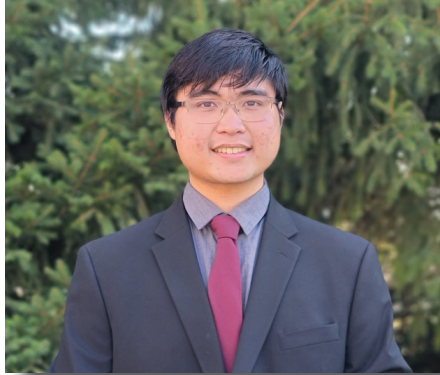




Stylmark Inc.



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Company Background

Stylmark is an aluminum anodizing company that processes aluminum parts through a mechanical and chemical line to create a variety of finishes. Founded in 1954 as Designware Industries, the company began as a small garage operation focusing on medicine cabinet parts. Since then, the company greatly expanded its reach to retail, industrial equipment, indoor light fixtures, and more. There are currently 109 employees at its 200,000-square-foot facility in Fridley.



“This internship made me more aware of how opportunities for sustainability exist in all forms of industry, particularly since the anodizing process at Stylmark was something completely new to me. I am very grateful to MnTAP and Stylmark for helping me gain valuable problem-solving experience, build confidence with and strengthen my appreciation for networking, as well as get a better understanding of how engineering concepts are used outside of the classroom.” ~ TP

Project Background

The aluminum anodizing process consumes large quantities of water. This is because the rinse baths on the line are fed constant amounts of water to limit the buildup of chemicals as parts were rinsed off. These rinse tanks consume approximately 12.5 million gallons per year (GPY) combined.

In addition, Stylmark runs approximately 13,300 racks of aluminum extrusions through its baths in a year. Current operating procedures generate 128,000 gallons of wastewater per year due to dragout and constitutes a water cost of about \$1,300 and a chemical cost of \$82,500.

Incentives To Change

As a growing company, Stylmark can benefit considerably by improving their operating conditions regarding water use. Using conductivity-controlled rinse tanks will minimize operating costs that would be magnified by increasing order volumes and rising water prices.

Reducing dragout will not only cut down on water consumption and wastewater generation but allow the company better control of product quality. With the water that is dragged out from each tank comes chemicals that can potentially interfere or adversely react with processes further down the line, so lower volumes of dragout can allow for a more controlled finishing environment and potentially reduce product loss through anodizing failures.

SOLUTIONS

Implement Conductivity-Based Rinse Control

It is recommended that the input of city water for rinse tanks be regulated using conductivity sensors and automated valves rather than manual control. This should allow for effective rinsing while reducing water use when tanks are below the conductivity limit for extended periods of time, indicating they are not currently in use. Implementation of conductivity control to 14 of the rinse tanks has the potential to conserve 12.6 million GPY of water and save \$123,000 annually.

“Our MnTAP intern surpassed all our expectations by taking the time to learn our operation and company first. While initially he was reserved, he quickly began to establish meaningful relationships to facilitate an excellent working relationship throughout the company. In doing so he found solutions that upheld our quality of work and water saving opportunities. His research was comprehensive and incorporation of ideas across our entire team has allowed him to optimize the projected design.”

*~ Casey Charging, Senior Chemist
Stylmark, Inc.*

Solutions

Regulate Dragout Timing

It is recommended that line operators pull racks out of tanks in the anodizing bay over a minimum of 10 seconds and allow racks an additional 5 seconds to drain above each tank before moving to the next tank. This change will not only save 48,100 gpy and 10,500 lbs of chemicals, but also provide better conditions for chemical baths by minimizing cross-contamination.

Insulate Exposed Boiler Pipes

Approximately 17 feet of exposed boiler pipes can be insulated to increase boiler efficiency and reduce natural gas use. This recommendation would result in 400 therms of gas energy saved annually.

Address Compressed Air Leaks

The facility air compressor can run more efficiently with repairs to air leaks. Six leaks were addressed, with a total estimated savings of 33,500 kWh or \$4,600 per year and a repair/equipment replacement cost below \$100.

Install Spray Bars

Spray bars are capable of significantly reducing dragout of chemicals. By installing spray bars to select chemical baths on the anodizing line, not only will the baths require less additions over time due to chemical loss, but chemical waste in the facility's sewer line can be directly addressed.

Install a Jet Rinser for Dye Storage Tanks

Installation of a jet tank rinser to clean the storage dye tanks is recommended. These tanks occasionally develop biological contaminants, making the stored dye unusable, and are also rinsed manually with a low-pressure hose. Installing the rinser and accompanying pressure-boosting pump at \$5,870 would reduce the risk of contaminant buildup, provide more efficient rinsing, and cut cleaning time for operators, leading to a potential savings of \$1,200 per year dye batch.



Recommendation	Annual Reduction	Annual Savings	Status
Implement Conductivity-Based Rinse Control	12,580,000 gal water	\$123,000	Recommended
Regulate Dragout Timing	48,100 gal water 10,460 lb chemicals	\$18,000	Recommended
Insulate Exposed Boiler Pipes	400 therms	\$380	Recommended
Address Compressed Air Leaks	33,500 kWh	\$4,600	Implemented
Install Spray Bars	1,300 gal water 1,600 lb chemicals	\$1,700	Needs Further Investigation
Install a Jet Rinser for Dye Storage Tanks	3,400 gal water 26.1 lb dyestuff	\$1,200	Recommended

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