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:
    - Interestenification and hydrolysis of glycerides
    - Esterification of fatty acids with aliphatic alcohols, etc.

**Typical Properties**

<table>
<thead>
<tr>
<th>Physical Properties</th>
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</thead>
<tbody>
<tr>
<td>Copolymer</td>
<td>Crosslinked phenol-formaldehyde polycondensate</td>
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<tr>
<td>Matrix</td>
<td>Porous</td>
</tr>
<tr>
<td>Type</td>
<td>Weak base anion</td>
</tr>
<tr>
<td>Functional Group</td>
<td>Tertiary amine</td>
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<tr>
<td>Physical Form</td>
<td>Green-gray, opaque, granules</td>
</tr>
</tbody>
</table>

**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⁻ → Cl⁻: 7%

**Density**
- Particle Density: 1.10 – 1.14 g/mL
- Shipping Weight: 307 g/L

$\text{For additional particle size information, please refer to the }$ Particle Size Distribution Cross Reference Chart $\text{(Form No. 45-D00954-en).}$

Form No. 45-D00981-en, Rev. 2 January 2020
**Suggested Operating Conditions**

<table>
<thead>
<tr>
<th>Maximum Operating Temperature</th>
<th>65°C (149°F)</th>
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<tbody>
<tr>
<td>Bed Depth, min.</td>
<td>2000 mm (6.6 ft)</td>
</tr>
<tr>
<td>Flowrate</td>
<td>≤ 5 BV/h</td>
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<tr>
<td>Pressure Drop</td>
<td>≤ 2.5 bar (35.3 psi) across each column</td>
</tr>
</tbody>
</table>

* 1 BV (Bed Volume) = 1 m³ solution per m³ resin or 7.5 gal solution per ft³ resin

**Hydraulic Characteristics**

Bed expansion of Duolite™ A568 Ion Exchange Resin is approximately 60% at 4 m/h (1.6 gpm/ft²) 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/ft²) 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.

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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.

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