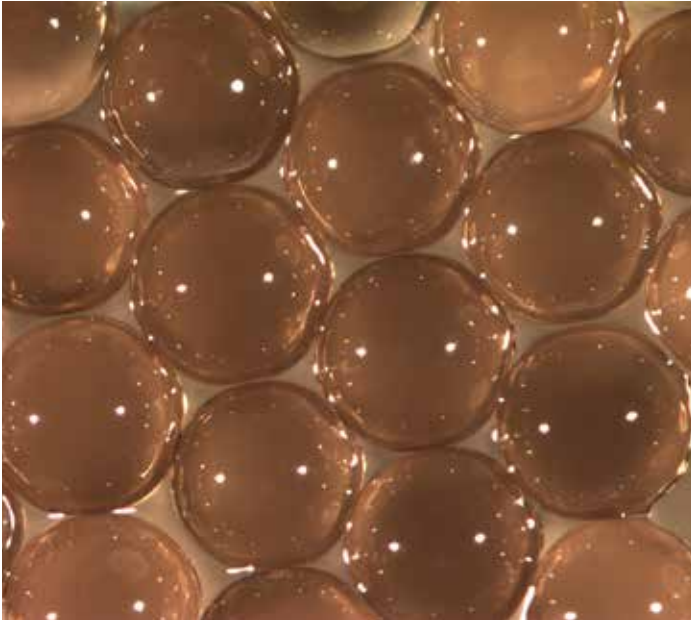# GRAVEX® UPS DEMINERALIZATION AND FOSSIL CONDENSATE RESINS

Graver Technologies

A Marmon Water/Berkshire Hathaway Company

The UPS ion exchange products are high capacity, uniform size, polystyrene gel type resins. They are processed to achieve the best possible performance. The Gravex UPS anions are offered in the fully regenerated hydroxide form and the UPS cations in the hydrogen form. Excellent physical properties and high purity levels enable these UPS products to perform at the highest level in the intended application. The color difference of the resins allows visual observation of the important separation portion of the overall regeneration process.

The Demineralization resins are designated as Gravex UPS GR-1-0 US DM (OH) and Gravex UPS GR-2-0 US DM (H). The fossil station Condensate resins are designated as Gravex UPS GR-1-0 US CGF (OH) and Gravex UPS GR-2-0 US CGF (H). The uniform particle size of these resins allows for more complete capacity utilization during operation, especially with the high flow rates of condensate polishing, excellent anion separation from the cation during the regeneration process, and lower rinsing requirements following regeneration. The anion is also available in the chloride form.

| TYPICAL PROPERTIES	DEMINERALIZATION		CONDENSATE	
	Gravex UPS GR-1-0 US DM	Gravex UPS GR-2-0 US DM	Gravex UPS GR-1-0 US CGF	Gravex UPS GR-2-0 US CGF
Type	Strongly basic type 1 gel	Strongly Acidic	Strongly basic type 1 gel	Strongly Acidic
Matrix	Styrene Divinylbenzene	Styrene Divinylbenzene	Styrene Divinylbenzene	Styrene Divinylbenzene
Functional Group	Trimethylammonium, A Quaternary Amine	Sulfonic Acid	Trimethylammonium, A Quaternary Amine	Sulfonic Acid
Ionic Form	Hydroxide (Chloride available)	Hydrogen	Hydroxide (Chloride available)	Hydrogen
Total Exchange Capacity	1.1 eq/L (min)	1.9 eq/L (min)	1.1 eq/L (min)	2 eq/L (min)
Ionic Conversion	95% Hydroxide (min)	99% Hydrogen (min)	95% Hydroxide (min)	99% Hydrogen (min)
			0.5% Chloride (max)	
Water Retention Capacity	55-65%	45-51%	55-65%	45-51%
Particle Size				
Mean Diameter	590 +/- 50 µm	660 +/- 50 µm	590 +/- 50 µm	660 +/- 50 µm
Uniformity Coefficient	1.1 (max)	1.1 (max)	1.1 (max)	1.1 (max)
Friaility				
Average g/bead	350 (min)	500 (min)	350 (min)	500 (min)
>200 g/bead	95% (min)	95% (min)	95% (min)	95% (min)
Whole Uncracked Bead	95% (min)	95% (min)	95% (min)	95% (min)
Swelling Approximate	20% (Cl⁻ to OH⁻)	8% (Na⁺ to H⁺)	23% (Cl⁻ to OH⁻)	8% (Na⁺ to H⁺)
Particle Density	1.07 g/mL	1.22 g/mL	1.07 g/mL	1.22 g/mL
Approximate Shipping Weight	41 lbs/ft³ (655 - 660 g/L)	50 lbs/ft³ (800 g/L)	41 lbs/ft³ (655 - 660 g/L)	50 lbs/ft³ (800 g/L)

