

**DuPont™ AmberLite™ MAC-3 H Ion Exchange Resin**

Food Processing, Macroporous, Acrylic, Weak Acid Cation Exchange Resin

**Description**

DuPont™ AmberLite™ MAC-3 H Ion Exchange Resin is an acrylic, macroporous weak acid cation exchange resin that offers high exchange capacity, excellent regeneration efficiency, very good resistance to osmotic shock, and good chemical and physical stability.

AmberLite™ MAC-3 H is effective in removing temporary hardness (hardness associated with alkalinity) and dealkalization. It can also be used for recovery of metals. AmberLite™ MAC-3 H can be supplied in accordance to the TOC (Total Organic Carbon) requirements of the major European legislations for use in food and potable water applications. In such cases, a recommendation is given for resin conditioning before use.

**Applications**

- Softening
- Dealkalization
- Demineralization

**Properties**

|                            |                                             |
|----------------------------|---------------------------------------------|
| <b>Physical Properties</b> |                                             |
| Copolymer                  | Crosslinked acrylic                         |
| Matrix                     | Macroporous                                 |
| Type                       | Weak acid cation                            |
| Functional Group           | Carboxylic acid                             |
| Physical Form              | White to off-white, opaque, spherical beads |
| <b>Chemical Properties</b> |                                             |
| Ionic Form as Shipped      | H <sup>+</sup>                              |
| Total Exchange Capacity    | ≥ 3.8 eq/L                                  |
| Water Retention Capacity   | 44 – 52%                                    |
| <b>Particle Size</b> §     |                                             |
| 300 - 1180 µm              | ≥ 90%                                       |
| <b>Stability</b>           |                                             |
| Whole Beads                | ≥ 90%                                       |
| Swelling                   | H <sup>+</sup> → Na <sup>+</sup> : ~70%     |
| <b>Density</b>             |                                             |
| Particle Density           | 1.18 g/mL                                   |
| Shipping Weight            | 750 g/L                                     |

§ 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 (H <sup>+</sup> form) | 120°C (248°F)                             |                                |
| pH Range                                            | 5 – 14                                    |                                |
| Bed Depth, min.                                     | 800 mm (2.6 ft)                           |                                |
| Flowrates                                           |                                           |                                |
| Service                                             | 5 – 50 m/h (2 – 20 gpm/ft <sup>2</sup> )  |                                |
| Backwash                                            | See Figure 1                              |                                |
| Regeneration                                        |                                           |                                |
| HCl                                                 | 1 – 10 m/h (0.4 – 4 gpm/ft <sup>2</sup> ) |                                |
| H <sub>2</sub> SO <sub>4</sub>                      | 5 – 20 m/h (2 – 8 gpm/ft <sup>2</sup> )   |                                |
| Displacement Rinse                                  | Same flowrate as the regenerant           |                                |
| Fast Rinse (if applicable)                          | 5 – 50 m/h (2 – 20 gpm/ft <sup>2</sup> )  |                                |
| Total Rinse Requirement                             | 3 – 6 BV*                                 |                                |
| Regenerant                                          | HCl                                       | H <sub>2</sub> SO <sub>4</sub> |
| Concentration                                       | 1 – 5%                                    | 0.5 – 0.8%                     |

\* 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

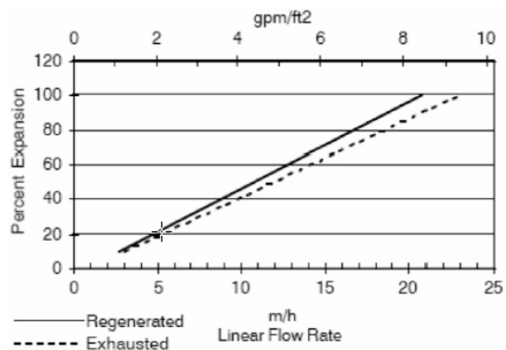
## Hydraulic Characteristics

Estimated bed expansion of DuPont™ AmberLite™ MAC-3 H Ion Exchange Resin as a function of backwash flowrate and ionic form at 25°C (77°F) 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™ MAC-3 H as a function of service flowrate at 20°C (68°F) is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water and a well-classified bed. Estimated pressure drop at other water temperatures can be calculated with the provided equations.

**Figure 1: Backwash Expansion**

Temperature = 25°C (77°F)



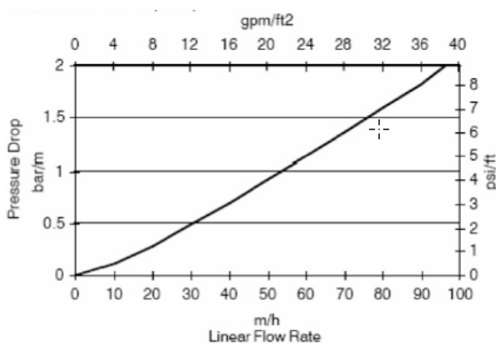
**For other temperatures use:**

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

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

**Figure 2: Pressure Drop**

Viscosity = 2 – 12 cP



**For other temperatures use:**

$$P_T = P_{20^\circ\text{C}} / (0.026T_C + 0.48), \text{ where } P \equiv \text{bar/m}$$

$$P_T = P_{68^\circ\text{F}} / (0.014T_F + 0.05), \text{ where } P \equiv \text{psi/ft}$$

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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.



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