

By Alain Mokbel

Water management can simply be defined as the activities involved in the extraction, treatment, distribution and consumption of water, whether the consumption is personal, residential or industrial.

Water Management & the Bottom Line

Reusing water in industrial applications

ARTICLE SUMMARY

Challenge: An industrial surface treatment application and a food processing group needed to conserve water and control costs.

Solution: Treating and recycling wastewater brought the users economic and environmental benefits.

Conclusion: Water management programs can help industries reduce water consumption and costs, reuse water and recover energy.

If we accept this definition to be true, water management can be a very large field of study. To simplify this text, we will specifically discuss water management in industrial applications and the importance of a properly designed water management program to a business and the environment.

Water Management Programs

A water management program is a system that will account for every liter of water being consumed in the process. There are three stages that water goes through in a process.

The first stage consists of bringing in the water. This can be done by connecting to the municipality drinking water supply or by treating water from a natural source. Either way, the influent water has a cost associated with it.

The second stage is the water being consumed in the facility (for human consumption) and in the process. In most cases, the cost associated with this stage is not obvious. However, we must consider the cost of operation and maintenance required if the water used in the process is not up to the standard required for an efficient process. Let's take the example of an electroplating plant to illustrate this point.

Electroplating requires large baths with highly pure water to ensure that the plating is performed properly

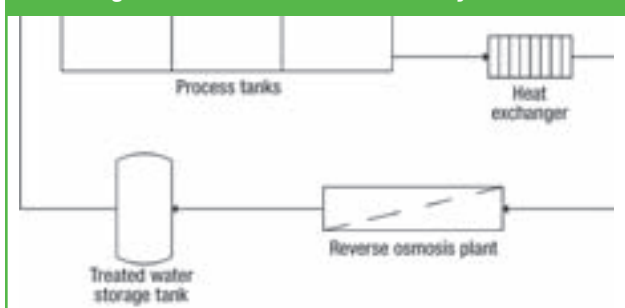
in order to produce high-quality products. If the process water is not of the required quality, the manufacturing plant can see issues in terms of product quality, products being returned, electroplating baths requiring more frequent maintenance, operating costs increasing since more energy is required, etc. This is an example of direct or primary use of process water.

Secondary process water can be any water that does not impact the quality of the product directly but has a significant impact on the process itself. Some examples are boilers, cooling towers, hydraulic pump seals and cooling water.

The third stage is the disposal of consumed water. This includes sanitary wastewater from the facilities of the plant as well as the spent water used from the process. Some processes can simply dispose of the effluent water to the city sewerage; others require some preliminary treatment to meet local environmental norms before disposal. In cases where the wastewater is highly toxic, a third party will be required in order to collect the toxic water and dispose of it in a safe manner. In all cases, there is a cost associated with the third stage.

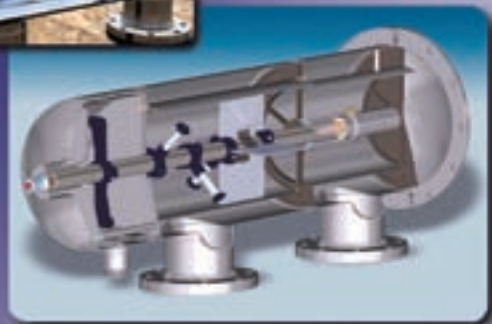
A water management program will study each of these stages in order to determine opportunities to reduce costs, reduce consumption, reuse water and recover energy.

Figure 1. Treatment of Industrial Cylinders



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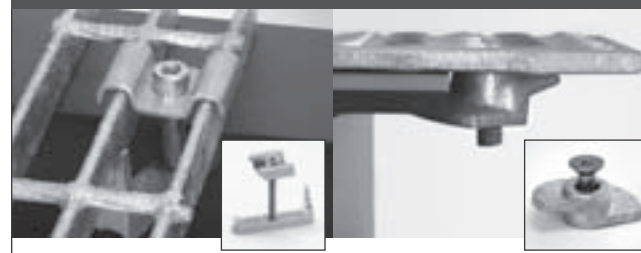
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Case Study 1: Industrial Process Water Recycling

In Quebec, Canada, Grupo Akvotek worked on a process involving salt infusion for the surface treatment of industrial cylinders. The process consumed a lot of water and generated wastewater high in salt concentration and temperature.

In this process, staff identified the opportunity to recover some of that energy through heat exchanger and used reverse osmosis (RO) to treat the wastewater and reduce the amount of disposed wastewater by 90%. This was rather significant, as the previous solution involved hiring a third-party transport company to pump out the wastewater. By reducing the wastewater by 90%, disposal costs were also significantly reduced, making the project that much more appealing. The treated water was then recycled back into the process.

This project was a complete success. Water of high quality was sent back to the process, the process tanks were cleaning themselves out and after a short period of time, the conductivity of the wastewater stabilized. This led to stabilization of the RO plant, allowing the membranes used to last longer than expected. Furthermore, Grupo Akvotek implemented a ceramic membrane filtration system for the separation of oil and water in the client's tool shop.

The benefits this company experienced with this solution were reduction of wastewater disposal costs, reduction in maintenance and operation costs and longer operation cycles as less maintenance was required in the process (See Figure 1).

Case Study 2: Washing Water in Food Processing

Grupo Akvotek was called in on one project to assist the client in finding the ideal solution for water filters. The client used several gallons of purified water to wash lettuce and other food items before packaging.

One solution offered was to reuse—with proper treatment—the consumed water. Some infrastructure was required in order to channel the wastewater to the water treatment plant. With the integration of an ultra-filtration unit and an RO plant, the recycled water met the norms required to be used as a “washing water” in the client's process.

Economic & Environmental Efficiency

Through the examples stated above, it is an undeniable fact that a proper water management program has an important impact on the bottom line of any industrial or commercial enterprise.

As we look at the different ways to treat, handle, use and reuse water, it is apparent that these systems can have a positive impact on the environment. As we increase the life of one molecule of water, we will require less water and therefore reduce the demand on the environment. [www](#)

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