

Storage of Used Demineralizer Resins

RESIN STORED OUTSIDE THE EXCHANGE VESSEL

If the resins are to be removed from the ion exchange vessels for long term storage, they should be first fully exhausted or converted to the proper ionic form, drained of excess water, and placed in watertight containers such as fiber drums with plastic liners. For strong cation resin and strong anion resins, the sodium and chloride forms are best.

The resin containers should be kept in a controlled environment and should not be exposed to extremes in temperatures, above 80° F or below freezing, or in direct sunlight. Avoiding such extremes will reduce drying out the resin, physical degradation, the leaching of organics and microbiological activity during storage. Containers should be kept in a dry area and protected from abusive handling.

RESIN STORED INSIDE THE EXCHANGE VESSEL

Generally speaking, unless the demineralizer is going to be shut down for more than a few weeks, the best process is simply to leave the unit filled with water with all valves to and from the unit turned off. When the system is being shut down for more than a few weeks, some form of storage preparation is recommended. Depending on the nature of the system, the following suggestions are offered:

Less than 2 Months Storage Time

TWO BED DEMINERALIZERS - The cation and anion resins can be left in the regenerated form and rinsed at two-week intervals in the following manner:

1. Rinse one bed volume of raw water through the cation vessel to waste.
2. Rinse a second bed volume through the cation vessel and through the anion vessel to waste. A bed volume is equal to 7.5 gallons per cubic foot of resin.

Explanation

As the cation resin sits in storage, leachable organic material from the cation resin will leach out, and if allowed to contact the anion resin, could cause fouling. Rinsing the cation resin to waste, first, rinses out these organics and thus prevents fouling of the anion vessel. The second bed volume of water through the cation vessel will provide a safe cleansing rinse for the anion vessel.

A log sheet of the volumes processed through each of the vessels should be kept so that the resins can be properly regenerated if they become exhausted.

Longer Term Storage - Two Months or Longer

It makes sense to store the resins in their most stable ionic form. For the cation resin, that means converting the resin to the sodium form. This retards the buildup of leachable organic matter. For the anion resin, placing the resin in the chloride form prevents oxidation degradation of the amine groups and this prolongs the strong base functional life of the resin.

In the case of working two-bed demineralizers that are being shut down, simply exhausting the resin until the pH of the cation vessel approaches that of the raw water to within one pH unit is sufficient to return the resin to the salt form.

Before shutting down and putting the anion units into standby, they should be double-regenerated to ensure complete removal of any residual silica. Afterwards, the resin should be converted to the chloride form for long-term storage. This can be accomplished by contacting it with a sufficient amount of a brine solution to dose the resin with at least 6 pounds per cubic foot. The brine introduction should take at least 30-minutes.

The concentration of the salt solution is not critical but for best results it should be between 2% and 8%. Higher concentrations may cause the resin to float; lower concentrations will result in using excessive amounts of

water. Rinse the salt form resin in the same manner as for the slow rinse step in a normal regeneration using the same volumes of slow rinse (sometimes called displacement rinse), since the resin will be regenerated completely before returning to service, the fast rinse step is not necessary.

MIXED BEDS

The resins should be separated by backwashing before storage so that the cation and anion layers are able to be rinsed simultaneous with one bed volume of suitable quality water in the “fast-rinse mode,” at one-month intervals using a technique that insures that the two layers are rinsed with separate water streams.

When mixed beds are used in high-purity applications, the decision has to be made whether it is worth the extra work that will be required to repurify the resin beds before startup before introducing them to service, as compared with the additional degradation that will otherwise happen if the resins are not converted to stable salt forms prior to shutdown and storage. Each case should be taken on a specific basis.

Important - Keep all valves to and from the demineralizer vessels in the off position so that resins remain submerged in water and all contact with oxygen and microbe-containing air is minimized.

