Product Data Sheet

AMBERLITE™ FPA53 Ion Exchange Resin

Food-grade, Gel, Acrylic, Weak Base Anion Exchange Resin

Description

AMBERLITE™ FPA53 Ion Exchange Resin is an acrylic, gel, weakly basic, anion exchange resin for use in the nutrition and bioprocessing industries.

The extremely flexible acrylic polymer matrix provides outstanding physical stability and greater resistance to organic fouling than conventional polystyrene-based resins, leading to longer life in the application.

Nutrition Applications
AMBERLITE™ FPA53 Ion Exchange Resin is used for deashing and deacidification of food streams, including starch-based sweeteners. Other uses include the treatment of organic acids and dairy products.

The gel structure of AMBERLITE™ FPA53 gives it higher capacity and longer run lengths than macroporous resins. AMBERLITE™ FPA53 contains tertiary amine functionality, but it has higher basicity than other weakly basic ion exchange resins, making it an excellent choice for the removal of weak organic acids. In addition, this resin contains no strongly basic functional sites, allowing the deacidification of glucose and fructose syrups with no product degradation, as well as no isomerization.

Bioprocessing Applications
AMBERLITE™ FPA53 Ion Exchange Resin is a unique solution for the decolorization of organic color bodies of most bioprocessing applications. It is extensively used in the recoveries of β-lactam antibiotics from fermentation broth. AMBERLITE™ FPA53 is widely used in conjunction with AMBERLITE™ XAD1600N Polymeric Adsorbent in the biopurification of cephalosporin C.

Applications

- Nutrition applications
  - Sweetener deashing
  - Sweetener deacidification
- Bioprocessing applications
  - Decolorization
  - Recovery of β-lactam antibiotics from fermentation broth
  - Biopurification of cephalosporin C

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Typical Properties

Physical Properties	
Copolymer	Crosslinked acrylic
Matrix	Gel
Type	Weak base anion
Functional Group	Tertiary amine
Physical Form	White, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Free base (FB)
Total Exchange Capacity	≥ 1.6 eq/L
Water Retention Capacity	56 – 64%
Particle Size [§]	
Particle Diameter	500 – 750 µm
< 300 µm	≤ 3.0%
> 1180 µm	≤ 5.0%
Stability	
Swelling	FB → HCl ≤ 30%
Density	
Shipping Weight	700 g/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	50°C (122°F)		
Bed Depth, min.	700 mm (2.3 ft)		
Flowrates			
Service	4 – 8 BV*/h		
Backwash	See Figure 1		
Regeneration			
NaOH	2 – 8 BV/h		
Na_2CO_3	2 – 4 BV/h		
NH_3	2 – 4 BV/h		
Slow Rinse	Regeneration flowrate for 2 BV		
Fast Rinse (if applicable)	10 BV/h for 8 – 16 BV		
Contact Time			
Regeneration	≥ 30 – 45 minutes		
Regenerant	NaOH	Na_2CO_3	NH_3
Concentration	4 – 10%	1 – 5%	1 – 4%
Level	130% of ionic load	130% of ionic load	130% 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 AMBERLITE™ FPA53 Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ FPA53 as a function of service flowrate and viscosity is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean feed and a well-classified bed.

Figure 1: Backwash Expansion

Temperature = 5 – 60°C (41 – 140°F)

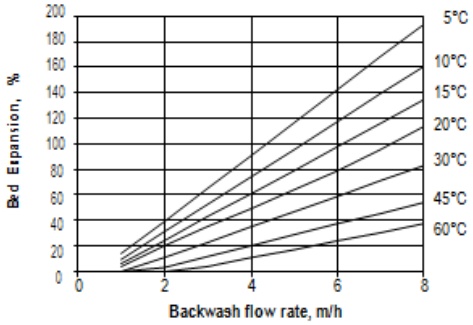

Figure 2: Pressure Drop

Viscosity = 1 – 10 cP

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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.

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