

AmberTec™ MR-450 UPW H/OH Ion Exchange Resin

Non-Separable, Uniform Particle Size, Mixed Bed Ion Exchange Resin for Final Polishing for the Semiconductor Industry

Description

AmberTec™ MR-450 UPW H/OH Ion Exchange Resin is an ultrapure water-grade, non-separable, homogeneous, mixed bed resin recommended as a point-of-use or non-regenerable mixed bed in the polishing loop to achieve sub-ppb levels of soluble silica, boron, sodium, potassium, sulfate, chloride, zinc, iron, and aluminum. This non-regenerable mixed bed resin is used for 2 – 3 years before replacement.



This homogeneous mixed bed contains 360-μm cation resin and 590-μm anion resin (mean particle size), thus providing efficient kinetics to achieve a higher operating capacity. The ratio of anion to cation in AmberTec™ MR-450 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 ($\geq 95.0\%$). As shown in Figure 2, the excellent rinse characteristics also allow very efficient online operation.

Applications

- Non-regenerable, polishing mixed bed

Historical Reference

AmberTec™ MR-450 UPW H/OH Ion Exchange Resin has previously been sold as DOWEX MONOSPHERE™ MR-450 UPW Ion Exchange Resin.

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	Light amber, translucent, spherical beads	White to yellow, translucent, spherical beads
Chemical Properties		
Ionic Form as Shipped	H ⁺	OH ⁻
Total Exchange Capacity	≥ 2.0 eq/L	≥ 1.1 eq/L
Water Retention Capacity	46 – 53%	55 – 65%
Ionic Conversion		
H ⁺	≥ 99%	
OH ⁻		≥ 95%
CO ₃ ²⁻		≤ 5.0%
Cl ⁻		≤ 0.1%
Particle Size §		
Particle Diameter	360 ± 50 µm	590 ± 50 µm
Uniformity Coefficient	≤ 1.1	≤ 1.1
< 300 µm	≤ 0.2%	≤ 0.2%
Purity		
Metals, dry basis		
Na	≤ 20 mg/kg	≤ 25 mg/kg
Fe	≤ 25 mg/kg	≤ 25 mg/kg
Cu	≤ 10 mg/kg	≤ 15 mg/kg
Al	≤ 15 mg/kg	≤ 15 mg/kg
Stability		
Whole Uncracked Beads	≥ 95%	≥ 95%
Friability		
Average	≥ 350 g/bead	≥ 350 g/bead
> 200 g/bead	≥ 95%	≥ 95%
Density		
Shipping Weight	704 g/L (AmberTec™ MR-450 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.

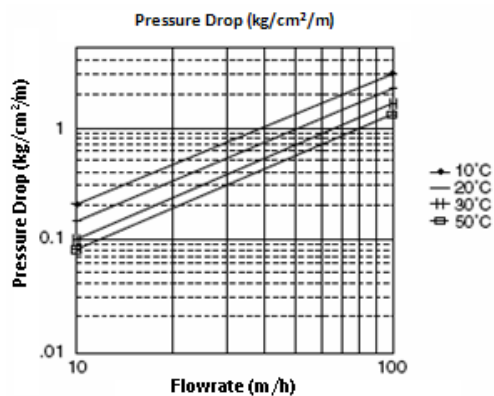
For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for [mixed beds](#) (Form No. 45-D01127-en) or [separate beds](#) (Form No. 45-D01131-en) in water treatment, please refer to our Tech Facts.

Hydraulic Characteristics

Estimated pressure drop for AmberTec™ MR-450 UPW H/OH Ion Exchange Resin as a function of service flowrate and temperature is shown in Figure 1. These pressure drop expectations are valid at the start of the service run with clean water.

Figure 1: Pressure Drop

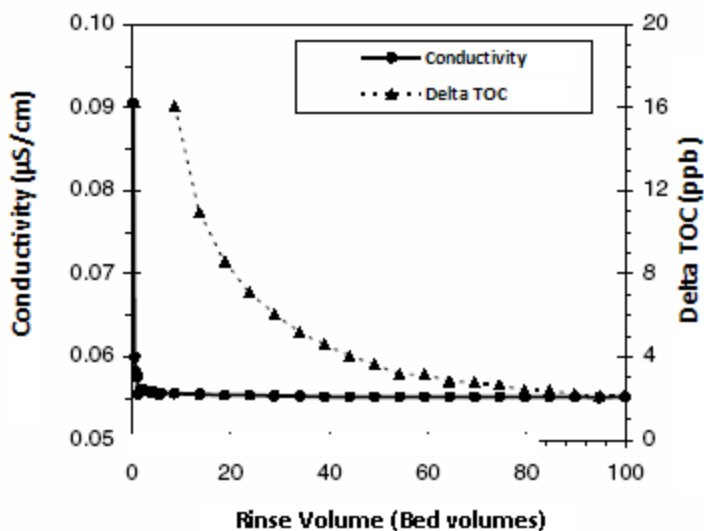
Temperature = 20°C (68°F)



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 conductivity and total organic carbon (TOC) as a function of rinse volume (in bed volumes) is shown in Figure 2.

Figure 2: Conductivity and TOC Rinse Performance



Product Stewardship

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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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