

Reverse Osmosis (RO)

Reverse Osmosis (RO) is considered by many to be the best filtration technology available and is widely used in both industrial and residential water filtration. RO filtration is so fine even dissolved salts are removed from water, to end up with essentially pure H₂O that is free of bacteria, viruses and organic compounds. In order to explain the RO technology, we first have to consider the natural process of osmosis.

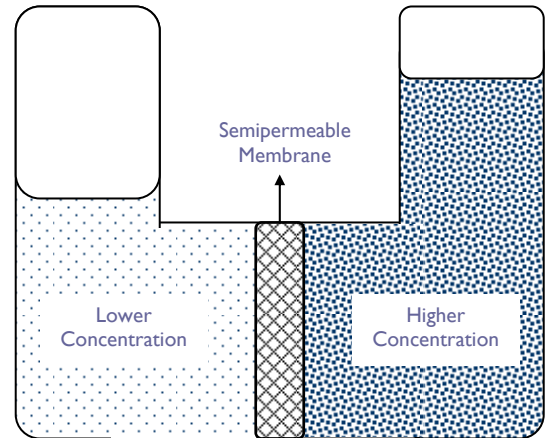
In nature, osmosis occurs when a semipermeable membrane separates a dilute solution and a concentrated solution. This membrane only allows water to pass through it while retaining everything else. Water will naturally flow from the dilute solution to the concentrated one until an equilibrium point is reached where both sides have the same concentration. This process allows plant roots to absorb water from the soil and is essential to many biological processes.

In RO, the reverse process is performed, hence the name. Pressure is applied to the concentrated solution in order to force water through a custom-designed semipermeable membrane. Salts, organic compounds and microorganisms are retained while pure water is filtered out. The spent concentrated solution – called reject – is drained out.

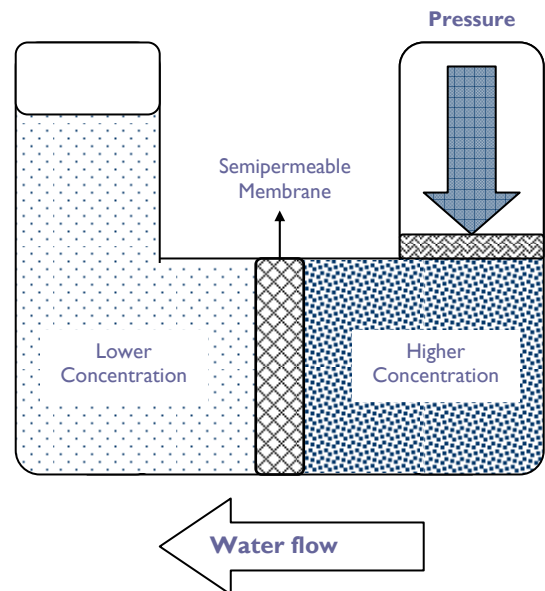
In typical residential water filtration systems, RO is used in combination with sediment and carbon filtration. This prefiltration step is necessary in order to remove silt, sand, chlorine and other chemicals that may shorten the life of the RO membrane. Water is then pressurized and passed through the RO membrane to produce almost pure water. Some systems add a secondary carbon filter to remove any trace chemicals and a UV lamp to kill any microorganisms that might escape filtration by the RO unit.

RO units are conveniently small, operate quietly and can fit under the kitchen sink. They do not require frequent maintenance except for replacement of sediment and carbon cartridge filters. RO membranes are efficient and typically last several years before they require replacement.

For residential applications, look for third party NSF certified systems, certified to Standard 58.



Normal Osmosis Process



Reverse Osmosis Process