Appt. 7 1404 Sofia, BULGARIA</p> <p>Tel: 359 2 8580122 Tel: 359 2 8581997 Fax: 359 2 8508940 Email: <a href="mailto:i.hristov@chromatech.bg">i.hristov@chromatech.bg</a></p>	<p><b>KOSMO NF CO., Ltd</b> 502-5, Sungnae 2-Dong Gangdong-Gu Seoul, 134-849, Korea</p> <p>Tel: 82-2-477-3291, 3292 Fax: 82-2-477-3281 Email: <a href="mailto:kosmo@netsgo.com">kosmo@netsgo.com</a></p>
<p><b>COMPañIA DE SERVICIOS Y EQUIPOS</b> Urb. Sta. Teresa, 15 Ave. Nte P.P., Pol. C-2 No. 5 Santa Tecla, El Salvador C.A</p> <p>Tel: 503-2288-8333 /60 Fax: 503-2287-0828 Email: <a href="mailto:cse_general@telesal.net.gen">cse_general@telesal.net.gen</a> Website: <a href="http://www.csel.com">www.csel.com</a></p>	<p><b>Schambeck SFD GmbH</b> Rhöndorfer Strasse 51 D-53604 Bad Honnef, Germany</p> <p>Tel: +49 (0) 2224-9239-0 Fax: +49 (0) 2224-9239-20 Email: <a href="mailto:mailto@schambeck-sfd.com">mailto@schambeck-sfd.com</a> Web Site: <a href="http://www.schambeck-sfd.com">www.schambeck-sfd.com</a></p>
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