

Western Water and Power Solution Bulletin

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New Generation Cellulose Acetate Reverse Osmosis Membrane

New cellulose acetate membrane will reduce water treatment costs for water treatment plants

What Is The Problem?

Cellulose acetate (CA) membranes, developed during the 1960s, were the first type of membrane used in commercial reverse osmosis (RO) water desalination plants. Relative to other types of RO membranes, CA membranes are less expensive, have a longer life, require less cleaning, and are much more resistant to chlorine.

However, due to impurities in the membrane that result from existing manufacturing processes, CA membranes do not remove as much salt and require higher pressure than other types of membranes. High operating pressures consume more energy and adequate salt removal can require additional treatment; both of which increase operating costs. Because of these limitations, CA membranes are used in only 25% of RO water desalination plants.



Reclamation's Water Quality Improvement Center in Yuma, AZ

Who Can Benefit?

Improved CA membranes will reduce the cost of RO treatment processes. Similar cost reductions will also be experienced where CA membranes are used in other RO processes, including production of food and beverages, pharmaceuticals, and chemical products. With the improved performance of CA membranes, new and existing RO facilities will treat increased quantities of water and other liquids while operating at lower pressures. Most importantly, RO water desalination plants will become more affordable offering a new alternative to many areas where drinking water is in short supply. All current users of RO treated water will benefit, as well as those in areas where RO will soon be utilized due to lower costs.

Future Development Plans

Currently, flat sheets of CA membrane are being tested. The next step is to test actual prototype RO elements. These 2.5" diameter by 40" long spiral-wound membrane elements will be tested under a range of salt concentrations and operating pressures. Reclamation is currently seeking industry partners to commercialize the new CA membrane elements.

More Information

Information on Reclamation's Desalination and Water Purification Research Program, including the WQIC and BGNDRF, is available at

<http://www.usbr.gov/pmts/water/research/DWPR/index.html>

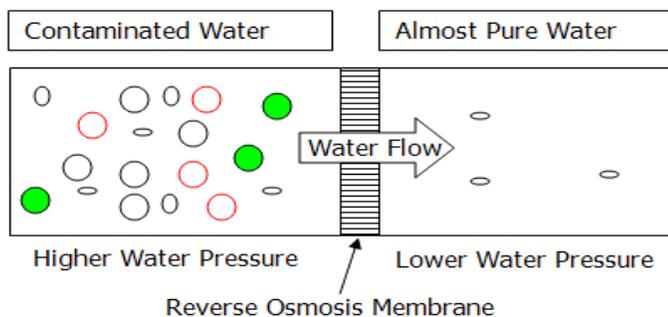
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Collaborators

Reclamation's Science and Technology Program, Yuma and Albuquerque Area Offices, and SST

Reverse Osmosis Technology



What Is The Solution?

In collaboration with Separation Systems Technology Inc. (SST), Reclamation has developed new CA membranes that perform better than existing CA membranes by removing more salts at lower operating pressures. Reclamation's patent pending membrane manufacturing process incorporates a solvent processing step that is more effective at removing impurities than previous methods. Initial tests of new CA membranes were conducted at SST and testing of additional membranes is ongoing. Further long-term tests will be conducted at Reclamation's Water Quality Improvement Center (WQIC) in Yuma, AZ and/or its Brackish Groundwater National Desalination Research Facility (BGNDRF) in Alamogordo, NM.