Product Data Sheet

AmberTec™ MR-300 UPW H/OH Ion Exchange Resin

Separable, Uniform Particle Size, Mixed Bed Ion Exchange Resin for Demineralization Applications and Final Polishing for the Semiconductor Industry

Description

AmberTec™ MR-300 UPW H/OH Ion Exchange Resin is an ultrapure water-grade, mixed resin recommended as a working or polishing mixed bed to complement 2-bed ion exchange or reverse osmosis systems. It can be used as a regenerable mixed bed since the color difference and particle size difference will allow a visually good separation to achieve optimal regeneration. Very low ionic load to a regenerable mixed bed can occasionally lead to clumping, especially when the mixed bed is operated to a boron or silica break. An improvement in the manufacturing process of the anion component will eliminate cation/anion clumping under normal regeneration conditions.

The ratio of anion to cation in AmberTec™ MR-300 UPW H/OH is volumetrically optimized to achieve maximum removal of boron and silica.

Semiconductor-grade is characterized by the high conversion to ionic sites (≥ 95.0%). As shown in Figure 2, the excellent rinse characteristics also allow very efficient online operation.

Applications

- Regenerable, polishing mixed bed
- Working mixed bed following reverse osmosis
- Non-regenerable, polishing mixed bed

Historical Reference

AmberTec™ MR-300 UPW H/OH Ion Exchange Resin has previously been sold as DOWEX MONOSPHERE™ MR-3 UPW Ion Exchange Resin.

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Typical Properties

	Cation Resin	Anion Resin
Physical Properties		
Copolymer	Styrene-divinylbenzene	Styrene-divinylbenzene
Matrix	Gel	Gel
Type	Strong acid cation	Strong base anion, Type I
Functional Group	Sulfonic acid	Trimethylammonium
Physical Form	Dark amber, translucent, spherical beads	White to yellow, translucent, spherical beads
Chemical Properties		
Ionic Form as Shipped	H^+	OH^-
Total Exchange Capacity	≥ 1.9 eq/L	≥ 1.1 eq/L
Water Retention Capacity	46 – 51%	55 – 65%
Ionic Conversion		
H^+	≥ 99%	
OH^-		≥ 95.0%
CO_3^{2-}		≤ 5.0%
Cl^-		≤ 0.1%
Particle Size [§]		
Particle Diameter	650 ± 50 µm	590 ± 50 µm
Uniformity Coefficient	≤ 1.1	≤ 1.1
< 300 µm	≤ 0.2%	≤ 0.2%
Purity		
Metals, dry basis		
Na	≤ 25 mg/kg	≤ 25 mg/kg
Fe	≤ 25 mg/kg	≤ 25 mg/kg
Cu	≤ 15 mg/kg	≤ 15 mg/kg
Al	≤ 15 mg/kg	≤ 15 mg/kg
Stability		
Whole Uncracked Beads	≥ 95%	≥ 95%
Friability		
Average	≥ 500 g/bead	≥ 350 g/bead
> 200 g/bead	≥ 95%	≥ 95%
Density		
Shipping Weight	689 g/L (AmberTec™ MR-300 UPW H/OH)	

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

Suggested Operating Conditions

Temperature Range (H^+/OH^- form) [‡]	15 – 25°C (59 – 77°F)
pH Range (Stable)	0 – 14

[‡] Operating at elevated temperatures, for example above 60 – 70°C (140 – 158°F), may impact the purity of the loop and resin life. Contact our technical representative for details.

For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for mixed beds (Form No. 45-D01127-en) or separate beds (Form No. 45-D01131-en) in water treatment, please refer to our Tech Facts.

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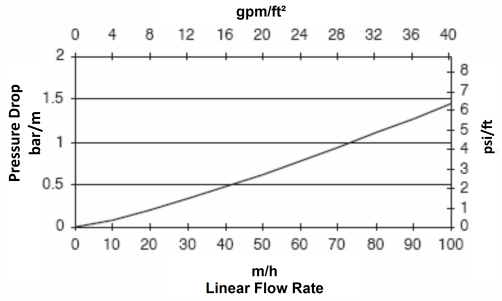
Hydraulic Characteristics

Estimated pressure drop for AmberTec™ MR-300 UPW H/OH Ion Exchange Resin as a function of service flowrate at 20°C (68°F) is shown in Figure 1. These pressure drop expectations are valid at the start of the service run with clean water. Estimated pressure drop at other water temperatures can be calculated with the provided equations.

Figure 1: Pressure Drop

Temperature = 20°C (68°F)



For other temperatures use:

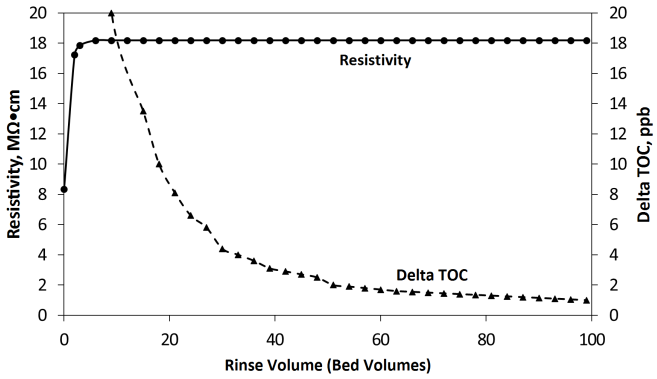
$P_T = P_{20°C} / (0.026T_{°C} + 0.48)]$, where P ≡ bar/m

$P_T = P_{68°F} / (0.014T_{°F} + 0.05)]$, where P ≡ psi/ft

UPW Rinse Properties

AmberTec™ UP Ion Exchange Resins are especially processed and controlled in Quality to ensure the purest treated water quality for semiconductors applications. Typical rinse curves for resistivity and total organic carbon (TOC) to DTOC = 2 ppb as a function of rinse volume (in bed volumes) is shown in Figure 2.

Figure 2: Resistivity and TOC Rinse Performance



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.

Have a question? Contact us at:

www.dupont.com/water/contact-us

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