

Process / Potable Water Treatment

Demineralization by Ion Exchange Resin (IOX)



Product Application

The Demineralization process is the removal of dissolved minerals that form salts when water is evaporated. These salts have corrosive properties and must be removed for industrial processes to protect downstream equipment from corrosion, scale deposit, etc.

In ion exchange demineralization applications ion exchange resins will remove all mineral salts, except for traces of sodium and colloidal (undissolved) silica. Typical cations targeted for removal are calcium (Ca^{++}), Magnesium (Mg^{++}), Sodium (Na^{+}), Potassium (K^{+}) and Iron (Fe^{++}). Typical anions targeted for removal are Bicarbonate (HCO_3^{-}) Chloride (Cl^{-}), Sulfate (SO_4^{--}), Nitrate (NO_3^{-}) and Silica (SiO_2). The IOX technology is used to produce high purified water ($< 0.02 \mu\text{m}$) when followed by Mixed bed ion exchange column and is used mainly for the following industries:

- Steam generation for Petrochemical, Chemical, Oil & Gas industries
- Injection water for Pharmaceutical and Autoclave steam disinfection
- Steam generation for combined cycle power plants and thermal power plants
- Food and beverage specialty and the wine industries
- Semi-conductor industries

Process Description

Demineralization (IOX) is based on chemical properties that form the ion exchange resins, synthetic origin polymeric roots. Those resins are supplied with active functional groups, bonded to the roots, that are able to exchange their moving ions with ions having the same

charge contained in the solutions when water pass the IOX bed.

Dementalization process is a cyclic process, thus, regeneration using acid & caustic soda is required at a certain frequency based on the ionic load, ion exchange quantity and flowrate.

The standard system consists of Pretreatment to insure feed water TSS less than $< 5 \text{ ppm}$, with a wide range of feed water conductivity up to $1,000 \mu\text{m}$, two mono beds (SAC & SBA) followed by a Mixed bed. Based on the feed water quality, a degasifier might be considered between the mono bids to reduce carbon dioxide load.

Product Benefits:

- Cost effective operation and maintenance with ionic load less than $500 \mu\text{m}$
- Low power consumption
- Reliability & Robust
- Provides complete removal of dissolved inorganic particles
- Handle wide range of raw water sources & quality

Service and Features:

- Complete supply including Pretreatment to achieve the performance guarantee values
- Modular type, easy to expand
- Fast track delivery
- Retrofit existing demineralization plants to improve efficiency and net production
- Installation & supervision commissioning
- Operation & maintenance services