



# SIR-300

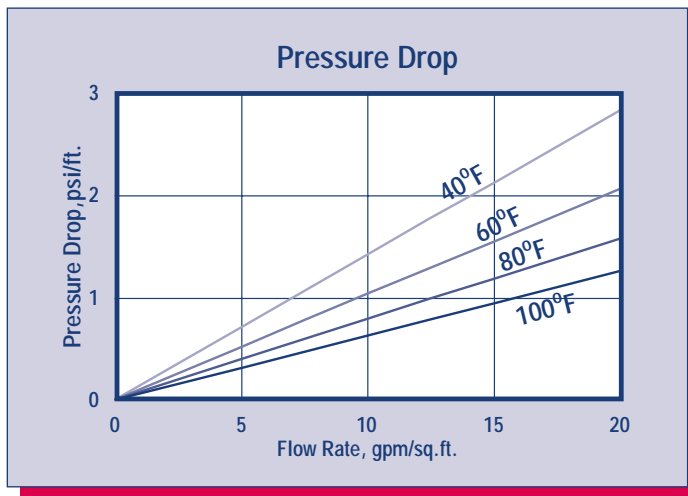
CATION EXCHANGE RESIN  
IMINODIACETATE  
Na FORM

**RESINTECH SIR-300** is a macroporous weak acid cation exchange resin based on the iminodiacetate acid functional group, 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. *RESINTECH SIR-300* is supplied in the sodium form as moist, tough, uniform spherical beads.

## FEATURES & BENEFITS

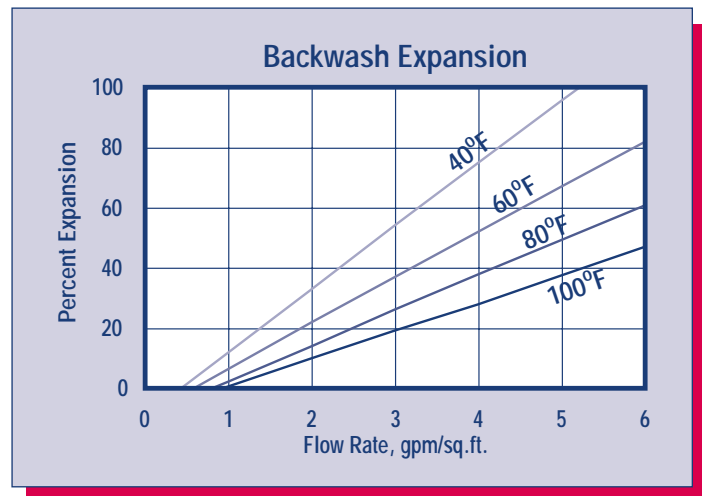
- **ABLE TO CHELATE HEAVY METALS IN METAL FINISHING RINSES**  
Extremely high selectivity for metals in slightly acid waters makes resin ideal for treatment prior to discharge, or in front of other resins used in recycle, recovery loops.
- **ABLE TO CHELATE HEAVY METAL IONS IN HIGH CALCIUM CONCENTRATIONS**  
High capacity for removing traces of heavy metals from wastewaters that have been treated by conventional hydroxide precipitation.
- **HIGHLY UNIFORM PARTICLE SIZE**  
16 to 50 mesh range; giving a LOW PRESSURE DROP while maintaining EXCELLENT KINETICS.
- **SUPERIOR PHYSICAL STABILITY**  
95% sphericity combined with a macroporous polymer structure, high crush strength and uniform particle size distribution gives greater resistance to bead breakage and osmotic shock.

