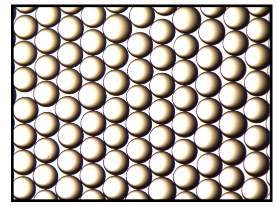
Product Data Sheet

AmberLite™ CR99 Ca/320 Chromatographic Separation Resin

Separation Resin Primarily Used for High Fructose Corn Syrup (HFCS) and High-Purity Fructose

Description



AmberLite™ CR99 Chromatographic Separation Resins are strong acid cation resins manufactured in a process that produces an extremely uniform particle size. This family of resins was specifically developed for use in simulated moving bed (SMB) chromatographic systems for the recovery and purification of sweeteners.

AmberLite™ CR99 Ca/320 Chromatographic Separation Resin is specifically designed with the combination of particle size and rapid kinetics for excellent separator performance. It has been the industry standard for decades, with demonstrated reliability in sweetener separations for the production of high fructose corn syrup (HFCS) and high-purity fructose.

This resin, or the available K-form or Na-form 320-μm chromatographic separation resins, can be used in other specialty separations, depending on the binary pair of constituents. ‡

Applications

- High fructose corn syrup (HFCS) production
- High-purity fructose production
- Polyols/sugar alcohols separation
- Specialty separations ‡

‡ Refer to the DuPont Separability Advisor™ Bubble Chart (Form No. 45-D01069-en) as a guide regarding the feasibility to separate various binary combinations of sugars and sugar alcohols. Plus, lab testing is available through System Optimization Services℠ (SOS) to help identify the best product to meet your needs.

Form No. 45-D00713-en, Rev. 1
February 2023

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	Amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	**Ca^{2+}**
Total Exchange Capacity	≥ 1.5 eq/L (H^+ form)
Water Retention Capacity	57 – 61% (H^+ form)
Stability	
Whole Uncracked Beads	≥ 98%
Density	
Particle Density	1.29 g/mL

Typical Bead Size Distribution §

(Light Obscuration Instrument Particle Size)

	Ca^{2+}	
Particle Diameter	315 ± 15 µm	
Broad Range	285 – 350 µm	≥ 90%
Narrow Range	300 – 335 µm	≥ 75%
Fine Beads	< 280 µm	≤ 4%
Coarse Beads	> 380 µm	≤ 4%

§ For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 45-D00954-en).

Suggested Operating Conditions

	HFCS (Ca^{2+} form)
Syrup Temperature	60 – 71°C (140 – 160°F)
Syrup pH	4 – 7
Dissolved Oxygen Concentration	
Recommended	< 0.1 ppm
Maximum	0.25 ppm
Simulated Moving Bed Operation	With optimized tuning (annually)

It is strongly advised to remove oxygen from feed streams and elution water going into the chromatographic separation resin. Limiting the oxygen concentration to less than 0.1 ppm (0.25 ppm maximum) will help maximize resin life.

Hydraulic Characteristics

Estimated bed expansion of the 320-µm size of AmberLite™ CR99 Chromatographic Separation Resin as a function of backwash flowrate at 25°C (77°F) is shown in Figure 1. Data for DuPont's 310- and 280-µm chromatographic separation resins is also provided for comparison. The flowrate necessary to achieve a desired bed expansion for other water temperatures can be calculated with the provided equations.

Estimated pressure drop data for the 320-µm size of AmberLite™ CR99 as a function of service flowrate and concentration of 42% HFCS (50% D.S. and 30% D.S.) is shown in Figure 2. Data for DuPont's 310- and 280-µm chromatographic separation resins is also provided for comparison.

Thermal expansion of the 320-µm size of AmberLite™ CR99 as a function of temperature and ionic form is shown in Figure 3.

Figure 1: Backwash Expansion

Temperature = 25°C (77°F)

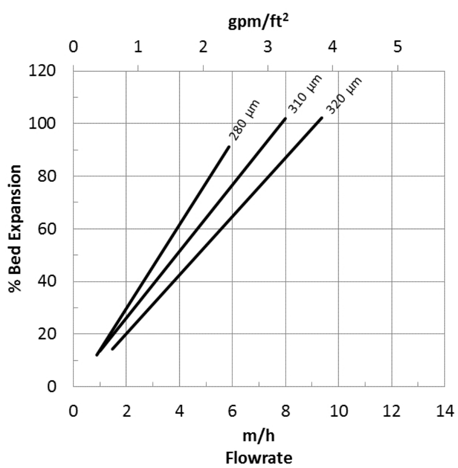
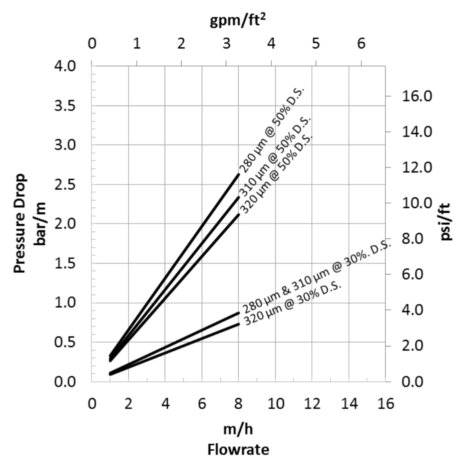


Figure 2: Pressure Drop

Syrup (42% HFCS) Concentration = 30% D.S., 50% D.S.

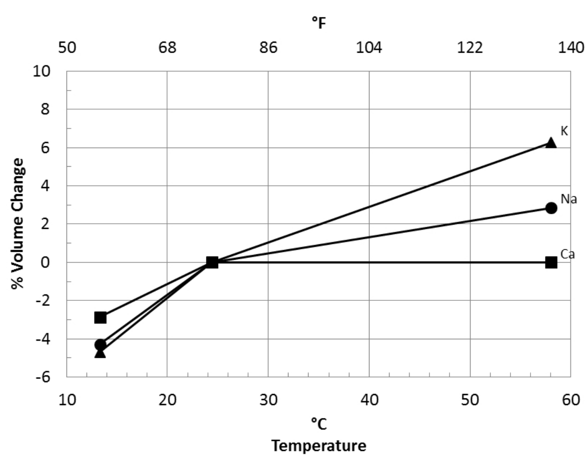


For other temperatures use:

$F_T = F_{25°C}\,[1 + 0.008\,(1.8T_{°C} - 45)]$, where F ≡ m/h

$F_T = F_{77°F}\,[1 + 0.008\,(T_{°F} - 77)]$, where F ≡ gpm/ft^2

Figure 3: Thermal Expansion



Product Stewardship

DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont personnel are available to answer your questions and to provide reasonable technical support. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont.

Please be aware of the following:

- **WARNING:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

Have a question? Contact us at:

www.dupont.com/water/contact-us

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