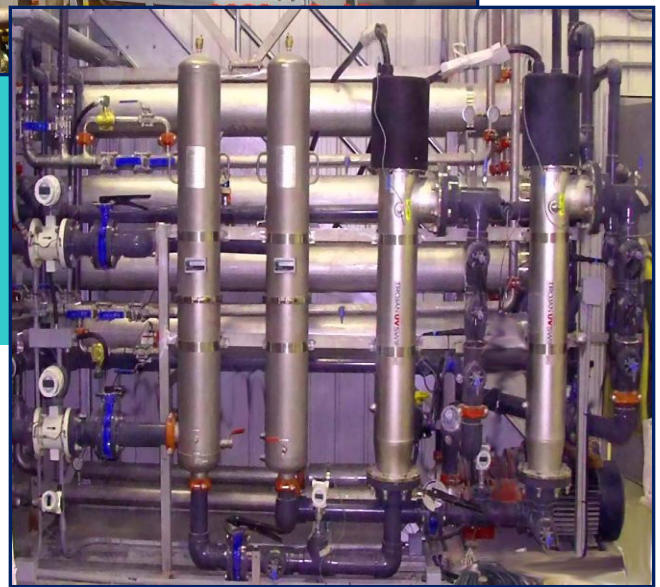


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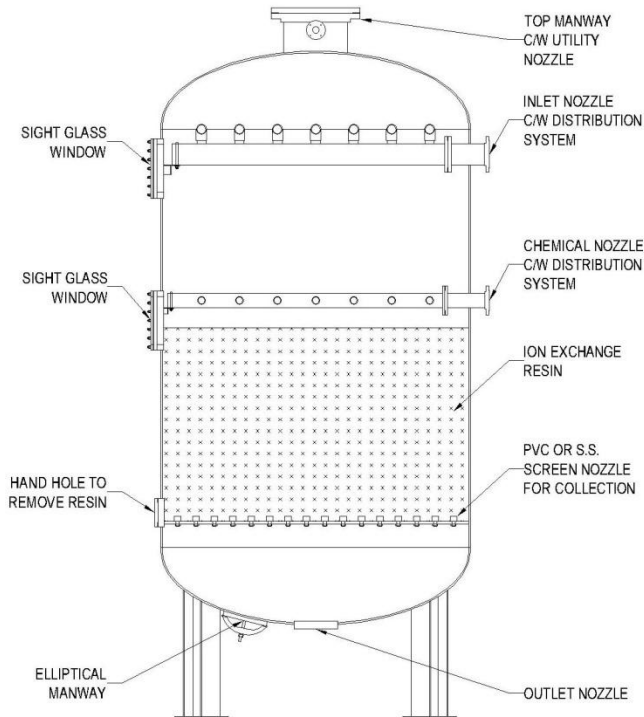
Demineralization Systems



Napier-Reid's demineralization systems are designed to remove minerals. There are three commonly used methods: Ion Exchange, Reverse Osmosis and Electrodialysis. These methods are widely used in water treatment.

Ion Exchange- Process Description

Ion exchange is primarily used for the removal of hardness ions (like calcium and magnesium) and for water demineralization. Meanwhile, over 90% of barium, arsenic, cadmium, chromium, silver, radium, nitrites, selenium and nitrates can be effectively removed.



Undesirable cations in the water are replaced with hydrogen ions from a strong acid cation (SAC) bed; Undesirable anions are replaced with hydroxyls from strong base anion (SBA) bed. The hydrogen ions and hydroxyls recombine producing water molecules. Thus, no ions remain in the produced water.

When resin becomes exhausted, it will be regenerated by designated regenerant. For SAC, strong acid, such as sulphuric acid or hydrochloric acid, will be used and hydrogen ions will replace absorbed cations in SAC bed. Caustic soda is regenerant for SBA and hydroxyls will replace absorbed anions in SBA bed. After regenerations, SAC and SBA beds will be put into demineralization process again.



Ion Exchange Resin Beads

Features

- Reliable in performance stability.
- Resins are available in many varieties and each resin is effective in removing specific contaminants.



