DOWEX™ MONOSPHERE™ MR-450 UPW

A Non-Separable Uniform Particle Size Mixed Bed Ion Exchange Resin for Ultrapure Water Production

Product	Resin ratio	Matrix	Functional group
DOWEX™ MONOSPHERE™ MR-450 UPW	Note*	Styrene-DVB, gel	Sulfonic acid and quaternary ammonium

Guaranteed Sales Specifications		H^+ form	OH^- form
Total exchange capacity, min.	eq/L	1.9	1.0
	kgr/ft³ as $CaCO_3$	41.5	21.9
Water content	%	46 - 53	55 - 65
Bead size distribution†			
Mean particle size	µm	360 ± 50	590 ± 50
Uniformity coefficient, max.		1.1	1.1
Whole uncracked beads, min.	%	95	95
Crush strength			
Average, min.	g/bead	350	350
> 200 g/bead, min.	%	95	95

Typical Physical and Chemical Properties		H^+ form	OH^- form
Particle density	g/mL	1.22	1.08
Shipping weight**	g/L	704	704
	lbs/ft³	44	44

Recommended Operating Conditions

- Maximum operating temperature: 60°C (140°F)
- Resin bed depth, min.: 800 mm (2.6 ft)
- Flow rates:
  - Service: 10 - 60 m/h (4-24 gpm/ft²)
- Pressure drop: see Figure 1

UPW Mixed Resin Specific Properties

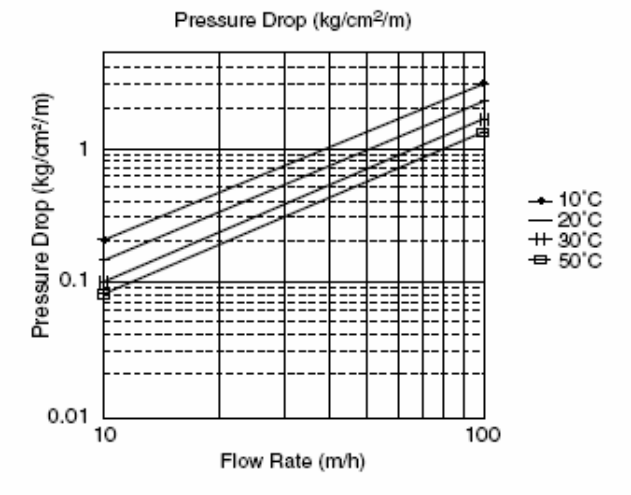
- Cationic resin conversion to H: 99.7% min.
- Anionic resin conversion to:
  - OH: 95% min.
  - CO_3: 5% max.
  - Cl: 0.1% max.
- Rinse characteristics:
  UPW grade resins are rinsed to meet stringent ionic and organic residuals
  - Ionic conductivity rinse down to 0.055 µS/cm (see Figure 2): 2 bed volumes
  - TOC rinse down to 4 ppb (+) (see Figure 2): 45 bed volumes

Note* Resin ratio of anion to cation is volumetrically optimized to achieve maximum removal of boron, silica and other sensitive ions.
† For additional particle size information, please refer to Particle Size Distribution Cross Reference Chart (Form No. 177-01775).
(+) delta TOC ppb measured in/out
** As per the backwashed and settled density of the resin, determined by ASTM D-2187.

Typical Properties and Applications

DOWEX™ MONOSPHERE™ MR-450 UPW grade resin is a non-separable homogeneous mixed bed resin. It is 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 two to three years before replacement. The UPW grade product is characterized by the very high conversion to ionic sites (95.0% min.), excellent rinse profiles for conductivity and (delta) TOC and superior crush strength. This homogeneous mixed bed contains 360 micron cation and a 590 micron anion (mean particle size) thus providing efficient kinetics to achieve a higher operating capacity.

Figure 1. Pressure Drop Data

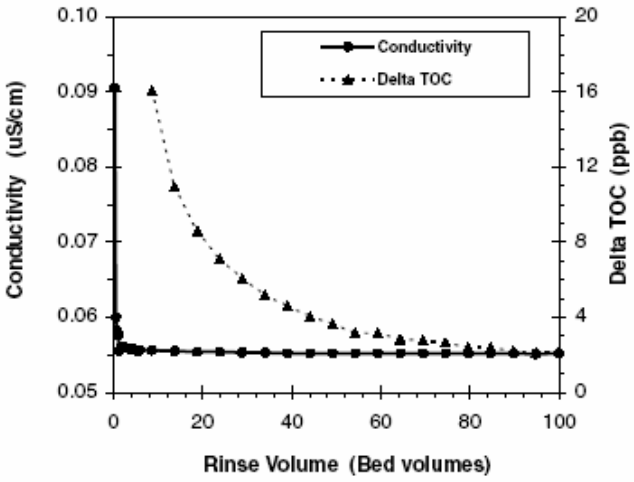


For other temperatures use:

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

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

Figure 2. Conductivity and TOC Rinsedown Curves



DOWEX™ Ion Exchange Resins

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