

Case Study: electrode deionization perfect solution for water treatment for POU dealers

Electrodeionization (EDI) is getting wide attention for procuring ultra pure water. It is particularly used most by semi-conductor, electronics and pharmaceutical manufacturers. This case study highlights the benefits of electrodeionization for the local medical device manufacturer. The manufacturer required approximately 1,440 gallons per day (GPD) of water with purity in excess of 2 meg-ohm (MW) resistivity in order produce medical devices.

Process followed

The equipment that is targeted in case study was meant for TDS reduction and microbial protection. For producing ultra pure water for product resistivity in excess of 2 MW, it was decided to adopt single-pass reverse osmosis system with an EDI system for polishing.

Water Treatment Process

Pre-treatment and Reverse Osmosis (RO) system

The objective of pretreatment was Protection of the reverse osmosis membrane element from scale and/or oxidation. Through media filtration equipment, it was decided to remove hardness and chlorine from the feed water.

The reverse osmosis (RO) system was expected to produce 1.15 GPM (1,656 GPD) of permeate water. RO membrane selected has high surface area in order provide the required rejection and flow rate. The flow rate of permeate was required to be 1.15 GPM that accounted for 87 percent recovery rate of the EDI unit.

EDI system

Under the expected feed water conditions, the size of the EDI was expected to produce 1.0 GPM . The permeate flow splits into three streams- to the EDI feed, electrolyte inlet, to the concentrate inlet. Whole process was expected to provide product water in excess of 15 MW resistivity.

Storage tank And Transfer Pump

The capacity of the gallon was 500-gallon in which EDI product water was stored. Water was continuously recirculated via whole unit. The atmosphere of whole tank is made microbe-free. Water is pumped from the storage tank to the distribution loop through the transfer pump.

Ultraviolet sterilizer (UV)

In order to provide final and continuous disinfection of the EDI product water, stainless steel UV system is installed.

Sub-micron post-filter

In the final step dual sub-micron filters are installed before use of the EDI product water.

Features Of The System Design

- Reverse Osmosis and electrode ionization operating as a single unit
- For maximum recovery, concentrate recycle valve was installed on the RO system.
- Recycling of the concentrate stream of the EDI module
- Divert valve is used to dump the concentrate to drain or to allow the concentrate to be collected in a skid-mounted atmospheric tank which is further recycled in a RO inlet.

Final Outcome

The initial performance of the unit was satisfactory and it is expected that it would meet performance requirements. Using this equipment manufacturers and the dealers can get the water of high quality.