Ion-Exchange Demineralization
Moa Nickel, Cuba
Design Flow: 6720m³ per day



Chemical Regeneration
Moa Nickel, Cuba
Design Flow: 6720m³ per day

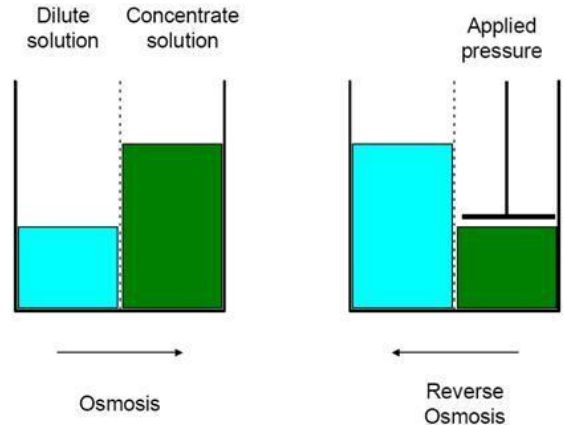
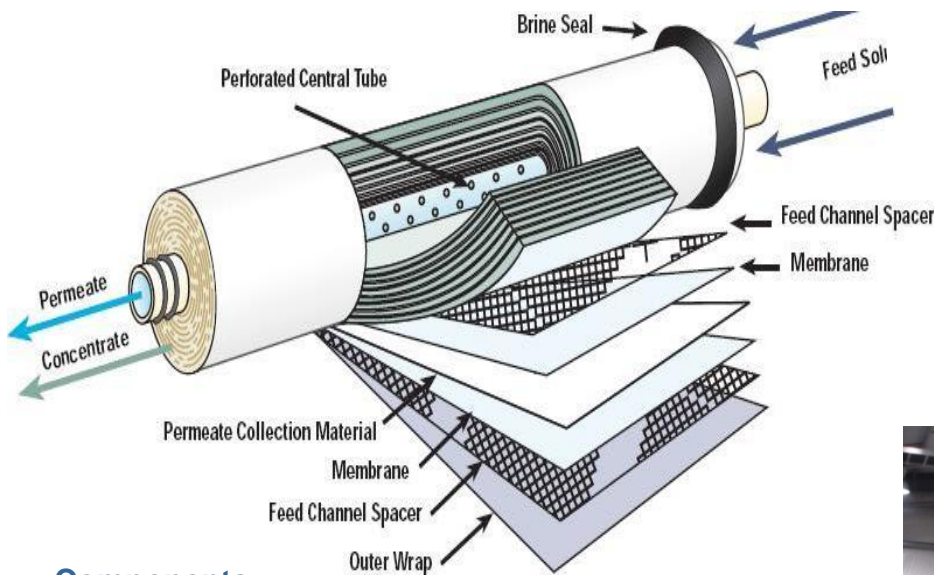
Components

Napier-Reid ion exchange systems can contain pre-filtration unit, ion exchangers, degasifier, chemical regeneration facilities, storage, distribution and control elements.

Reverse Osmosis - Process Description

Napier-Reid reverse osmosis (RO) system works on the principle of reverse osmosis. Pressure is applied to reverse the natural osmosis process while the semi-permeable membrane allows water molecules, not the dissolved ions, to pass through its pores (<0.0005 micron) from concentrated solution to dilute solution retaining the contaminants.

▼ **RO Module:** The spiral membrane is constructed of one or more membrane envelopes wound around a perforated central tube. The permeate passes through the membrane into the envelope and spirals inward to the central tube for collection.



Features

- High quality RO membranes with high chemical tolerance and mechanical strength.
- Operating Pressure: 75-500 PSIG
- Capacity: 10-5,000 m³ per day
- Compact design with small foot print
- Simplicity and automatic operation allows for less operator attention and longer life.

Components

Napier-Reid RO systems can contain raw water pumps, pre-treatment units, membranes, disinfection, storage, distribution and control elements.



