GE
Water & Process Technologies

Case Study

Reverse Osmosis and Pretreatment Chemicals Save US$110,000 for Battery Manufacturer

Challenge

Daramic, Inc. is the world's largest producer of battery separators. While Daramic's direct customers for separators are the world's battery makers, end-users for the products cover virtually every electric battery application, from cars to submarines to defense to healthcare.

During the battery separator production process, Daramic uses three 100 to 150 lb boilers for their heating needs. Daramic used sand filters, water softeners and chemicals for pretreatment of the water prior to it going to the boilers. These water treatment methods left the water's alkalinity untreated. The untreated alkalinity caused the boiler water to reach alkalinity concentrations within 5 to 6 cycles.

For a complete, economical solution to save money in their boiler operation, Daramic turned to GE Water & Process Technologies

Solution

GE's solution was to install a PRO 150 Reverse Osmosis (RO) system (Figure 1), which allows control of the alkalinity concentrations and increases the boiler cycles. The RO alone cannot treat all of the water problems such as the high iron content so GE also provided a chemical RO pretreatment regiment to treat the high iron content and remove chlorine.

Results

The combination of RO and chemicals eliminates the need to use the water softeners on a daily basis. The water softeners will now only be used as a back up for the RO during maintenance, thereby nearly eliminating the US$25,000 per year cost for salt consumption.

Figure 1: PRO 150 RO System

By installing a GE RO system, the cycles of operation have increased to 25-30 cycles. As the boiler cycles are increased, less makeup water is needed for the boiler. Increased cycles result in longer residence time in the boiler and, therefore, less boiler blowdown. This translates to decreased energy consumption to heat the boiler water. The natural gas savings for this project is estimated at US$110,000 per year and the ROI is estimated to be 9 months. The higher boiler cycles also equate to lower chemical requirements for boiler treatment. Because boiler blow down is reduced, there is less water sent to sewer, which also lowers the load of the wastewater plant.

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