



Graver Technologies

**POWDEX® SELECTION GUIDE**

PRODUCT	TYPE	MATRIX	FUNCTIONALITY	IONIC FORM	TOTAL CAPACITY meq/dryg	% MOISTURE	% IONIC CONVERSION
<b>POWDEX</b>							
PAO	SBA TYPE I	Styrene DVB Gel	-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>	OH <sup>-</sup>	4	50-60	95
PACL	SBA TYPE I	Styrene DVB Gel	-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>	Cl <sup>-</sup>	3.8	40-60	99
PAS	SBA TYPE II	Styrene DVB Gel	-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> OH	Cl <sup>-</sup>	4	55-75	99
PCH	SAC	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	H <sup>+</sup>	5	45-62	99
PCN	SAC	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	NH <sub>4</sub> <sup>+</sup>	4.5	40-60	95
PCM	SAC	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	Morpholinium	4.8 H Form	40-60	90
PCNA	SAC	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	Na <sup>+</sup>	4.8	40-60	95
PKH	WAC	Acrylic DVB Macro	-COOH	H <sup>+</sup>	7.5	40-60	95
<b>POWDEX PREMIX</b>							
					Wt Ratio		
22 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1:1	2.5	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		2		95
32 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1.5:1	2.9	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1.6		95
42 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	2:1	3.2	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1.3		95
62 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	3:1	3.7	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1		95
82 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	4:1	3.9	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		0.8		95
45 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1:1	2.2	50-70	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		Capacity		2.2
46 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	2:3	2	50-75	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		2.4		95
24 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1:2	1.6	50-75	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		2.6		95
28 H	SAC-H	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1:4	1	50-75	99
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		3.2		95
22 N	SAC-NH <sub>4</sub>	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1:1	2.3	50-75	95
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		2		95
32 N	SAC-NH <sub>4</sub>	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	1.5:1	2.7	50-75	95
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1.6		95
42 N	SAC-NH <sub>4</sub>	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	2:1	3	50-70	95
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1.3		95
62 N	SAC-NH <sub>4</sub>	Styrene DVB Gel	-SO <sub>3</sub> <sup>-</sup>	3:1	3.4	50-70	95
	SBA-OH		-N <sup>+</sup> -(CH <sub>3</sub> ) <sub>3</sub>		1		95

# POWDEX® AND POWDEX PREMIX™

Powdex ion exchange resins and premixed versions are powdered bead resins. The cation and anion exchange resins are typically cross-linked styrene divinylbenzene copolymers. They are commonly referred to as strongly acidic and strongly basic ion exchange resins. The beads are specially processed and highly regenerated prior to grinding. The grinding process is precisely controlled to achieve target particle sizes. The small particles provide rapid kinetic response.

When the negatively charged cation exchange resin and the positively charged anion exchange resin powders are mixed in an aqueous slurry, they agglomerate to form large floc particles. The slurry is then precoated on filter septa such as, Aegis®, DualGuard® and AFA® filters, among others. Excellent hydraulic properties are achieved with much higher flux rates than can be attained with similarly sized media. The precoat depth is typically 1/4" to 3/8" (~ 6 to 9 mm) although even thinner layers may be used to achieve some high-purity deionization.

The large surface area provided by the fine particles and the resultant floc structure of the agglomerate, permit the filtration of suspended solids while maintaining the rapid kinetics necessary for dissolved solids removal at fast flow rates. The electrokinetic nature of the resin precoat enables the attraction and adsorption of colloids and color bodies. Both Powdex and Powdex Premix products are recommended for high-purity polishing applications, when the concentrations of soluble and particulate impurities are relatively low.

## APPLICATIONS

### Condensate Polishing

High flow rate condensate polishing was the original application for Powdex products. They were developed to provide an economical means of providing simultaneous filtration and deionization for start-up and steady-state operation. Water quality is maintained during small condenser leaks as shown in the simulated leak test in Figure 1.

### Fuel Pool and Reactor Water Cleanup

Silica and other dissolved solids are easily removed from the reactor. Fuel pool parameters are maintained by the Powdex System continuously filtering and cleaning. New products include very high content anion premixes for silica and thermally stable anion for higher temperature operation.

### Radwaste

Powdex resin operating capacity is up to 90% or more of the total ion exchange capacity. In addition to filtration, ionic species such as iodine, cobalt and silica as well as organics are removed.



Bead Resin, Powdex and Premix

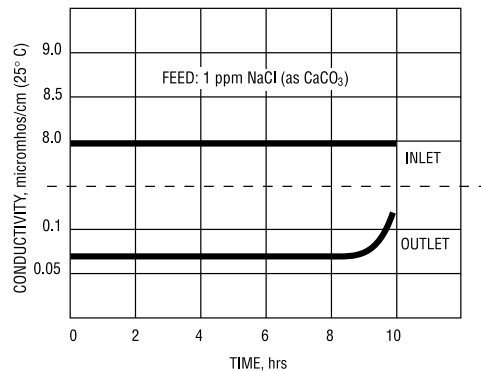


Figure 1: Simulated condenser leak test with POWDEX

Please contact Graver Technologies today at **1-800-249-1990** (24-hour service) or E-mail: [info@gravertech.com](mailto:info@gravertech.com) Visit our website: [www.gravertech.com](http://www.gravertech.com)

All Graver Technologies resins are manufactured in accordance with a quality assurance program meeting the requirements of Title 10 of the Code of Federal Regulations, Part 50, Appendix B (10CFR50 App. B). Our resins are all individually QC tested assuring quality and purity.



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