



Reverse Osmosis Systems



Clean-in-place skid

Reverse Osmosis Systems

Ecodyne RO systems employ the reverse osmosis process to demineralize water without the use of regenerant chemicals and the associated waste disposal. Mixed bed ion exchange, a second-pass RO, or EDI can be used to polish the RO product to higher purity levels when required.

Ecodyne RO systems yield 70-90% of the feedwater as product, with inlet concentrations as high as 15,000 ppm TDS or more. The process functions by employing a 200-600 psi driving force across reverse osmosis membranes. 97-99% of dissolved ions and all of the particulate matter and colloids are removed.

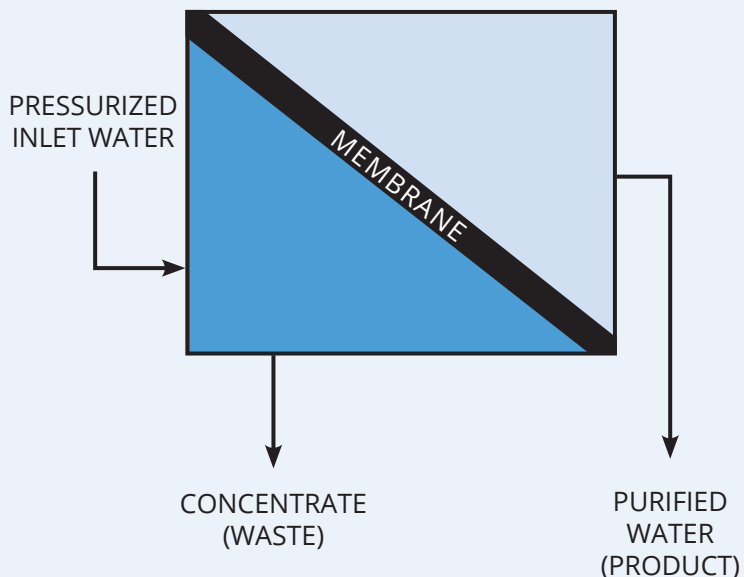
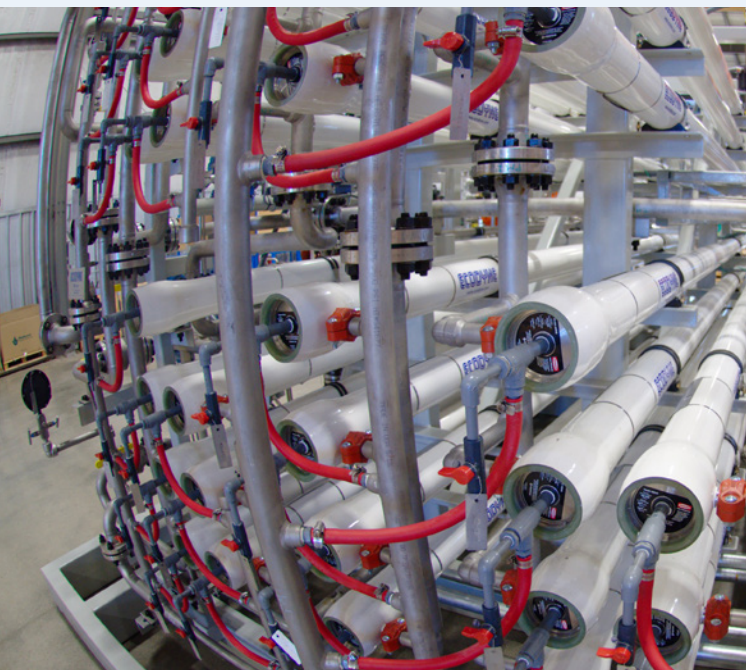
Ecodyne RO systems are custom designed to fit the specific process and are capable of continuous operation. Operating and maintenance labor requirements are small. The main components include an inlet cartridge filter, a booster pump, a reverse osmosis membrane skid and a membrane cleaning package (clean-in-place skid). Inlet water chemistry is automatically controlled to optimize membrane life and performance.

Reverse Osmosis

When solutions of different concentrations are separated by a semipermeable membrane, solvent (water) will naturally permeate to the more concentrated solution. This flow may be stopped or the direction reversed with sufficient pressure applied to the more concentrated solution. The pressure which produces zero net flow in either direction across the membrane is known as the osmotic

pressure. When the pressure applied is greater than the osmotic pressure the solvent flows from the more concentrated solution to the cleaner solution. This is reverse osmosis.

As pressurized water passes through the membrane, dissolved ions and colloids are screened out and discarded in a small concentrated stream.



Design of Ecodyne's RO Systems

The design of all demineralizing plants is affected by the influent water source. Deep wells and city water supplies may not require full pretreatment in some cases. However, most other waters require clarification and filtration as a minimum. RO demineralization systems require optimized pretreatment equipment for proper operation and extended membrane life.

Ecodyne can provide complete custom designed pretreatment systems that may include:

- **Ecodyne Ultrafiltration Equipment** for optimum suspended solids removal.
- **Ecodyne Reactivator Clarifier** with solids recirculation for high flow rates, optimum quality, and efficient chemical usage.
- **Ecodyne Monomedia Filters** designed for depth filtration and high solids loading and with air scour cleaning for reliable long term service.
- Softening for hardness removal when required.
- Chemical conditioning to reduce scaling and precipitation when required.

RO installations should include the above processes to the extent required by feedwater characteristics and most installations will involve the incorporation of the reverse osmosis process into a chain of water treatment steps. In this regard, Ecodyne has the special advantage of nearly 60 years of experience in the water treatment industry that assures optimum utilization of the reverse osmosis process in complete treatment systems.

Ecodyne's RO Systems Offer

- Low operating costs.
- Minimized waste discharge.
- Low maintenance requirements and operator attention.
- Minimized chemical usage.
- Reliability.
- In conjunction with high quality custom designed pretreatment equipment, applicability to many water sources.

Cost Savings

Compared to Ion Exchange, RO systems can save on operating costs in high TDS applications in the following ways:

- Reduction in chemical costs.
- Reduction in waste disposal costs (no neutralization).
- Lowers operating and maintenance costs.

Operating cost savings achieved with RO increase as the inlet water TDS increases. RO systems are typically cost effective at 300-400 ppm TDS or higher.

Typical Uses for RO Systems

Utility Makeup Plants

The demineralization of a wide variety of brackish water sources is accomplished most economically using reverse osmosis followed by appropriate polishing equipment. Well waters and high salt content reservoirs have been pretreated, purified with RO, and polished to provide boiler makeup water for electric generating stations and other high purity uses.

Ecodyne's many years of experience in the utilities industry enable it to design the most efficient makeup plants incorporating RO systems. Makeup plants can be designed to provide peak flow rates for high demand periods during startup and restarts while allowing highly efficient normal flow rate for full load operation.

Industrial Boilers

Steel mills, petroleum, petrochemical, chemical and pulp and paper plants require large continuous volumes of high purity water to generate process steam and electrical power. RO systems provide these demands reliably and continuously at low cost and minimal waste discharge.



Preparing to ship

The Ecodyne Difference

- Custom Engineering
- Shop Assembly and Trial Fit Capability
- Global Experience
- Industry Leader
- Spare Parts
- ISO 9001 Certified



Ecodyne Limited
4475 Corporate Drive
Burlington, ON
Canada L7L 5T9

T: 905 332 1404
T: 1 888 326 3963

info@ecodyne.com

 facebook.com/ecodyne

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ecodyne.com



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