



DOW™ Ion Exchange Resins

Loading and Start Up Procedure for Single Bed Ion Exchange Vessels

Single bed ion exchange vessels are those vessels which operate with only one type of resin. Demineralizers and softeners operated in the cocurrent regenerated mode, or in water or air blocked countercurrent mode, should be loaded according to the following procedure:

Procedure

Before loading the resins, make a detailed inspection of the empty vessel:

- Remove all debris from previous resins or foreign material.
- Clean up distributors and collectors, and inspect all laterals and splash-plates for damage or plugging.
- Inspect the nozzles, check that they are in good shape, clean and tight, and gaskets are intact and in place. Whenever possible, replace with new ones if older than 5 years.
- Inspect the rubber lining (if present) for integrity, and perform a spark test, if possible.
- Whenever possible, check the pressure loss of the empty vessel at nominal flow rate and observe the flow patterns for uniformity.

Loading of the resins:

- Make available water in the right quality and quantity.
- Fill vessel with sufficient water (~1/3 vessel height), or completely in the case of using a vacuum eductor.
- Load the ion exchange resin by dumping the resin from the top, or by the use of a vacuum eductor.
- Backwash the resin at maximum available expansion for 30 minutes, according to the manufacturers recommended flow rates.
- Note: Macroporous resins, especially weak base anion resins, should be stored in solution overnight in order to wet-out the resins prior to backwash. 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.
- Let the resin settle and record the level.
- Close the vessel and carry out a double regeneration.

For packed bed countercurrent 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 resin in the most swollen form. For a strong acid cation resin, this is the fully regenerated H⁺ form, for strong base anion resin, the fully regenerated OH⁻ form, and for weak base anion and weak acid cation resins, the exhausted form.
- Add approximately half of the resin and backwash as above.
- Add the floating inert resin, level out, and then load the remaining resin.
- Check the freeboard and adjust if necessary.
- Carry out a double regeneration.

Note: it is more convenient to backwash the resin in the external backwash tank

Procedure (cont.)

Start-up operation:

- Check pretreatment against specifications (Cl₂, SS, TOC, etc).
- Start the run and monitor rinse down and conductivity.
- It is strongly recommend that the first runs be stopped based on throughput, according to the CADIX design. The plant may produce more after a double regeneration, but if exhausted in this condition it will take more cycles to reach the final equilibrium at normal regeneration levels. The expected high water quality at countercurrent systems will be achieved only after a few runs, provided that the endpoint is monitored correctly and the plant is not overrun.

DOW™ Ion Exchange Resins For more information about DOW resins, call the Dow Water & Process Solutions business:

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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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