Product Data Sheet

AMBERLYST™ A21 Ion Exchange Resin

Industrial-grade, Weakly Basic Polymeric Resin

Description

AMBERLYST™ A21 Ion Exchange Resin is a bead-form, weak base anion exchange resin developed for the removal of acidic materials from product streams. AMBERLYST™ A21 is supplied in the water-moist, free base (FB) form. After proper solvent conditioning, it can be used directly to remove acidic materials from any organic streams where the pK_a value is > 4.75.

AMBERLYST™ A21 is also used in adsorption of SO_2 from gas streams.

Applications

- Deacidification
- Phenol removal from benzene
- Inhibitor removal from monomers (hydroquinone (HQ), hydroquinone monomethyl ether (MEHQ), tertiary butyl catechol (TBC)
- Base-catalyzed reactions

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Weak base anion
Functional Group	Tertiary amine
Physical Form	Beige, opaque, spherical beads
Nitrogen BET	
Surface Area	35 m^2/g
Total Pore Volume	0.10 cc/g
Average Pore Diameter	110 Å
Chemical Properties	
Ionic Form as Shipped	Free base (FB)
Concentration of Base Sites ‡	≥ 4.60 eq/kg
	≥ 1.30 eq/L
Water Retention Capacity	56 – 62%
Particle Size §	
Particle Diameter	490 – 690 µm
Uniformity Coefficient	≤ 1.80
< 300 µm	≤ 1.0%
> 1180 µm	≤ 2.0%
Swelling (in solvent)	
Phenol	77%
Density	
Shipping Weight	660 g/L

‡ Dry Weight Capacity ≥ 4.60 eq/kg; Total Exchange Capacity (on a water-wet basis) ≥ 1.30 eq/L

§ For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 177-01775).

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Suggested Operating Conditions

Maximum Operating Temperature	100°C (210°F)		
Bed Depth, min.	600 mm (2.0 ft)		
Pressure Drop, max.	1 bar (15 psig) across the bed		
Flowrates			
Operating	1 – 5 BV/h (0.125 – 0.625 gpm/ft^3)		
Linear Hourly Space Velocity (LHSV)	0.5 – 5 h^{-1}		
Backwash	See Figure 1		
Regeneration	2 – 8 BV/h (0.25 – 1 gpm/ft^3)		
NaOH	4 – 8 BV/h (0.5 – 1.0 gpm/ft^3)		
NH_4OH	4 – 8 BV/h (0.5 – 1.0 gpm/ft^3)		
Na_2CO_3	4 – 8 BV/h (0.5 – 1.0 gpm/ft^3)		
Slow Rinse	Regeneration flowrate for 2 BV (15 gal/ft^3)		
Fast Rinse	Operating flowrate for 2 – 4 BV (15 – 30 gal/ft^3)		
Contact Time			
Regeneration	≥ 30 minutes		
Regenerant	NaOH	NH_4OH	Na_2CO_3
Concentration	2 – 4%	2 – 4%	4 – 8%
Level	120% of ionic load	120% of ionic load	120% of ionic load

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLYST™ A21 Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLYST™ A21 as a function of service flowrate and temperature is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water and a well-classified bed.

Figure 1: Backwash Expansion

Temperature = 10 – 90°C (50 – 194°F)

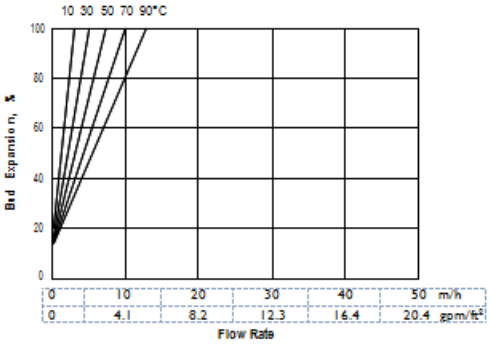
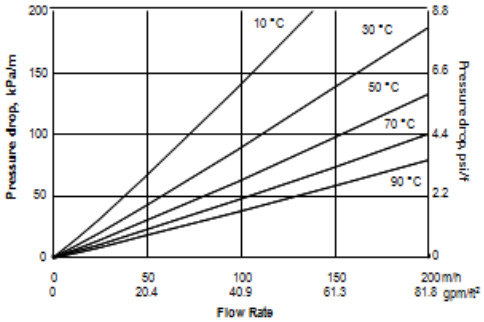


Figure 2: Pressure Drop

Temperature = 10 – 90°C (50 – 194°F)



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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:

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