

POWDEX® • PREMIX

High Performance Water Treatment for Power Generation

Powdex® and Powdex Premix Products

Powdex and Powdex Premix precoat products are made from functionalized, crosslinked styrene-divinylbenzene copolymers that create two types of very pure, highly regenerated powdered ion exchange resins: strongly acidic Powdex cation and strongly basic Powdex anion resins. Powdex precoat products are available in several ionic forms; they are also available in Powdex Premix products with preset ratios that address typical condensate conditions.

The flocced fine resin particles in Powdex resins provide superior kinetic, hydraulic and filtration properties that offer a high suspended solids loading capacity with excellent permeability and long run lengths. The fine particles and floc structure supply a large surface area that efficiently filters suspended solids. The electrokinetic nature of Powdex and Powdex Premix

Powdex products are mixed at point of use, a flexible method that allows operators to adjust precoat properties. The Premix products are precoated in a single, simple step.



Both product types are applied by adding to a slurry tank and precoating on septa such as Aegis® wound and Aegis DualGuard® septa. Excellent hydraulic properties deliver much higher flux rates compared to similarly sized media. The precoat depth is typically 1/4" to 3/8" (~ 6 to 9 mm) though thinner layers achieve some high-purity deionization.

Powdex and Premix cations are available in either hydrogen or ammonium form. The anions are hydroxide form in all cases. Hydrogen form products are designed for neutral pH systems. Ammonium forms are designed for high pH systems. However, all products are useable across the full pH range

APPLICATIONS

Condensate Polishing

Powdex and Powdex Premix products provide superior treatment for high purity condensates. They are especially effective in high temperature, air cooled condenser plants; high pressure boiler condensates; and nuclear boiling water reactors. They also effectively treat the condensates in nuclear pressurized water reactors and drum boilers. For all condensate polishing applications, an individual Powdex cation or anion product may be applied over a base precoat to provide additional capacity for troublesome species like silica or sodium.

Reactor Water Cleanup

Several Premix products are suited for application as a layer over an Ecodex® base precoat to enhance removal capabilities for select radionuclides including cobalt, cesium and others.

Powdex and Premix deliver revolutionary features and benefits in easy-to-use formulations

FEATURES

- > High integrity flocced agglomerate
- > Powdex resin interaction
- > Disposable precoat products
- > Electrokinetic precoat properties
- > Mixed bed Premix products

BENEFITS

- > High flux rate
- > Excellent filtration
- > No chemical storage, complex regenerations or chemical disposal
- > Adsorption of colloids and organics
- > Simple, one-step precoat application

Powdex and Powdex Premix Products

Powdex and Premix Product Descriptions

Product Name	Resin Type	Ionic Form	Cation: Anion
Powdex PAO	SBA	Hydroxide	
Powdex PCH	SAC	Hydrogen	
Powdex PCN	SAC	Ammonium	
Powdex PCM	SAC	Morpholinium	
Premix 22H	SAC/SBA	H/OH	1:1
Premix 42H	SAC/SBA	H/OH	2:1
Premix 62H	SAC/SBA	H/OH	3:1
Premix 82H	SAC/SBA	H/OH	4:1
Premix 45H	SAC/SBA	H/OH	1:1
			Stoichiometric
Premix 22N	SAC/SBA	NH ₄ /OH	1:1
Premix 42N	SAC/SBA	NH ₄ /OH	2:1

Typical Operating Conditions

Service Flow Rate	2.5 – 10 m/hr (1– 4 gpm/ft ²)
Recommended Precoat Dosage	0.5 – 1 dry kg/m ² (0.1– 0.2 dry lb/ft ²)
Min/Max Precoat Dosage	0.4 / 1.5 dry kg/m ² (0.08 – 0.3 dry lb/ft ²)
Typical Precoat	6 mm (.25 inch) @ 1 dry kg/m ² (0.2 dry lb/ft ²)
Temperature	Typical 27°– 49°C (80°– 120°F) Max 116°C (240°F)



Graver Technologies Worldwide Locations



Superior Products and Global Reach

Graver Technologies designs, develops and manufactures ion exchange technology and products that enable and enhance separation, purification, process filtration and analysis. A Marmon Water/Berkshire Hathaway Company, Graver has a long history of strong corporate support, ion exchange innovation, industry commitment, global reach and world-class capabilities.

Whether you are around the corner or across the globe, Graver Technologies supports customers with superior products and services. Customers worldwide trust our products over competitive offerings; we export about a third of our manufacturing output. Backed by more than half a century of innovation, our ion exchange products treat over 6.5 billion gallons of water daily in more than 38 countries.

In the United States, over 90 percent of nuclear power facilities choose Graver's ion exchange systems, services and products to meet stringent water purity requirements.



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10CFR50, Appendix B



A Marmon Water/Berkshire Hathaway Company