standard resin regeneration services

description and use

SUEZ Water Technologies & Solutions provides custom and emergency regeneration services for ion exchange resins. Resin beds requiring emergency regeneration can be sluiced directly into either the six, 100 ft^3 (3 m^3) vessels on SUEZ's MobileFlow* trailer or into one to four 85 ft^3 (2.4 m^3) vessels on MultiFlow* trailers for transport to the nearest SUEZ Service Center. The resin beads will then be transferred to external regeneration vessels for regeneration which includes air scrub, backwash, chemical introduction, deionized water rinse, and reloading into the MobileFlow or MultiFlow units for transport back to the job site. Turn around time at the SUEZ Service Center is often less than 24 hours, depending on quantity and type of resins received.

As an option, should time permit, the resins can be repackaged, and dewatered in drums or cargo bags for shipment back to the job site by common carrier. Resins can also be received from the job site in drums or cargo bags delivered by common carrier.

The standard emergency regeneration service does not include brine cleaning nor separation of crossfouled individual bed resins. These services are available from SUEZ, but plant turn around time will be extended and pre-sampling is required to determine feasibility and cost effectiveness. The regeneration services provide the customer with a resin analysis which includes tests for % moisture, total and salt splitting capacity, and microscopic examination.

equipment

SUEZ's Service Centers are equipped with individual cation, anion, and mixed bed regenerators in the size range of 100 to 300 ft^3 (3 to 9 m^3). In general, minimum volumes for individual bed cation and anion resins is 100 ft^3 (3 m^3), whereas 250 ft^3 (7 m^3) is the minimum mixed bed requirement.

SUEZ's 250 ft^3 mixed bed regenerators have a fixed interface at a ratio of 1:2 cation to anion. For resins having higher cation to anion ratios, the excess cation is removed from the bottom of the mixed bed regenerator and regenerated separately in the cation regenerator.

chemicals

Regeneration of cation resins will be with 8 lbs. (4 kg) of hydrochloric acid per cubic foot applied at 4% to 6% strength at ambient temperature.

Regeneration of anion resin will be with 10 lbs. (4.5 kg) of sodium hydroxide per cubic foot applied at 3% to 5% strength at 120°F (49°C).

All dilution water will be either softened or demineralized water. All final rinse water will be deionized water analyzing less than 1 Mmho and less than 20 ppb silica.

The single bed resins will be rinsed to less than 50 Mmho conductivity[1] and the mixed bed to less than 1 Mmho[2].

regeneration sequence and timing

backwash/air scrub

All resin will be thoroughly backwashed and air scrubbed until the backwash effluent is relatively free of suspended material indicating that this procedure has removed all of the surface foulants possible. Up to six individual air scrub and backwash steps may be used during this step over a six hour time period.

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us".

regenerant introduction

Minimum contact times will be 45 minutes for cation resin and 90 minutes for anion resin. The anion regeneration sequence will include a bedwarm step.

regenerant displacement

Minimum regenerant displacement time will be 20 minutes, but will be continued until the calculated time to displace all of the regenerant from the inlet distributor to the outlet distributor.

final rinse

All final rinses will be done with deionized water to a 50 Mmho endpoint for individual resins (Note 1) and 1 Mmho endpoint for mixed bed resins (Note 2). However, in all cases, minimum rinse volumes will be 30 gallons/ft^3.

degree of regeneration

Due to the varying condition of used resins, it is not reasonable to expect ultra high conversions to the regenerated forms as is possible with new resin due to the accumulation of foulants and normal chemical resin degradation of older resins. However, SUEZ does estimate that these procedures will yield a minimum of 80% conversion to the hydrogen form cation and 65% conversion to the hydroxide form anion based on the available salt splitting capacity for the resin. As the norm, most resins will analyze 90% conversion of the cation resin and 70% conversion of the anion resin to the regenerated forms.

notes

1. Assumes strong base resins are not severely fouled with organics and weak base resins do not contain excess carboxylic acid sites. In such cases, final rinse conductivity will be determined but minimum rinse will be 75 gal./ft^3.
2. Mixed bed regenerations include additional steps of remixing resins after regeneration and shipping resins back to the job site in a mixed condition. Final rinse to 1 Mmho is from mixed resin.