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DOWEX Ion Exchange Resins

Loading Procedure for Layered Bed Anion Resins

The loading procedure for layered bed anion resins is as follows:

The freeboard should be 5% of the total resin bed height, when the system is operated with counter-current regeneration. The calculations of resin height should be made based on the volume of the resins in the most swollen form. For the strong base anion, this is the fully regenerated OH- form and for the weak base anion, the exhausted form.

For co-flow and block systems:

1. **Before loading the resins, make a detailed inspection of the empty vessel:**
   - Remove all debris of previous resins or foreign material.
   - Clean up distributors and collector, and inspect all laterals for damage or plugging.
   - Inspect the rubber lining for integrity, and perform a spark test, if possible.
   - Whenever possible check the pressure loss of the empty vessel at nominal flow rate (case of in-situ regeneration) and observe the flow patterns for uniformity.

2. **Loading of the resins:**
   - Fill vessel with sufficient water (~ 1/3 vessel height) to allow settling and avoid resin damage.
   - Load strong base anion resin in the Cl-form.
   - Backwash at 6-8 m/hr (2.5-3.5 gpm/ft^2) for 30 minutes.
   - With 1 meter (3 feet) of water above the strong base anion, load weak base anion resin and soak overnight to ensure wetting of the resin. Backwash at 1.5-2 m/hr (0.5-0.75 gpm/ft^2) for 30 minutes.
   - *Alternatively, if an overnight soak is not feasible, the bed can be operated for one cycle before a backwash is performed. This will allow the resin to be wetted during operation, but care should be taken so that a backwash is not performed on unwetted resin, as resin loss will occur.*
   - Close vessel and carry out double regeneration on both resin components.

3. **Start-up operation:**
   - Start run and monitor rinse down and conductivity.

For packed bed counter-current regeneration systems, the procedure is the same as above with the following modifications:

- The freeboard should be calculated on the basis of the total resin bed height, taking the volume of the resins in the most swollen form. For the strong base anion, this is the fully regenerated OH-form and for the weak base anion, the exhausted form.
- Before adding the weak base resin, add the floating inert resin on top of the strong base anion and then load the weak base resin on top.

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Warning: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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