## HYDRAULIC PROPERTIES



### PRESSURE DROP

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

# RESINTECH® SIR-300

## TYPICAL PROPERTIES

Polymer Structure	Macroporous Styrene with DVB
Functional Group	R-CH <sub>2</sub> -N(COOH) <sub>2</sub>
Ionic Form, as shipped	Sodium
Physical Form	Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
- 50 mesh " "	< 1 percent
pH Range	1.5 to 14
Water Retention	
Sodium Form	55 to 60 percent
Solubility	Insoluble
Approximate Shipping Weight	
Sodium Form	43 lbs./cu. ft.
Swelling H- to Na- Form	20 percent
Total Capacity	> 1.1 meq/mL Na form
Sphericity	> 95 percent

## SUGGESTED OPERATING CONDITIONS

Maximum Temperature	
Salt form	170°F
Hydrogen form	140°F
Maximum Free Chlorine	NONE
Minimum Bed Depth	36 inches
Backwash Rate	50 to 75 % Bed Expansion
Acid Regenerant Conc.	4 to 10%
Regenerant Flow Rate	0.25 to .5 gpm/cu. ft.
Regenerant Contact Time	At least 30 Minutes
Regenerant Level	8.7 (HCl) or 12.5 (H <sub>2</sub> SO <sub>4</sub> ) lbs/cu. ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 20 gallons/cu. ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gals./cu. ft.
Caustic Neutralization Conc.	4 to 10%
Caustic Solution Flow Rate	0.25 to .5 gpm/cu. ft.
Caustic Contact Time	At least 30 Minutes
Caustic Dose Level	2.5 to 6.0 pounds/cu. ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 20 gallons/cu. ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gals./cu. ft.
Service Flow Rate	1 to 2 gpm/cu. ft.

## OPERATING CAPACITY

The relative affinity of ResinTech SIR-300 for heavy metals in near neutral solutions is in accordance with the following sequence.

H<sup>+</sup> >> Cu<sup>2+</sup> > V<sup>2+</sup> >> (UO<sub>2</sub>)<sup>2+</sup> > Pb<sup>2+</sup> > Ni<sup>2+</sup> > Zn<sup>2+</sup> > Co<sup>2+</sup> > Cd<sup>2+</sup> > Fe<sup>2+</sup> > Be<sup>2+</sup> > Mn<sup>2+</sup> > Mg<sup>2+</sup> > 2Ca<sup>2+</sup> > Sr<sup>2+</sup> > Ba<sup>2+</sup> >> Na<sup>+</sup>

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<sup>2+</sup> > Ni<sup>2+</sup> > Co<sup>2+</sup> > Zn<sup>2+</sup> > Cd<sup>2+</sup> > Fe<sup>2+</sup>

### HIGH SULFATE SOLUTIONS

Cu<sup>2+</sup> > Ni<sup>2+</sup> > Cd<sup>2+</sup> > Zn<sup>2+</sup> > Co<sup>2+</sup> > Fe<sup>2+</sup>

*RESINTECH SIR-300* 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 ResinTech SIR-300 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 *RESINTECH SIR-300* 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 *RESINTECH SIR-300*.

*RESINTECH SIR-300*, 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 *RESINTECH SIR-300* 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.

*RESINTECH SIR-300* is useful in numerous applications including Waste Treatment, Chemical Processing and Resource Recovery.

*RESINTECH SIR-300* can be used to selectively remove heavy metal multivalent ions from a variety of industrial effluents such as oil refineries, plating shops, mine drainage, battery manufacturing, and cooling towers. Consult your ResinTech technical representative for specific applications.

**\*CAUTION:DO NOT MIX ION EXCHANGE RESIN 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.

**Material Safety Data Sheets (MSDS)** are available for all ResinTech Inc.products.To obtain a copy,contact your local ResinTech sales representative or our corporate headquarters. They contain important health and safety information.That information may be needed to protect your employees and customers from any known health and safety hazards associated with our products.We recommend that you secure and study the pertinent MSDS for our products and any other products being used These suggestions and data are based on information we believe to be reliable.They are offered in good faith.However we do not make any guarantee or warranty. We caution against using these products in an unsafe manner or in violation of any patents;further we assume no liability for the consequences of any such actions.

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