United States Resin Company

P.O. Box 31219
Phoenix, Az. 85046

C-10 Na

STRONG ACID CATION EXCHANGE RESIN

(Designed for use in water softening applications)

Product Description

US Resin's C-10 Na resin is a high-capacity, conventional gel polystyrene strong acid cation exchange resin designed for use in residential or industrial water softening equipment. Cation resin in sodium form removes hardness ions such as calcium and magnesium by replacing them with sodium. When the resin bed is exhausted the hardness ions begin to pass through the bed. Functionality is returned by regeneration with concentrated sodium or potassium chloride solution. The capacity obtained depends largely on the amount of salt used in the regeneration. Typically 15 lbs of chemical per ft3 is used to obtain maximum capacity of up to 32,000 grains per ft3.

US Resin's C-10 Na resin is also capable of removing in the same way dissolved iron, manganese, and also suspended matter by virtue of the filtering action of the bed.

Typical Physical, Chemical & Operating Characteristics

Polymer Structure	Polystyrene 10% cross-linked with Divinylbenzene
Physical Form and Appearance	amber spherical beads
Whole Bead Count	90% Min.
Functional Groups	Polystyrene sulfonate
Ionic Form (as shipped)	Na+
Shipping Weight, approx.	850 g/l (53 lb./ft.^{3})
Mesh Size (U.S. Std.)	16-50
Moisture retention, Na+ form	40–45%
Swelling, Na+—>H+	5% max.
Total Capacity in sodium form	2.0 meq/ml
pH Range, Stability	0–14

Complies with FDA Regulations for Potable Water Applications

Conforms to paragraph 21CFR 173.25 of the Food Additives Regulations of the F.D.A.

Complies with USDA Regulations for Potable Water Systems

Meets standards for use in systems operating under the Federal meat and poultry products inspection program.

CHEMICAL AND THERMAL STABILITY

US Resin's C-10 Na resin is insoluble in dilute or moderately concentrated acids, alkalies, and in all common solvents. However, exposure to >3 ppm of free chlorine, "hypochlorite" ions, or other strong oxidizing agents over long periods of time will eventually break down the cross-linking. Temperature over 30 °C (85 °F) will accelerate the oxidation. This will tend to increase the moisture retention of the resin, decreasing it s mechanical strength, as well as generating small amounts of extractable breakdown products. Like all conventional Polystyrene sulfonated resins, it is thermally stable to higher than 138 °C (280 °F) in the alkali (for instance, sodium) or alkaline earth (calcium and magnesium) salt forms. The free acid form tends to hydrolyze in water temperatures appreciably higher than 121 °C (250 °F) thereby losing capacity, as the functional groups are gradually replaced by hydroxyl groups.

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SUGGESTED OPERATING CONDITIONS

Minimum Bed Depth	24 inches
Backwash Rate	25 to 50% Bed Expansion
Regenerant Concentration	
Hydrogen Cycle	10% HCl or 1 to 8% H_2SO_4
Sodium Cycle	10% to 15% NaCl
Regenerant Flow Rate	0.5 to 1.5 gpm/cu.ft.
Regenerant Contact Time	At least 20 Minutes
Regenerant Level	4 to 15 pounds/cu.ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 15 gallons/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gallons/cu.ft.
Service Flow Rate	2 to 10 gpm/cu.ft.

The Sodium cycle operating capacity of United States Resin C-8 for hardness removal at various regeneration levels with an influent calcium/magnesium ratio of 2/1 and a hardness level of 500 ppm, as $CaCO_3$, is shown in the following table:

Pounds NaCl/cu.ft.	Capacity Kilograins/cu.ft.
5	20.0
7.5	25.4
10	29.0
15	33.0

The following table shows the hydrogen cycle relationship between operating capacity and regeneration level when using sulfuric acid as the regenerant:

Pounds H_2SO_4/cu.ft.	Capacity Kilograins /cu.ft.	
	500 ppm as $CaCO_3$ NaCl	500 ppm as $CaCO_3$ $CaCl_3$
5	19	11.5
7.5	23	12.8
10	25.3	13.6
15	28.1	14.5
20	29.7	15.0