Products and Services

Ion Exchange Equipment, Filters & Degasifiers

- Commercial/Industrial Softening Systems
- Multi Media, Activated Carbon, Sand and Anthracite Filtration System
- Two-Bed/Mixed-Bed Demineralizing Systems
- Bulk Ion Exchange Resin Regeneration Plants and Equipment
- Primary-Polishing Softening Systems
- Mobil/Portable Softeners Demineralizers and Filter System

Membrane Technology

- Reverse Osmosis Systems Primary and Second Pass
- Electronic Deionization EDI Systems and Modules
- Ultrafiltration Systems, Hollow Fiber Sprial Wound
- Pumps, Multistage High Pressure Centrifugal
- Reverse Osmosis and Ultrafiltration Replacement Membranes

Other Products & Services

- Welded Carbon and Stainless Steel ASME Code and Non-Code Pressure Vessels
- Fiberglass Bulk Brine Storage Silo's and System
- Waste Treatment Neutralization Systems
- Ion Exchange Resin and Filtration Media
- Custom Internals for Filters Softeners and Demineralizers PVC, Stainless, Hastelloy
- Custom Piping Systems - Welded Steel, Stainless & Plastic
- Solid State and Electro-mechanical Industrial Controls
- Field , Startup, Technical and Repair Services

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AATech INCORPORATED Water Treatment Equipment

ELECTRONIC DEIONIZATION

USING ELECTROPURE™ XL EDI SERIES HI-FLO MODULES

150 Gpm System Shown
Expandable to 200 gpm

AAtech Water Treatment, can provide your facility with state of the art high quality Electronic Deionization equipment and systems. Utilizing Electropure's high quality XL EDI proprietary modules enables this equipment to be the most competitive and affordable system in the market place today.

This equipment is designed primarily for the purpose of polishing reverse osmosis effluent, which can completely eliminate the use of conventional regenerable DI polishing.

Features of ***AATech's*** Electronic Deionization System
- No regeneration chemicals eliminating waste neutralization
- No handling or storage of chemicals
- Produces water up to 18 Megohm-cm
- Provides a continuos uninterrupted supply to your process

Elimination of waste neutralization and disposal

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Reverse Osmosis
(Two Pass)

WITH A FEED WATER QUALITY LIKE THIS-

Source:	4-30 uS/cm Conductivity
pH	6.0-8.0 (7.0-9.0 for optimum resistivity performance, but only if hardness is minimized below normal.
Temp	25°C +/- 10°C (60 to 95°F)
Inlet Pressure	2.6 bar (40 psi) - maximum
Hardness (as CaCO3)	1.0 ppm maximum (Recommend 0.1 ppm)
Organics	0.05 ppm maximum (Cl2). (Recommend not detectable)
Oxidizers	0.02 ppm maximum (O3). (Recommend not detectable)
Metals	0.01 ppm maximum (Fe).
Silica	RO effluent typically 50-150 ppb
Total CO2	Product water quality depends highly on CO2 level and pH

Electronic Deionization

AATECH'S EDI SYSTEM WILL PROVIDE A DILUTE PRODUCT LIKE THIS "USING NO CHEMICALS"

Resistivity:	12 - 17 MΩ-cm
pH	6.0-8.0
Temp	25°C +/- 10°C (60 to 95°F)

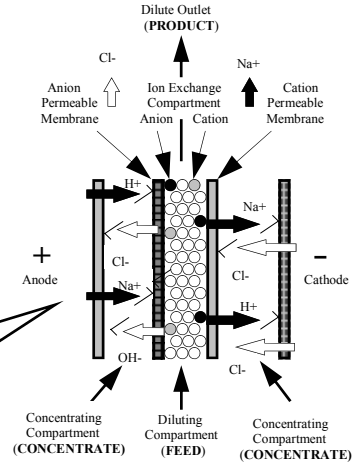

FIGURE 2

Advantages over Conventional DI

- EDI does not require chemicals for regeneration
- EDI does not require shutdown for regeneration
- AATech's system uses Electropure Modules which are the lightest per unit flow on the market. AATech's skids are therefore very compact as compared to others.
- EDI provides water of consistent quality

Process of Electrodeionization

AATech uses modules combining two well established water purification technologies - electrodialysis and ion exchange resin deionization. Through this revolutionary technique, dissolved salts can be removed with low energy cost and without the need for chemical regeneration; the result is high-quality water of multi-megohm-cm resistivity which can be produced continously at substantial rates.

AATech's EDI remove ions from water by forcing them out of the feed stream into an adjacent stream via an electric potential. EDI differs from ED by using resin in the diluting chambers. The resins allow for more effficient migration of ions in very low conductivity water. The resins operate in steady state; they act not as an ion reservoir but as an ion conduit.

The electrodeionization process uses a combination of ion-selective membranes and ion-exchange resins sandwiched between two electrodes (anode(+) and cathode (-) under a voltage potential to remove ions from the RO pretreated water.

Ion-selective membranes operate using the same principle and materials as ion exchange resins, and they are used to transport specific ions away from their counterions. Anion-selective membranes are permeable to anions but not to cations; cation-selective membranes are permeable to cations but not anions. The membrane are not water-permeable.

By spacing alternating layers of anion- and cation-selective membranes within a plate-and-frame module, parallel purifying and concentrating compartments are created. Under the influence of the applied DC potential, ions in the purifying chambers are transported across the membranes into the concentrating chambers. Thus, as water moves through the purifying compartment, it becomes free of ions. This stream is the product stream.

The feed water to AATech's EDI system is channeled into three separate streams:

1. Product Stream (up to 99% water recovery)
2. Concentrate Stream (typically recycled to RO feed)
3. Electrolyte Stream (1% anolyte + catholyte to drain)

The concentrate and product (purifying) compartments are formed within the "stack" of cells consisting of alternating anion-and cation-permeable membranes and gasketed monofilament screen spacers. These form the two distinct, and alternating, flow compartments. The screens between the purifying chambers form the concentrating chambers. The ion-selective membranes, fixed to a thin inert polymer frame, and filled with mixed ion-exchange resins form the purifuing chambers.

This basic repeating element of EDI, called a "cell-pair" is illustrated in Figure 2. The "stack" of cell-pairs are positioned between the two electrodes which supply the DC potential of the module.

The electrolyte stream flows past the anode and cathode in series. The anolyte bathing stream flows next to the anode; this anolyte compartment is formed by a gasketed monofilament screen which is located between the anode (+) and an adjacent anion-selective membrane. The anolyte stream then flows into the catholyte compartment. This chamber is formed by a similar screen located between the cathode (-) and an adjacent cation-selective membrane.

In addition to assisting with the removal of ions, the anolyte and catolyte streams expel the unwanted chlorine, oxygen, and hydrogen gas from the electrodes.