CHELATING RESIN

PROBOND™ CI (CATION IMINODIACETATE)

ProBond CI (Cation Iminodiacetate) (P/N ER10112) is a macroporous weak acid cation exchange resin which has chelating properties for heavy metal ions even against high concentrations of calcium. It is intended for use in polishing heavy metal ions from near neutral industrial wastes and process streams, and recovery of precious metals. It is supplied in the sodium form as moist, tough, uniform spherical beads.

FEATURES

- Able to chelate heavy metals in metal finishing rinses
- Able to chelate heavy metals ions in high calcium concentrations
- Highly uniform particle size giving a low pressure drop while maintaining excellent kinetics
- Superior physical stability

Physical Properties

Polymer Structure	Macroporous Styrene with DVB
Functional Group	R-CH_2-N($COOH)_2$
Ionic Form, as shipped	Sodium
Physical Form	Spherical beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std.)	< 5%
–50 mesh (U.S. Std.)	< 1%
pH Range	1.5 to 14
Sphericity	> 95%
Water Retention	
Sodium Form	55 to 60%
Solubility	Insoluble
Approximate Shipping Weight	
Sodium Form	43 lb/cu.ft.
Swelling H^- to Na^- Form	20%
Total Capacity	
Sodium Form	> 1.1 meq/mL

Suggested Operating Conditions

Maximum Temperature	
Sodium Form	170°F (77°C)
Hydrogen Form	140°F (60°C)
Maximum Free Chlorine	None
Minimum Bed Depth	36 inches
Backwash Rate (see next page)	50 to 75% bed expansion
Service Flow Rate	1 to 2 gpm/cu.ft.
Pressure Drop	See next page
Acid Regenerant Concentration	4 to 10%
Regenerant Flow Rate	0.25 to 0.5 gpm/cu.ft.
Regenerant Contact Time	30 minutes minimum
Regenerant Level	
HCl	8.7 lb/cu.ft.
H_2SO_4	12.5 lb/cu.ft.
Displacement Rinse Rate	Same as Regen Flow Rate
Displacement Rinse Volume	10 to 20 gal/cu.ft
Fast Rinse Rate	1 to 2 gpm/cu.ft.
Fast Rinse Volume	Same as Service Flow Rate
Caustic Neutralization Conc.	4 to 10%
Caustic Solution Flow Rate	0.25 to 0.5 gpm/cu.ft.
Caustic Contact Time	30 minutes minimum
Caustic Dose Level	2.5 to 6.0 lb/cu.ft.

CAUTION: DO NOT MIX ION EXCHANGE RESINS WITH STRONG OXIDIZING AGENTS. Nitric acid and other strong oxidizing agents can cause explosive reactions when mixed with organic materials such as ion exchange resins.

Note: These suggestions and data are based on information we believe to be reliable. However, we do not make any guarantee or warranty. We caution against using these products in any unsafe manner or in violation of any patents. Further, we assume no liability for the consequences of any such actions.

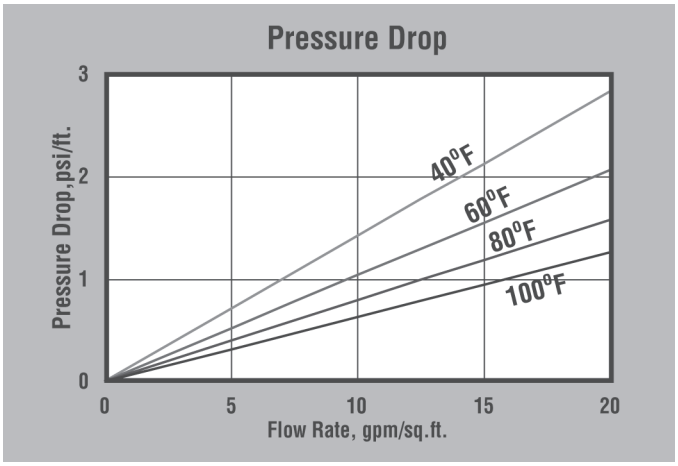
SAFE WATER TECHNOLOGIES, INC.
996 BLUFF CITY BOULEVARD, ELGIN, IL 60120 USA
TELEPHONE 847 888 6900 • FACSIMILE 847 888 6924
E MAIL: info@swtwater.com • WEB SITE: www.swtwater.com

