

Resin Fouling - Anaerobic Bacterial Fouling of Anion Resin

The growth of anaerobic bacterial in a resin bed can occur in an ion exchange system that is left stagnant in the exhausted or semi-exhausted form. These bacteria thrive only in environments where oxygen is not present.

As a preventative measure, (for example, in the case of condensate polishers that are left on standby for long periods of time) a small flow of city water can be introduced and treated by the unit. The city water would be an oxygenated water supply plus it will have residual amounts of chlorine. The presence of the oxygen and/or chlorine in the water will prohibit the growth of anaerobic bacteria.

The effluent water from the condensate polishers will be a high quality demineralized water that can be stored or used in the plant as boiler feed.

To clean a resin that has been fouled by anaerobic bacteria, follow the procedure outlined below:

1. The strong base anion resin should first be pre-treated with a 10% brine solution.* Use 10 lbs. of salt per cubic foot of resin. This brining will prevent any damage to the resin due to the heat of neutralization between the regenerated resin and the acid solution in step 2. Putting the resin in the salt form will also avoid gassing problems (if the resin was in the exhausted carbonate or bicarbonate form).

*If more than 5% of the strong base anion resin capacity has been used for the removal of silica then the resin bed should be regenerated with caustic soda before brining the bed in Step 1 to avoid hardening of silica on the resin.

2. Draw 10 lbs/cu. ft. of 30% HCl into the resin bed at a concentration of 5% and at a flow rate of 0.25 to 0.5 gpm/cu. ft. Let bed soak in the acid solution for at least 60 minutes.
3. If the fouling is severe, it may be necessary to let the resin soak for two to eight hours, after eight hours there is very little further benefit. However, using warm acid does help.
4. Following the acid rinse and soak, rinse the resin bed with soft water or water from the cation unit and continue to rinse until all the acid has been removed from the resin bed.
5. Backwash the resin and regenerate with twice the normal dose of regenerant.

In cases of severe fouling, the bed should be air-lanced and backwashed to remove loose debris before step 1, using the following procedure:

1. Backwash the resin bed at the regular flow rate for 10 minutes and drain to bed level.
2. Air-lance for 30 minutes at 4 cubic feet of air per minute, per cubic foot of resin, backwash at the regular flow rate for 20 minutes and drain to bed level.

