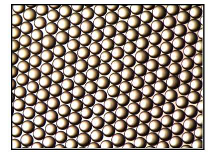
Product Data Sheet

AmberLite™ CR99 Ca/220 and K/220 Chromatographic Separation Resins

Separation Resin Primarily Used for Sugar Alcohols and Novel Separations

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.

The 220-µm members of the AmberLite™ CR99 family are specifically designed with the particle size to provide rapid kinetics, yielding better separation in difficult-to-separate and high-value sweeteners, making it the premium resin for water use reduction and helping to reduce energy costs associated with evaporation. When installed in shallow-bed separators, it can provide exceptional performance compared to a resin with larger beads.

AmberLite™ CR99 Ca/220 Chromatographic Separation Resin is used for the separation of glucose and fructose in the production of high fructose corn syrup (HFCS), high-purity fructose, and polyols/sugar alcohols.

AmberLite™ CR99 K/220 Chromatographic Separation Resin is used in the separation of polyols/sugar alcohols.

Either ionic form 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.

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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+}**	**K^+**
Total Exchange Capacity	≥ 1.8 eq/L (H+ form)	≥ 1.8 eq/L (H+ form)
Water Retention Capacity	50 – 57% (H+ form)	50 – 57% (H+ form)
Stability		
Whole Uncracked Beads	≥ 94%	≥ 94%
Density		
Particle Density	1.33 g/mL	1.35 g/mL

Typical Bead Size Distribution §

(Light Obscuration Instrument Particle Size)

	Ca^{2+}	K^+
Particle Diameter	220 ± 20 µm	220 ± 20 µm

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

Suggested Operating Conditions

	Fructose or HFCS (Ca^{2+} form)	**Polyols (Ca^{2+} or K^+ form)**
Syrup Temperature	60 – 71°C (140 – 160°F)	60 – 71°C (140 – 160°F)
Syrup pH	4 – 7	4 – 7
Dissolved Oxygen Concentration		
Recommended	< 0.1 ppm	< 0.1 ppm
Maximum	0.25 ppm	0.25 ppm
Simulated Moving Bed Operation	With optimized tuning (annually)	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 220-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 280-µm chromatographic separation resin 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 220-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 280-µm chromatographic separation resin is also provided for comparison.

Thermal expansion of the 220-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)

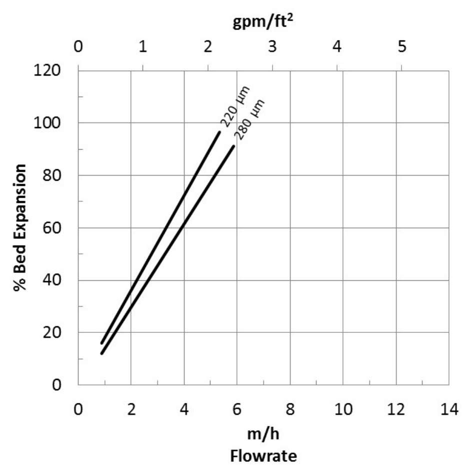
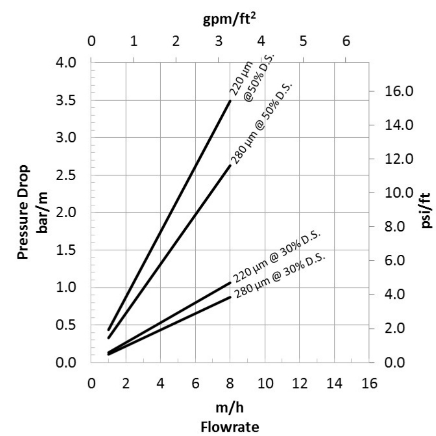


Figure 2: Pressure Drop

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



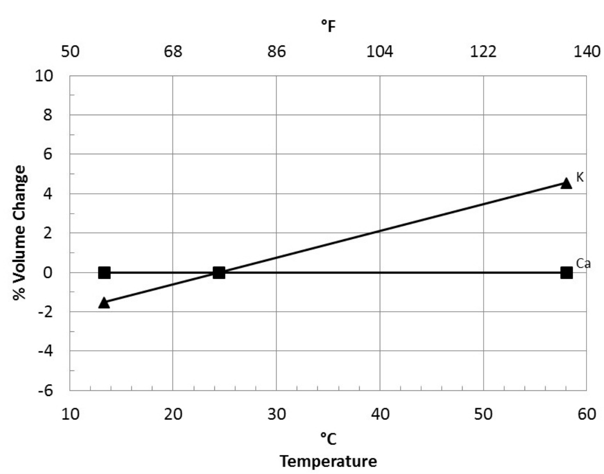
For other temperatures use:

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

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

Figure 3: Backwash Expansion

Temperature = 25°C (77°F)



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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.

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