Product Data Sheet

Duolite™ A568 Ion Exchange Resin

Food-grade, Weak Base Anion Exchange Resin

Description

Duolite™ A568 Ion Exchange Resin is a highly porous, granular, weak base anion exchange resin based on crosslinked phenol-formaldehyde polycondensate. Its hydrophilicity and controlled pore size distribution make it the most suitable resin to be used as an enzyme carrier in many bioprocessing applications. The ionic strength, pore volume, pore size, and particle size of Duolite™ A568 are designed for optimum immobilization of enzymes used in the starch and fat (and other) industries.

Applications

- Starch hydrolysates
  - Glucose isomerase immobilization (for the production of enriched fructose syrups from glucose syrups)
  - Beta-amylase immobilization [for saccharification – production of high maltose syrup starting from low DE (15 – 20 DE) maltodextrin syrups]
- Fat processing
  - Lipase immobilization for:
    - Interesterification and hydrolysis of glycerides
    - Esterification of fatty acids with aliphatic alcohols, etc.

Typical Properties

Physical Properties	
Copolymer	Crosslinked phenol-formaldehyde polycondensate
Matrix	Porous
Type	Weak base anion
Functional Group	Tertiary amine
Physical Form	Green-gray, opaque, granules
Nitrogen BET	
Total Pore Volume	0.78 – 1 mL/g
Average Pore Diameter	300 – 500 Å
Chemical Properties	
Ionic Form as Shipped	Free base (FB)
Total Exchange Capacity	≥ 1.20 eq/L
Water Retention Capacity	
Fully Hydrated	62 – 67%
As Delivered	5.5 – 10.5%
Particle Size [§]	
< 150 µm	≤ 0.2%
> 850 µm	≤ 2.0%
Stability	
Swelling	$OH^- \rightarrow Cl^-$: 7%
Density	
Particle Density	1.10 – 1.14 g/mL
Shipping Weight	307 g/L

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

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Suggested Operating Conditions

Maximum Operating Temperature	65°C (149°F)
Bed Depth, min.	2000 mm (6.6 ft)
Flowrate	≤ 5 BV*/h
Pressure Drop	≤ 2.5 bar (35.3 psi) across each column

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

Hydraulic Characteristics

Bed expansion of Duolite™ A568 Ion Exchange Resin is approximately 60% at 4 m/h (1.6 gpm/ft^2) with water at 20°C (68°F).

Pressure drop for Duolite™ A568 is approximately 0.06 bar per m/h linear velocity (2.1 psi per gpm/ft^2) with water at 20°C (68°F).

Application Information

Immobilization Procedures

The general procedure to immobilize enzymes on Duolite™ A568 Ion Exchange Resin is as follows:

Case 1 – Column operation

1. Dissolve enzyme in deionized water.
2. Adjust pH of Duolite™ A568 by recirculating the appropriate buffer.
3. Recirculate the enzyme solution through the column.
4. Continue recirculation until enzyme has been adsorbed.
5. Backwash until effluent is clear.

Case 2 – Batch operation

1. Dissolve enzyme in deionized water.
2. Adjust pH of Duolite™ A568 resin slurry by equilibrating with appropriate buffer.
3. Add the enzyme solution to the slurry under stirring.
4. Continue stirring until enzyme has been adsorbed.
5. Decant several times with deionized water until effluent is clear.

Enzymatic Reaction Conditions

The enzymatic reaction is carried out in columns containing Duolite™ A568 Ion Exchange Resin operated in down-flow. In practice, several columns are working either in series or in parallel, the columns being in time lag with each other in order to obtain a constant enzymatic conversion.

The flowrate is fixed by the desired level of enzymatic conversion and by pressure drop (see the Suggested Operating Conditions section).

Note

Duolite™ A568 Ion Exchange Resin is supplied in the partially dried form. Volume delivered is measured in the fully hydrated form after being exhausted with dilute HCl, regenerated with 2 – 6% NaOH solution, backwashed extensively, settled, and drained.

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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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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