



## 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**

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

## 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 <sup>3</sup> )		
Linear Hourly Space Velocity (LHSV)	0.5 – 5 h <sup>-1</sup>		
Backwash	See Figure 1		
Regeneration	2 – 8 BV/h (0.25 – 1 gpm/ft <sup>3</sup> )		
NaOH	4 – 8 BV/h (0.5 – 1.0 gpm/ft <sup>3</sup> )		
NH <sub>4</sub> OH	4 – 8 BV/h (0.5 – 1.0 gpm/ft <sup>3</sup> )		
Na <sub>2</sub> CO <sub>3</sub>	4 – 8 BV/h (0.5 – 1.0 gpm/ft <sup>3</sup> )		
Slow Rinse	Regeneration flowrate for 2 BV (15 gal/ft <sup>3</sup> )		
Fast Rinse	Operating flowrate for 2 – 4 BV (15 – 30 gal/ft <sup>3</sup> )		
Contact Time			
Regeneration	≥ 30 minutes		
Regenerant	NaOH	NH <sub>4</sub> OH	Na <sub>2</sub> CO <sub>3</sub>
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<sup>3</sup> solution per m<sup>3</sup> resin or 7.5 gal per ft<sup>3</sup> resin

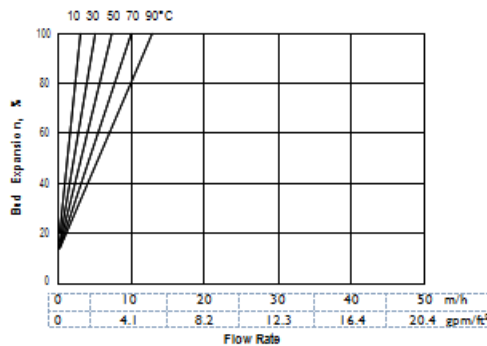
## Hydraulic Characteristics

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.

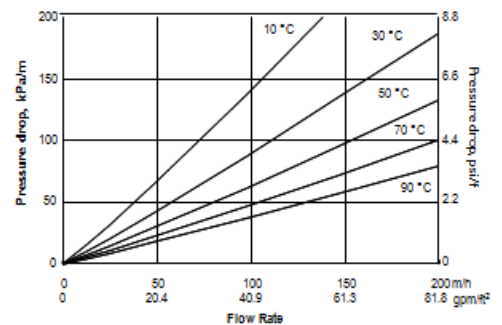
**Figure 1: Backwash Expansion**

Temperature = 10 – 90°C (50 – 194°F)



**Figure 2: Pressure Drop**

Temperature = 10 – 90°C (50 – 194°F)



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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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