



Graver Technologies

GRAVEX® GR 1-9 US Ultra



Ultra Low Chloride Anion Exchange Resin

Gravex GR 1-9 US Ultra is a new and unique fully regenerated anion exchange resin product. It is a high capacity strong base gel resin that is specially processed to achieve the ultimate in low chloride content and leachables. A step beyond the traditional low chloride Nuclear Grade resins, this ultra low chloride Gravex product is designed for top performance in non-regenerable applications and may be termed a pico-chloride anion.

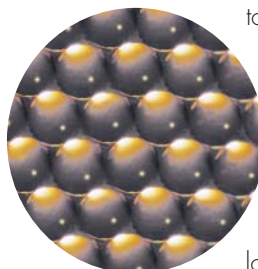
The breakthrough Gravex processing achieves chloride levels not attainable by on-site plant regenerations, nor anywhere but perhaps under the most stringent and impractical laboratory conditions. Graver Technologies continues to lead in the development of new and innovative ion exchange products. The development included not only new chemical treatment and resin regeneration techniques, but test methods for accurately measuring chloride in the chemicals and on the resin.

Applications

The first application for the Gravex GR 1-9 US Ultra was condensate treatment in a PWR nuclear plant using ETA for pH control. Other areas for use include Chemical Volume Control System (CVCS) beds to treat primary reactor coolant, Steam Generator Blowdown Demineralizers, and Fuel Pool treatment. BWR nuclear plant condensate is another application.

PWR Condensate

The Gravex GR 1-9 US Ultra provides a plant with the ability to effectively operate the condensate polishers with cation resin in the amine form. The major advantage is reducing the iron corrosion product, transport to the steam generators. This is accomplished by increasing the amine concentration and continuing to operate the polishers after the amine break.



Once the cation resin is converted to the amine form and the pH increases in the condensate polisher, Condensate Grade and Nuclear Grade anion resins leach chloride. Gravex GR 1-9 US Ultra mitigates the issue because the residual chloride level on the resin is consistently much lower. The Gravex anion

performance has continued to improve with time and is expected to exceed two years of amine form service, without regeneration.

PWR CVCS

Gravex GR 1-9 US Ultra, with significantly lower chloride, is the best choice for anion to be used in the CVCS. The product may be used as an anion bed or as part of a mixed bed, typically a Li⁺OH resin combination.

PWR Fuel Pool

Gravex GR 3-16 N, a mixed bed with a high crosslinked cation for stability, is commonly used in this application. Adding GR 1-9 US Ultra to the high crosslinked cation provides the highest possible mixed bed product quality.

GRAVEX GR 1-9 US Ultra

Properties	Parameter
Functionality	Quaternary Ammonium
Matrix	Styrene – DVB
Ionic Form	Hydroxide
Avg. Particle Size	600+/- 50µm
Total Exchange Capacity	1.1 meq/mL (min)
Conversion	97% OH (min)
Conversion	0.05% Cl (max)
Water Retention	42-50%
Packing Weight	40 lbs/ft ³ (640 g/L)

Recommended Operating Conditions

Temperature	140°F (60° C) (max)
pH Range	0 - 14
Bed Depth	30 inches (0.75 meters) (min)
Condensate Flow Rate	50 gpm/ft ² (125m/hr) (max)
Other Flow Rate	1 – 6 gpm/ft ³ (8–50 BV/hr)

For more information

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Superior Products & Global Reach

Graver Technologies continues to set the industry's pace in ion exchange resin purity, consistently meeting today's tougher requirements for nearly undetectable levels of chloride, sulfate and TOC for high-purity condensates and other process waters.

Whether your business is around the corner or around the world, Graver Technologies can support you with superior products and services. Our products are used worldwide. In fact, we export over 35% of the products we manufacture. Graver Technologies ion exchange products treat more than 6.5 billion gallons of process water every day. Over 75 percent of the nuclear industry uses our resins. We've achieved this by consistently delivering dependable, high performance products.

Gravex GR 1-9 US Ultra The Future is Corrosion-Free

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