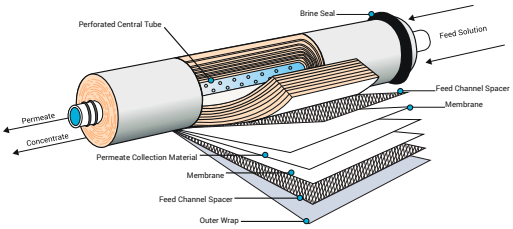
NANOFILTRATION & REVERSE OSMOSIS

NF / RO

Nanofiltration (NF) and reverse osmosis (RO) are used for a variety of water treatment applications. Highly efficient in removing dissolved salts and organic material, the NF and RO processes are popular membrane filtration technologies for small and large scale projects.



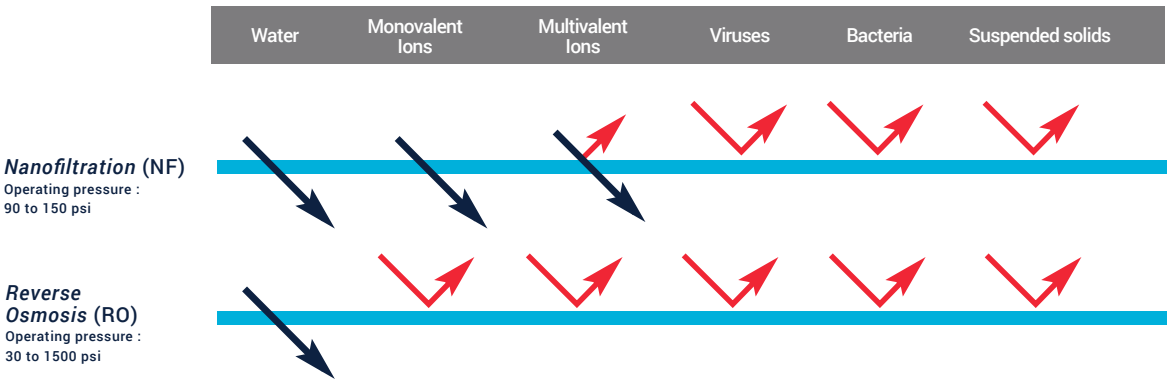
MEMBRANE FILTRATION PROCESSES

Very similar in appearances, NF and RO spiral wound elements are made with a flat sheet of semi-permeable polyamide membrane sandwiched with a permeate and feed spacer and then rolled around a perforated core tube.

Nanofiltration or softening membranes have a pore size around 0.001 microns and are usually operated at pressures between 50 to 100 psi. Because of its pore size, NF is typically used on feed sources that have low total dissolved solids (TDS), but significant hardness, iron, manganese and/or total organic carbon (TOC). Nanofiltration membranes typically have a rejection of less than 85% of sodium chloride.

Cambria, California, United States

Reverse osmosis membranes have smaller pores, in the range of 0.0001 microns and have typical operating pressures ranging from 125 to 1000 psi making this process remarkably efficient. With pores this small and such high operating pressures, some RO membranes can reject everything found in water other than water itself, thus producing nearly pure water. Some applications even require the reintroduction of minerals in the treated water to inhibit the corrosion of the equipment downstream of the RO system. RO membranes typically have a sodium chloride rejection greater than 99.5%.



NANOFILTRATION & REVERSE OSMOSIS

City of Winkler, Manitoba, Canada

Leo J. Van der Land, California, United States

City of Cape Coral, Florida, United States

The selection of the appropriate membrane technology amongst the various element types is strongly influenced by the raw water source, the application, the required treated water quality, and, sometimes, the associated operating and maintenance costs. Though NF and RO use different membranes, they operate the same way: water is forced through the semi-permeable layers of the membranes leaving behind the dissolved minerals, suspended solids and bacteria. Both systems will include feed pumps, piping, and valves. Only a portion of the feed water entering the NF or RO membrane system is turned into clean water. The portion of water that passes through the membrane pores is collected by the core tube to reach the next treatment step is called permeate. The portion of water exiting the system containing the minerals and other contaminants rejected by the membrane is called concentrate.

PARTIAL NF/RO REFERENCE LIST

PROJECT	WATER TREATED	APPLICATION	FLOW RATE
Leo J. Van der Lans, CA, USA	Process Water	Drinking Water	3 470 gpm
Swan Lake Community, MB, CAN	Ground Water	Drinking Water	22 gpm
Renard Diamond Mine (Stornoway Mines), QC, CAN	Surface Water	Drinking Water	88 gpm
Eastman, QC, CAN	Surface Water	Drinking Water	242 gpm
City of Winkler, MB, CAN	Ground Water	Drinking Water	502 gpm
Cambria, CA, USA	Ground Water & Brackish Water	Drinking Water	587 gpm
Hillsboro, ND, USA	Ground Water	Drinking Water	680 gpm
JR Simplot, ID, USA	Reclaimed Water	Process Water	1 000 gpm
West Basin, CA, USA	Reclaimed Water	Drinking Water	2 430 gpm
City of Oxnard, CA, USA	Reclaimed Water	Drinking Water	4 513 gpm
City of Cape Coral, FL, USA	Ground Water	Drinking Water	6 944 gpm
Hamby, TX, USA	Wastewater	Wastewater	2 917 gpm

H2O Innovation designs, builds and commissions RO and NF systems for various applications and of different flow rates. The company's multidisciplinary teams have extensive water treatment knowledge and work closely with industry leaders to design appropriate systems with pertinent parts and features.