

## DM Plants

### Process Description

There are two basic kinds of demineralizer systems, separate-bed and mixed-bed. In a separate-bed system, cation resins and anion resins are loaded into separate pressure vessels. During the service cycle, water passes through the cation bed first, where undesirable positive ions (cations) such as sodium ( $\text{Na}^+$ ), calcium ( $\text{Ca}^{+2}$ ), and magnesium ( $\text{Mg}^{+2}$ ) are exchanged for hydrogen ( $\text{H}^+$ ) ions.



The water next passes through the anion bed, where a similar process removes undesirable negative ions (anions) such as chloride ( $\text{Cl}^-$ ), sulfate ( $\text{SO}_4^{2-}$ ), and bicarbonate ( $\text{HCO}_3^-$ ), replacing them with hydroxyl ( $\text{OH}^-$ ). Pure water is produced from the combination of hydrogen and hydroxyl ions. In a mixed-bed system, also referred to as a polisher, the cation and anion resins are loaded into the same vessel.