

Iron Removal with SST Ion Exchange Resins

Both sodium and hydrogen cation exchangers will remove dissolved ferrous iron and manganese by ion exchange in the same way that cation resin removes other cations. For example at pH 2 the cation resin is 325,000 times more likely to pick up Fe⁺⁺⁺ than Ca⁺⁺. Care must be taken, however, to prevent any air from coming into contact with the water before the ion exchange takes place, because the air tends to oxidize the metals to an insoluble form. The insoluble iron will precipitate on the exchanger granules and foul them. Well water must, therefore, be pumped directly through pressure ion exchange units and not be passed through any storage tanks where it could absorb oxygen from the atmosphere. Even a leaky pipe joint on the suction side of the well pump can suck in enough oxygen to precipitate iron.

Shallow Shell Technology has been proven to significantly reduce iron fouling of cation resin. Heavy metal fouling of resin builds from the center out (see figure 1). Since chemical regenerant strength diminishes as it travels to the center of the bead and the effectiveness of the regenerant is reduced. The result is iron-fouling increase and resin rinse time to leakage specification lengthens. The effects are compounded as the resin ages.

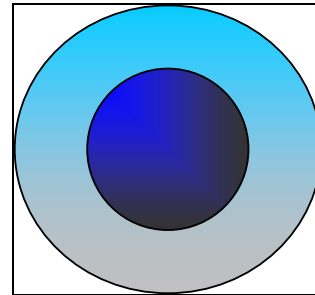
Figure 1 – Fe fouling of resin center.



The solid core (see figure 2) provides for the superior performance by preventing fouling, and allowing for higher chemical conversion

resulting in more completely regenerated resin than conventional cation resins at any given regenerant level. The higher regeneration efficiency associated with SST resin provides quick rinse down, significantly lower leakage, and no opportunity to compound metal fouling.

Figure 2 SST resin with solid core



USA Field Installations using SST for both softening and iron removal in a common vessel.

Inlet water 120 ppm hardness, 26 ppm Fe, 0.66 ppm Mn, 15% NaCl dosage – 14 lb/ft³, up flow regeneration, **Fe leakage – 0.05 ppm, & Mn leakage 0.02 ppm**

Inlet water 140 ppm hardness, 9 ppm Fe, 0.4 ppm Mn, 15% NaCl dosage – 8 lb/ft³, up flow regeneration, **Fe leakage – 0.05 ppm, & Mn leakage 0.02 ppm**

Inlet water 320 ppm hardness, 4.4 ppm Fe, 0.52 ppm Mn, 15% NaCl dosage – 10 lb/ft³, up flow regeneration, **Fe leakage – 0.05 ppm, & Mn leakage 0.02 ppm**

All of the above either use a high grade of salt that have a built in resin cleaner, or are treated annually with a resin cleaner specific for iron.

The reference contact for all of the above, Craig Winter, President, Advanced Quality Water Solutions, phone 207-721-8620

FOR MORE INFORMATION CONTACT:

APPLIED PROCESS EQUIPMENT

Scottsdale, AZ

480-998-4097 sales@apewater.com