



## Product Data Sheet

### **DuPont™ AmberLite™ FPA53 Ion Exchange Resins**

Food Processing Grade, Gel, Acrylic, Weak Base Anion Resin

#### **Description**

DuPont™ 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  $\beta$ -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  $\beta$ -lactam antibiotics from fermentation broth
  - Biopurification of cephalosporin C

## 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 <sup>§</sup>	
Particle Diameter, Harmonic Mean Diameter	500 – 750 μm
< 300 μm	≤ 3.0%
> 1180 μm	≤ 5.0%
Stability	
Swelling	FB → HCl ≤ 30%
Density	
Shipping Weight	665 g/L

<sup>§</sup> 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	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 <sub>2</sub> CO <sub>3</sub>	2 – 4 BV/h		
NH <sub>3</sub>	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 <sub>2</sub> CO <sub>3</sub>	NH <sub>3</sub>
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<sup>3</sup> solution per m<sup>3</sup> resin or 7.5 gal per ft<sup>3</sup> resin

† NaOH is recommended.

‡ Regeneration level may be lower for counter-current regeneration systems.

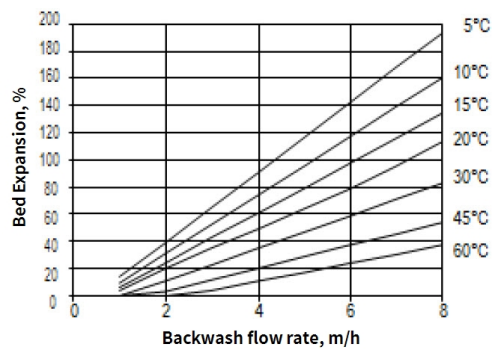
## Hydraulic Characteristics

Estimated bed expansion of DuPont™ AmberLite™ FPA53 Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1. The flowrate necessary to achieve a desired bed expansion for other water temperatures can be calculated with the provided equations.

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.

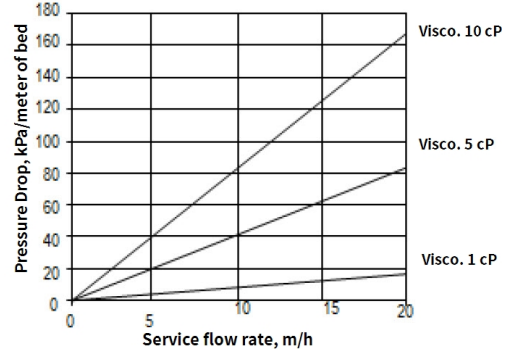
**Figure 1: Backwash Expansion**

Temperature = 5 – 60°C (41 – 140°F)



**Figure 2: Pressure Drop**

Viscosity = 1 – 10 cP



For other temperatures use:

$$F_T = F_{25^\circ\text{C}} [1 + 0.008 (1.8T_C - 45)], \text{ where } F \equiv \text{m/h}$$

$$F_T = F_{77^\circ\text{F}} [1 + 0.008 (T_F - 77)], \text{ where } F \equiv \text{gpm/ft}^2$$

## 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.

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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.

## Regulatory Note

This product may be used in applications that need to comply with relevant regulations. In support of these applications, a Regulatory Information Package is available upon request. Please address your request to your sales team or the contact details provided in this Product Data Sheet.

Have a question? Contact us at:

[www.dupont.com/water/contact-us](http://www.dupont.com/water/contact-us)

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