RO System
Tolko Industries, Alberta
 Design Flow: 380m³/day



Nanofiltration System
Rolling River, Manitoba, Canada
 Design Flow: 648m³/day



Nanofiltration System
Ebb & Flow, Manitoba, Canada
 Design Flow: 1850m³/day

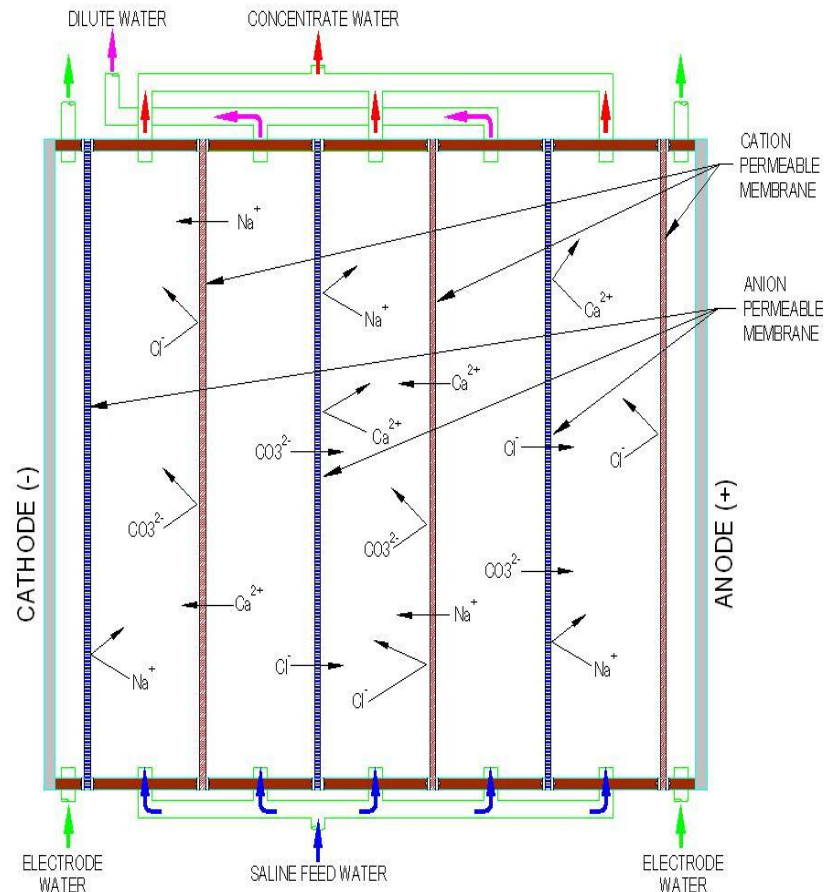
Nanofiltration System
Pelican Falls, Ontario, Canada
 Design Flow: 280 m³/day

Electrodialysis- Process Description

Napier-Reid provides electro dialysis (ED) systems to deionise water and to recover the salt using membranes.

The saline solution consists of dissolved salts like Na^+ , Ca^{2+} and CO_3^{2-} . Inside an electro dialysis unit, the solutions are separated by alternately arranged anion permeable membranes and cation permeable membranes. Two kinds of compartments are thus formed. While applying a current, cations will move toward the cathode passing the cation permeable membrane and anions will move toward the anode passing the anion permeable membrane. A further transport of these ions is stopped by the respective next membrane. Dilute and concentrate water is therefore produced in the respective compartments.

Napier-Reid ED system contains a source of pressurized water, direct current power supply and numerous pair of membranes.



About Napier - Reid

Over 60 years of excellence in water & wastewater treatment

Napier-Reid is located in the greater Toronto area in the Province of Ontario, Canada. We supply engineering services and process equipment for water and wastewater treatment.

We have the technology, resources and experience to design, manufacture and implement innovative water and wastewater treatment solutions worldwide. We have completed over 3000 projects since our inception in 1950. It stands as a testament of our ongoing commitment of providing the highest quality service, products and after sales support in the industry. Our capabilities include engineering, manufacturing, installation and field support. We have in-house personnel for complete mechanical, electrical and instrumentation process and control system design. As a manufacturer, our designs focus on cost-effective solutions, simplicity of installation and ease of maintenance.

Napier-Reid has developed an excellent team with many years of experience. We have a well-deserved reputation for innovation, service and integrity. A significant portion of Napier-Reid's business is now exported to regions such as the Caribbean, Central America, South America, Middle East, Eastern Europe, Africa, and Asia. Some of these projects are financed by Canadian government or International financing institutes. As a Canadian manufacturer, we are eligible for Canadian governmental funding and EDC export credit. We have the capability to handle a large range of projects, from engineering, equipment supply, installation, start-up, to turnkey projects. Let Napier-Reid be your single solution for water and wastewater purification.



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