



DUOLITE™ A568

Weak Base Anion Exchanger

Introduction

DUOLITE A568 is a highly porous granular weak base anion exchange resin, based on crosslinked phenol-formaldehyde polycondensate. Its hydrophilic structure combined with a controlled pore size distribution makes 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.

Properties

Matrix	Crosslinked phenol-formaldehyde polycondensate
Functional groups	Tertiary amine
Physical form	Green to grey coloured granules
Ionic form as shipped	Free Base (FB)
Total exchange capacity	≥ 1.20 eq/L (FB form) 62 to 67 % (FB form)
Moisture holding capacity (fully hydrated)	5.5 - 10.5 % (FB form)
Moisture content (as delivered)	1.10 to 1.14 (FB form)
Specific gravity	307 g/L
Shipping weight	< 0.150 mm : 0.2 % max
Fines content	> 0.850 mm : 2.0 % max OH ⁻ → Cl ⁻ : 7 %
Coarse beads	15 to 25 µm
Maximum reversible swelling	0.78 to 1 ml/g
Pore size radius range	Approx 6 kPa per m/h linear velocity
Pore volume	(water, 20°C)
Pressure drop per m bed depth	Approx. 60 % at 4 m/h (water, 20°C)
Hydraulic expansion	---

Applications

Starch hydrolysates

- Immobilization of glucose isomerase for the production of enriched fructose syrups from glucose syrups.
- Immobilization of beta-amylase for saccharification: production of high maltose syrup starting from low DE (15 - 20 DE) maltodextrin syrups.

Fat industries

- Immobilization of lipase for :
 - Interesterification and hydrolysis of glycerides.
 - Esterification of fatty acids with aliphatic alcohols, etc

Suggested Operating Conditions

Immobilization procedures

General procedure is as follows :

Case 1 : Column operation

1. Dissolve enzyme in deionised 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 deionised water until effluent is clear.

Enzymatic reaction conditions

The enzymatic reaction is carried out in columns containing DUOLITE A568 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 flow rate is fixed by the desired level of enzymatic conversion and by pressure drop.

General recommendations are :

- 4 Bed depth : 2000 mm maximum
- 5 Temperature : 65°C maximum
- 6 Flow rate : up to 5 BV/h
- 7 Pressure drop : 250 kPa across each column

Remark : DUOLITE A568 is supplied in the partially dried form. Volume delivered is measured in the fully hydrated form (moisture hold content : 59 – 64 %) after being exhausted with dilute HCl, regenerated with 2 to 6 % NaOH solution, backwashed extensively, settled and drained.

Food processing

DUOLITE A568 conforms compositionally with the COE Resolution AP(97)1. It is recommended that potential users of resins for food processing applications contact their Rohm and Haas representative to assess the best choice of resin and optimum operating conditions.

For more information about DOW™ resins, call the Dow Water & Process Solutions business:

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