Product Data Sheet

AmberSep™ 21K Ion Exchange Resins

Industrial-grade, Strong Base Anion Exchange Resins for Mineral Processing Applications

Description

AmberSep™ 21K Ion Exchange Resins are Type I strong base anion resins with excellent kinetics and regeneration efficiency, along with outstanding physical stability. Both are especially suited for mineral processing and groundwater remediation applications due to their enhanced-porosity gel bead matrix made by a special process giving fast equilibrium rates and improved resistance to organics.

AmberSep™ 21K XLT Ion Exchange Resin, with its high capacity and uniform particle size, represents the state-of-the-art solution for mineral processing, giving enhanced performance for packed bed systems.

AmberSep™ 21K 16-20 Ion Exchange Resin, with its screened particle size from 16 – 20 U.S. Mesh, is a high-efficiency, large-bead resin suitable for fluidized-bed and Resin-In-Pulp (RIP) applications.

Applications

- Mineral Processing (Zn, Mn, etc.)
- Precious metal recovery (Au, Ag, Pt, Pd, Rh)
- Uranium recovery

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February 2023

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion, Type I
Functional Group	Quaternary amine
Physical Form	White to tan, translucent, spherical beads

	AmberSep™ 21K XLT	AmberSep™ 21K 16-20
Chemical Properties		
Ionic Form as Shipped	Cl^-	Cl^-
Total Exchange Capacity	≥ 1.4 eq/L	≥ 1.2 eq/L
Water Retention Capacity	50 – 60%	50 – 58%
Particle Size [§]		
Particle Diameter	575 ± 50 µm	800 – 1300 µm
Uniformity Coefficient	≤ 1.1	
< 840 µm		≤ 10%
< 710 µm		≤ 2%
Stability		
Whole Uncracked Beads	≥ 95%	≥ 90%
Swelling	$Cl^- \rightarrow OH^-$: 18 – 20%	$Cl^- \rightarrow OH^-$: 20%
Density		
Particle Density	1.08 g/mL	1.08 g/mL
Shipping Weight	670 g/L	690 g/L

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

Suggested Operating Conditions

Maximum Operating Temperature	
OH^- form	60°C (140°F)
Cl^- form	100°C (212°F)
pH Range	0 – 14
Bed Depth, min.	800 mm (2.6 ft)
Organic Loading	≤ 3 g $KMnO_4$/L resin

	AmberSep™ 21K XLT	AmberSep™ 21K 16-20
Flowrates		
Service	5 – 60 m/h (2 – 24 gpm/ft^2)	5 – 50 m/h (2 – 20 gpm/ft^2)
Backwash	See Figure 1	See Figure 1
Regeneration		
Chemical Injection		
Co-current	1 – 10 m/h (0.4 – 4 gpm/ft^2)	1 – 10 m/h (0.4 – 4 gpm/ft^2)
Counter-current	5 – 20 m/h (2 – 8 gpm/ft^2)	
Displacement Rinse		
Co-current	1 – 10 m/h (0.4 – 4 gpm/ft^2)	1 – 10 m/h (0.4 – 4 gpm/ft^2)
Counter-current	5 – 20 m/h (2 – 8 gpm/ft^2)	
Fast Rinse	5 – 60 m/h (2 – 24 gpm/ft^2)	5 – 50 m/h (2 – 20 gpm/ft^2)
Total Rinse Requirement	3 – 6 BV*	3 – 6 BV*
Regenerant	NaCl, Na_2CO_3, NaOH	
Temperature	Ambient or up to 50°C (122°F) for silica removal	

* 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin or 7.5 gal per ft^3 resin

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Hydraulic Characteristics

Bed expansion of AmberSep™ 21K XLT and AmberSep™ 21K 16-20 Ion Exchange Resins as a function of backwash flowrate at 25°C (77°F) is shown in Figure 1.

Pressure drop data for AmberSep™ 21K XLT and AmberSep™ 21K 16-20 as a function of service flowrate at 25°C (77°F) is shown in Figure 2. Pressure drop data are valid at the start of the service run with clean water.

Figure 1: Backwash Expansion

Temperature = 25°C (77°F)

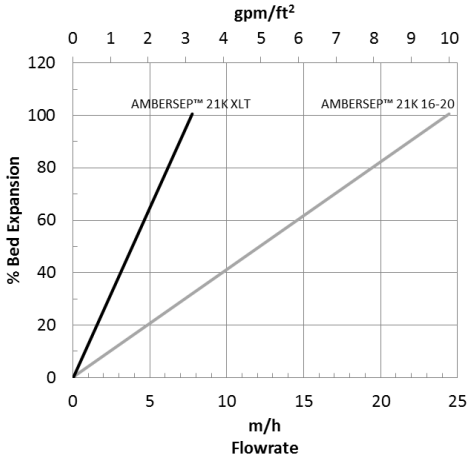
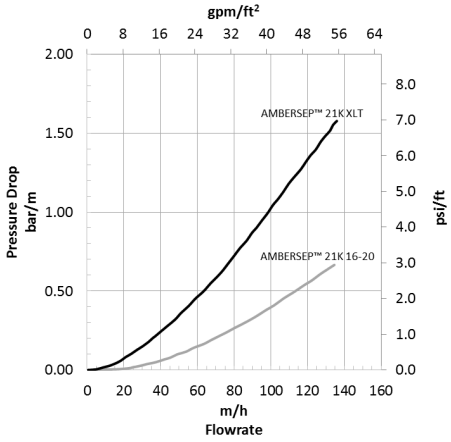


Figure 2: Pressure Drop

Temperature = 25°C (77°F)



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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.

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Have a question? Contact us at:

www.dupont.com/water/contact-us

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