Nano Filtration:

The Nano filtration technique is mainly used for the removal of two valued ions and the larger mono valued ions such as heavy metals. This technique can be seen as a coarse RO (reversed osmosis) membrane. Because Nano filtration uses less fine membranes, the feed pressure of the NF system is generally lower compared to RO systems. Also the fouling rate is lower compared to Ro systems.

2. Removal of Dissolved Solids:

The dissolved solids are of both organic and inorganic types. A number of methods have been investigated for the removal of inorganic constituents from waste water.

Three methods which are finding wide application in advanced waste treatment are ion-exchange, electro dialysis and reverse osmosis. For the removal of soluble organics from waste water the most commonly used method is adsorption on activated carbon. Solvent extraction is also used to recover certain organic chemicals like phenol and amines from industrial waste waters.



Ion exchange:

This technique has been used extensively to remove hardness, and iron and manganese salts in drinking water supplies. It has also been used selectively to remove specific impurities and to recover valuable trace metals like chromium, nickel, copper, lead and cadmium from industrial waste discharges. The process takes advantage of the ability of certain natural and synthetic materials to exchange one of their ions.

A number of naturally occurring minerals have ion exchange properties. Among them the notable ones are aluminium silicate minerals, which are called zeolites. Synthetic zeolites have been prepared using solutions of sodium silicate and sodium aluminate.

Alternatively synthetic ion-exchange resins composed of organic polymer with attached functional groups such as (strongly acidic cation exchange resins), or -COO - 3 -SO H+~ H+ (weakly acidic cation exchange resins or -N+(CH3)3OH~ (strongly basic anion exchange resins) can be used.

In the water softening process, the hardness producing elements such as calcium and magnesium are replaced by sodium ions. A cation exchange resin in sodium form is normally used. The water-softening capability of cation exchange can be seen when sodium ion in the resin is exchanged for calcium ion in solution





Reverse osmosis:

In the reverse osmosis process, de-mineralization water is produced by forcing water through semi permeable membranes at high pressure. In ordinary osmosis, if a vessel is divided by a semi permeable membrane (one that is permeable to water but not the dissolved material), and one compartment is filled with water and other with concentrated salt solution, water diffused through the membrane towards the compartment containing salt solution until the difference in water levels on the two sides of the membrane creates a sufficient pressure to counteract the original water flow. The difference in levels represents the osmotic pressure of the solution.







