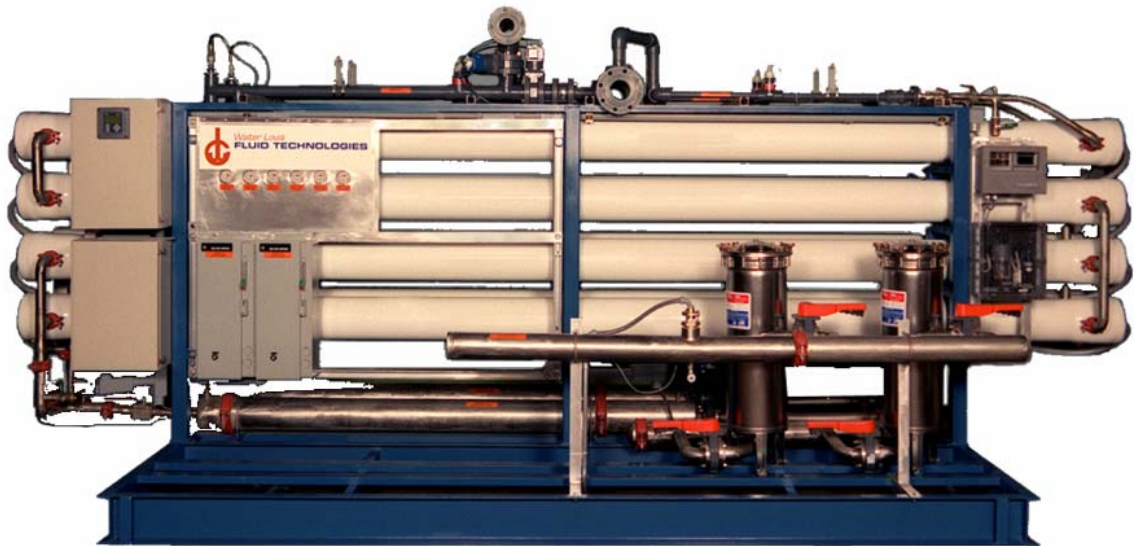


RO

REVERSE OSMOSIS SYSTEMS



Reverse Osmosis offers a separation technique for purification of many solvent—solute systems. By the application of pressure greater than the natural osmotic pressure of the solution, the fluid will flow through the membrane leaving behind the dissolved solids. The result is a pure stream essentially free of dissolved solids, colloids, and bacteria. Many fluids can be processed; however, the most common application is the purification of water. Because no regeneration chemicals are required, the high operating costs inherent in their use and disposal is avoided. Routine maintenance is minimal and can be preformed in very little time. The ability of R.O. to remove over 90% of dissolved minerals and organics, as well as colloidal matter bacteria, pyroxenes and most virus, results in many applications including:

- **Drinking water from brackish, or sea water**
- **Boiler feed water**
- **Waste water treatment (plating, rinse, cooling tower blowdown, etc.)**
- **As a component in ultra-pure water production**
- **Water for hemodialysis**

While the basic process of Reverse Osmosis appears simple, in actual operation many factors must be considered, including membrane configurations and material of construction. Walter Louis offers the standard cellulose and polyamide membranes in hollow fiber or spiral wrap configurations.

The reverse osmosis systems can be used as a stand alone process for producing low solids water or combined with other Water Louis equipment such as Ion Exchange and Ultrafiltration to produce the highest quality water.

TYPICAL R.O. SYSTEMS CONSIST OF THE FOLLOWING BASIC SECTIONS.

1. Pretreatment – The operation of the R.O. process may result in a large increase in the concentration of colloidal particles, calcium carbonate and various metallic oxide often present in the raw water. These contaminants can cause severe and often irreversible fouling of the membrane. This in turn causes a loss in output and a degeneration of the quality of the water that is produced.

2. Pressurization System - High pressure multi-stage centrifugal or positive displacement piston pumps of corrosion resistant stainless steel supply the driving force to overcome natural osmotic pressure and force the fluids through the membrane.

Typically applied pressure ranges from 200 psi to 800 psi.

Flow rates increase with an increase in applied pressure. However, Walter Louis recognizes the cost of high pressure operations and often stipulates lower than rated pressure operation.

3. Membrane - As mentioned previously, various membrane materials and configurations are available. The choice is depended on variables such as quality of the raw fluid, pH and presence of components incompatible with the membrane and configuration is evaluated for each application.

4. Instrumentation and Control - Walter Louis offers the most extensive range of instrumentation and controls as standard equipment in the industry. All packaged systems are completely prewired and prepiped. Only one electrical hook up is required on all systems.

STANDARD FEATURES INCLUDE:

- Stainless steel and heavy wall plastic piping
- Epoxy coated steel frames and control panels
- Stainless steel pumps
- Cartridge pre-filter
- Chemical feed system
- pH and conductivity instrumentation
- Raw water and reject flow meter
- Automatic high and low pressure shut down

Model TE

500-20,000 GPD

These compact totally enclosed systems contains all of the features of large Walter Louis package reverse osmosis systems. All R.O. applications are possible with Model TE but the most common application include production of water of laboratory, hemo-dialysis and other small volume uses.

All brackish water systems are shipped ready to accept power and water supply. These systems are complete and if inlet water meets quality requirements for the given membrane they are ready to operate. If input water quality does not meet minimum standards Walter Louis can specify additional pretreatment systems to allow operation on most water supplies. Daily output for each Model is nominal and dependent on the particular membrane used and the pressure of operation. Special sizes and larger or smaller outputs are available.



System SM

20,40, & 75 GPM Modules

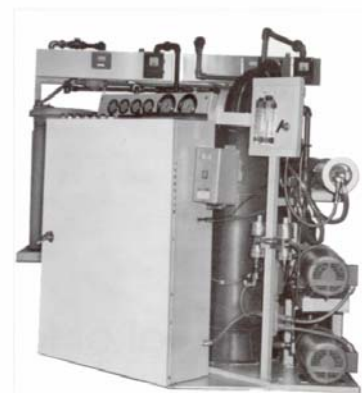
These systems are designed for easy set up operations and maintenance. All components are mounted on a single frame. Each frame can be expanded with additional modules. The modular system can be used as building blocks for very large systems.

Sea Water

From 1000 GPD

The development of membranes capable of ionic rejections of over 99% and the ability to operate at pressure greater than 800 psi have made sea water desalination by Reverse Osmosis feasible. Such higher pressures are necessary to overcome the high osmotic pressure of sea water.

Reverse Osmosis offers significant advantages over competitive techniques such as evaporation-distillation. Because of the low temperature operation scale and corrosion are minimal. Pumping energy required is less than one third that of vapor compression and only one eighth of multistage flash distillation. All sea water systems include storage tanks for potable water. Contact factory for the specific size required. Additional models are available for larger outputs or with less extensive pretreatment equipment



Chemical Equipment Services

Specialty Chemicals

- Cooling Water Corrosion & Scale Inhibitors
- Boiler Compounds
- Condensate Return Line Treatments
- Organic & Inorganic Flocculants for Water & Waste Water
- Industrial Microbiocides
- Fuel Additives
- Process Antifoams
- Oil Field Chemicals
- Chemical Intermediates

Fluid Process Equipment

- Membrane Process
- Ion Exchange
- Filtration
- Chemical Feed Systems
- Heat Recovery
- Package Water & Waste Water Systems
- Process Controllers
- Boiler Feed Systems

Analytical Services

- NPDES Monitoring
- Analytical Reagents
- Corrosion Analysis
- Laboratory Instrumentation
- Ultra Pure Water Systems