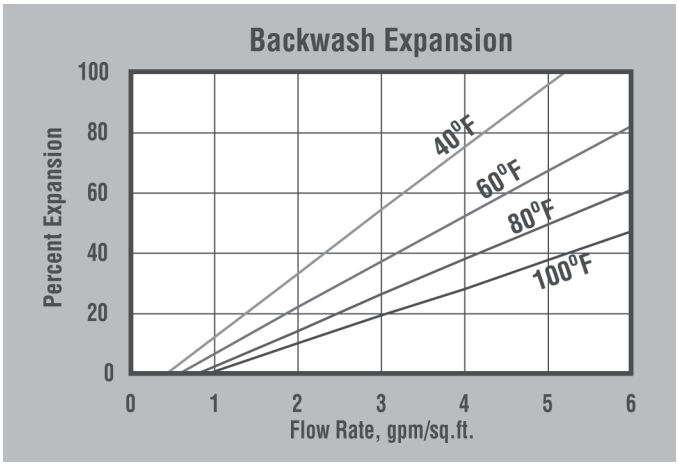
MEMBER Water Quality ASSOCIATION

FORM 1369
EFFECTIVE
APRIL 2014

CHELATING RESIN

PROBOND™ CI (CATION IMINODIACETATE)





PRESSURE DROP — The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate at various temperatures.

BACKWASH — After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed.

OPERATING CAPACITY

The relative affinity of ProBond CI (Cation Iminodiacetate) for heavy metals in near neutral solutions is in accordance with the following sequence.

H^{+1}>>Cu^{+2}>V^{+2}>>$(UO2)^{+2}$>Pb^{+2}>Ni^{+2}>Zn^{+2}>Co^{+2}>
Cd^{+2}>Fe^{+2}>Be^{+2}>Mn^{+2}>Mg^{+2}>Ca^{+2}>Sr^{+2}>Ba^{+2}>>Na^{+1}

High concentrations of chlorides or sulfates, or the presence of chelating or complexing agents can alter this sequence and likewise will affect the operating capacity.

High Chloride Solutions
Cu^{+2}>Ni^{+2}>Co^{+2}>Zn^{+2}>Cd^{+2}>Fe^{+2}

High Sulfate Solutions
Cu^{+2}>Ni^{+2}>Cd^{+2}>Zn^{+2}>Co^{+2}>Fe^{+2}

ProBond CI has similar chelating characteristics to EDTA and NTA. Therefore it is less effective when these agents are present.

For each particular metal cation there is a critical pH at which ProBond CI has optimum selectivity. For most metals this pH is approximately 4.0. As the pH decreases, so does the selectivity. At a pH of approximately 1.5, ProBond CI loses its ability to remove most metals. The minimum pH values for removal of some common metal ions are as follows:

Manganese	4.0
Iron	3.0
Zinc, Cobalt	2.7
Nickel	2.5
Copper	1.5

As the pH increases, selectivity also decreases. At a pH of 9.0 selectivity for most metals is about 10% of the selectivity at optimum pH. Above a pH of 9.0 many metals form anionic complexes and are no longer present in a form that can be removed by ProBond CI.

ProBond CI, like other chelating resins, has very slow kinetics. Optimum capacity is obtained when the service flow rate is limited to 0.5 to 1.0 gpm/cu.ft. Where extremely low leakage of metals is required, two columns of ProBond CI should be operated in series. The primary column can be fully exhausted, allowing the polishing column to protect against leakage. After regeneration, the order of the columns is reversed with the freshly regenerated column used as the polisher.

SAFE WATER TECHNOLOGIES, INC.
996 BLUFF CITY BOULEVARD, ELGIN, IL 60120 USA
TELEPHONE 847 888 6900 • FACSIMILE 847 888 6924
E MAIL: info@swtwater.com • WEB SITE: www.swtwater.com

FORM 1369
EFFECTIVE
APRIL 2014