RECOMMENDED OPERATING CONDITIONS

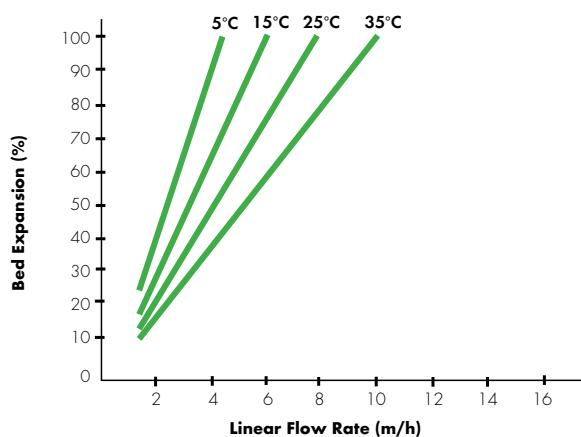|	DEMINERALIZATION		CONDENSATE	
	Gravex UPS GR-1-0 US DM	Gravex UPS GR-2-0 US DM	Gravex UPS GR-1-0-US CGF	Gravex UPS GR-2-0 US CGF
Operating Temperature (max)	60°C (140°F)	130°C (265°F)	60°C (140°F)	130°C (265°F)
pH Range	0 - 14	0 - 14	0 - 14	0 - 14
Bed Depth (min)	800 mm (2.6 ft)	800 mm (2.6 ft)	450 mm (1.5 ft)	450 mm (1.5 ft)
Service Rate	5 - 60 m/h (2 - 24 gpm/ft²)	5 - 60 m/h (2 - 24 gpm/ft²)	40 - 150 m/h (16 - 60 gpm/ft²)	40 - 150 m/h (16 - 60 gpm/ft²)
Regenerant	4 - 8 % NaOH	2 - 10 % H_2SO_4 4 - 8% HCl	4 - 8 % NaOH	2 - 10 % H2SO4 4 - 8% HCl
Regeneration Rate	2 - 10 m/h (0.8-4 gpm/ft²)	2 - 10 m/h (0.8-4 gpm/ft²)	2 - 10 m/h (0.8-4 gpm/ft²)	2 - 10 m/h (0.8-4 gpm/ft²)
Total Rinse Requirement	2 - 10 BV	2 - 10 BV	2 - 10 BV	2 - 10 BV

PRESSURE DROP
GR-2-0 US DM
GR-2-0 US CGF
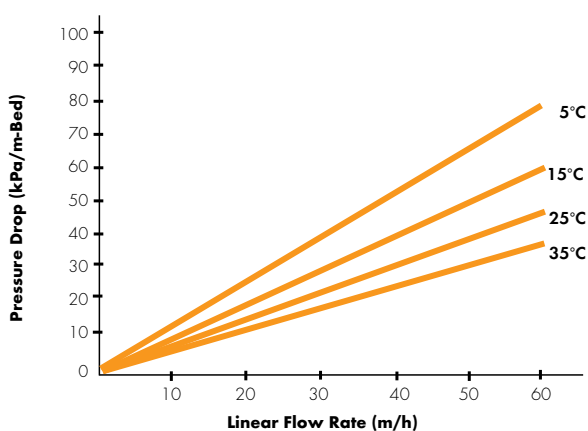
PRESSURE DROP
GR-1-0 US DM
GR-1-0 US CGF
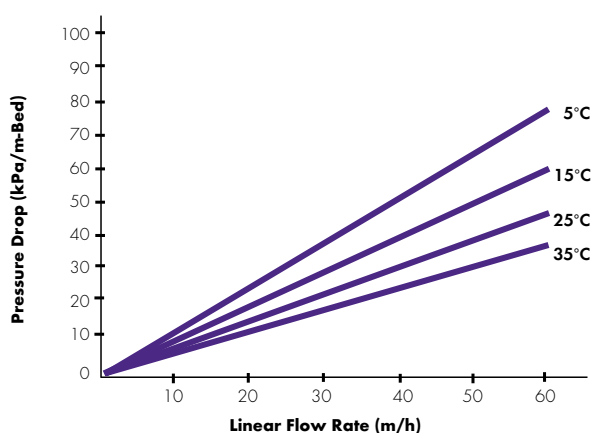
BED EXPANSION
GR-2-0 US DM
GR-2-0 US CGF
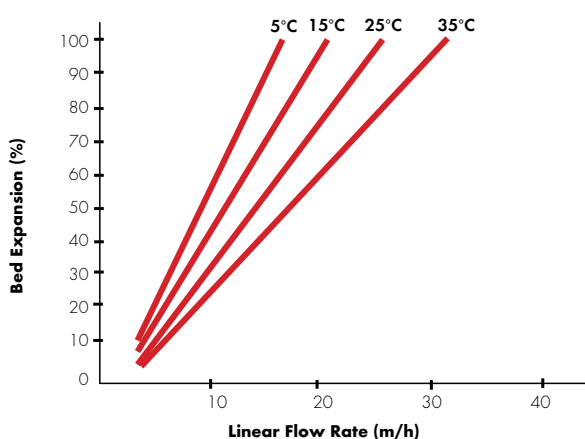
BED EXPANSION
GR-1-9 US DM
GR-1-0 US CGF