



Aqseptence Group



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Company Background

Johnson Screens, a brand of Aqseptence Group Inc., was founded in 1904 by Edward E. Johnson after developing the world's first continuous slot wire wrapped screen to be used in a water well. Johnson Screens is the leading brand for screens in industrial filters, water well, and architecture. Products are used in a wide range of industries, including chemical and pharmaceutical and oil and gas. Johnson Screens is located in New Brighton, where it has resided since 1971.



**Aqseptence
Group**

“Working at MnTAP has allowed me to grow as an engineer and learn about the industrial workplace. I have been challenged to understand unfamiliar processes and find solutions to complex problems in a new environment. MnTAP has provided me the support to be successful and has given me an opportunity for a hands-on work experience that I would not have received in other internships.” - RP

Project Background

Production of Johnson Screens' trademark cylindrical screen uses water to quench the welds on the screens. On an annual basis, approximately ten million gallons of water is consumed to carry out this quenching process, as well as other smaller processes performed on the production floor. The ten million gallons of water annually used costs Johnson Screens about \$120,000. Johnson Screens wishes to reduce the amount of water that is used annually by 30% by improving the water recycling systems currently in place and reducing the amount of water used for quenching the welds.

Johnson Screens also wishes to be able to manufacture National Sanitation Foundation (NSF) certified products with recycled water. The chromium content in the recycled water is currently preventing this from happening. NSF certification, an independent third-party certification, would allow Johnson Screens to increase the markets where its products are distributed and increase profit.

Incentives To Change

Johnson Screens is conscientious of its footprint and wishes to reduce the impact that its production processes have on the environment. Reduction of water would increase profitability of the company and efficiency of the processes. NSF certification has been removed

from an increasing number of products, when water started to be recycled. A recycling system that controlled containments would allow those products to be recertified by the NSF and sold at an increased price.

“Aqseptence Group, Inc. is a manufacturing facility that uses 10 million gallons of water a year. This summer Ryan has been able to identify, recommend and build a prototype water recycling system. With this system we should be able to achieve NSF approval for our products using recycled water instead of using straight city water. With the multiple recommendations that Ryan has provided, we should be able to conservatively reduce our water use by close to 2 million gallons a year. Ryan has been a great self-starter who has been appreciated and respected by everyone with whom he has interacted. We have enjoyed working with Ryan and know that he will be very successful in his future endeavors.”

~ Paul Johnson, Aqseptence

Solutions

Install Recycling Systems on Screen Machines

The water is currently contaminated with particulates, burnt oil, free oil, emulsified oil and lubricant. A water recycling system comprised of a centrifuge and ultrafiltration columns is recommended to be installed on all the screen machines. The water from all the screen machines is contaminated in the same manner, so the same recycling system will be able to effectively purify all the water. The recycling system will remove all contaminants from the water except for metal ions.

Install Ion Exchange Columns on Select Screen Machines

Welding of stainless steel screens causes an increased concentration of chromium in the quenching water that prevents NSF approved products from being made with recycled water. Removal of chromium can be carried out with ion exchange columns containing a strong acid cation resin. The ion exchange columns should be implemented on select screen machines and NSF approved products should be manufactured exclusively on these machines.

Apply Quenching Water Flow Control

Application of quenching water to the screens during the manufacturing process uses an excess amount of water. Water can be reduced by installing flow meters and replacing the ball valves with globe valves to increase flow control, while instructing operators to slowly open the globe valve until the weld is acceptable.

Install Closed Loop for Fine Wire Screen Machines

The electronics cooling water stream is separate from the quenching water stream on the fine wire screen machines, which is different from the other screen machines. The electronics cooling water is sent down the drain. Installation of a chiller and rerouting of the piping will allow reuse of the electronic cooling water without the need for any purification.

Eliminate Wire Mill Cleaning Water

The water used in the wire mill to clean the wire of lubricants is not contaminated when it is sent down the drain. The existing air wipes should be sufficient to dry and clean the wire of any contaminants that the water currently cleans. Further testing of this recommendation is required.



Recommendation	Annual Reduction	Annual Savings	Status
Install recycling systems: screen machines	940,000 gallons	\$7,000	Implemented
Install recycling system: other machines	1,600,000 gallons	\$12,000	Recommended
Install ion exchange	120,000 gallons	\$870	Recommended
Apply quenching water flow control	82,000 gallons	\$600	Recommended
Install closed loop cooling	780,000 gallons	\$4,700	Recommended
Eliminate wire mill cleaning water	2,100,000 gallons	\$15,400	Researching

MnTAP Advisor: Jane Paulson, Senior Engineer