

Physical

Physical desalination processes allow to separate water from a saline solution using mechanical energy instead of thermal energy.

The most diffuse method of physical desalination is the reverse osmosis.

An RO system is made up of the following basic components:

- Pretreatment
- High-pressure pump
- Membrane assembly
- Post-treatment

Pretreatment is important in RO because the membrane surfaces must remain clean. Therefore, suspended solids must be removed and the water pretreated so that salt precipitation or microbial growth does not occur on the membranes.

Usually, the pretreatment consists of fine filtration and the addition of acid or other chemicals to inhibit precipitation and the growth of microorganisms.

The high-pressure pump supplies the pressure needed to enable the water to pass through the membrane and have the salts rejected. This pressure ranges from 15 to 25 bar (225 to 375 psi) for brackish water and from 54 to 80 bar (800 to 1,180 psi) for sea water.

The membrane assembly consists of a pressure vessel and a membrane that permits the feed water to be pressurized against the membrane. The membrane must be able to withstand the entire pressure drop across it. The semi-permeable membranes vary in their ability to pass fresh water and reject the passage of salts. No membrane is perfect in its ability to reject salts, so a small amount of salts passes through the membrane and appears in the product water.

Reverse osmosis



