

# ECO Finishing



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## Company Background

ECO Finishing is a plating company that has supported electroplating, anodizing, phosphating, and electroless nickel services since 1994. About 100 employees work at the Fridley facility, which contains a certified lab and inspection area. A wide variety of companies make use of these finishes, including the medical, aerospace, military, commercial, and automotive industries. ECO Finishing prides itself on its ability to meet its customer's requirements through quality control while still having a competitive part lead time.



*"The MnTAP internship gave me a better understanding of how to approach challenges in industry and allowed me to be in charge of my own project. I really enjoyed seeing concepts from classes in an industrial setting and learning about new processes. It was a great opportunity to use my engineering background to come up with a variety of solutions to increase efficiency at the company." ~JSH*

## Project Background

Two of the largest ongoing costs at ECO Finishing are water use and wastewater treatment. Most of the water used in the electroplating process originates from rinsing parts in between steps, which is important for high quality plating. This water has to be treated for metals and cyanides before it can be released to the sewer. As a byproduct of the wastewater treatment process, hazardous waste is produced that must be sent out for proper disposal. Industrial waste reduction can occur by reducing contamination at the source and by looking at alternate treatment processes or chemistries, while water use can be reduced at the source or reused in the plant.

## Incentives To Change

About 28,000,000 gallons of water are used per year, costing nearly \$200,000 per year. It costs \$120,000 per year to properly dispose of the 840,000 lbs. of electroplating sludge that is produced in the waste treatment process. In addition to this sludge, about 200

barrels of waste are produced each year from different areas of the plant, which costs \$51,000 to properly eliminate. Water, sewer, and waste disposal charges have been increasing over time, which is a concern as ECO Finishing has been expanding production.





### Implement Floating Insulation for Open Tanks

On ten manual plating lines, there is about 950 ft<sup>2</sup> of open heated tanks which lose heat and evaporate a large amount of water. Additionally, for agitated tanks it can be difficult to keep the temperature high enough. By implementing floating hexagonal insulation on open tanks, heat loss can be reduced by 80% and evaporation by 70%. This will prevent the release of 80,000 therms and 1,000,000 gallons of water to the environment per year when applied to all heated tanks; after accounting for the initial purchase, this will save \$63,000 per year.

### Install Drum Evaporator

Besides the sludge from waste treatment, more than 200 barrels of varying types of waste are produced yearly. A drum evaporator will allow the company to reduce the volume of waste picked up, thus decreasing disposal costs and environmental impact. Drums that make good candidates for evaporation have high water contents, no volatile organic compounds (VOCs), and little debris. Using conservative estimates for waste evaporation efficiencies for 32% of these barrels, hazardous waste production will be reduced by 19,000 lbs. per year, reducing yearly disposal costs by \$8,100.

## Solutions

### Install Closed Loop System

After rinsing parts, all water must be treated at the facility before being discharged. Over 60,000 gallons of this water is sent to the sewer per day. If this water were further cleaned, it could be used instead of city water for rinses in the plant. A closed loop system could be installed that uses ultrafiltration and reverse osmosis to recover 70% of the water. This would remove dissolved and suspended solids and make the water clean enough for reuse in the plant. It is estimated that this system could save 15,000,000 gallons of water per year with yearly net savings of \$63,000.

### Reclaim RO Rinse Water

Currently, water from the reverse osmosis system is used for final rinses on seven lines. By recording water composition and conductivity, it was determined that most of this water is clean enough to be reused before being sent to waste treatment. One option to reclaim this water is to pipe it to another rinse tank, which would recuperate 2,000,000 gallons of water a year. There is at least one compatible rinse on each line where this water could be reused. Since there is only an initial installation cost for this project, this would result in \$14,000 in water savings each year.



Recommendation	Annual Reduction	Annual Savings	Status
Install Closed Loop Water System	15,000,000 gallons	\$63,000	Recommended
Reclaim RO Rinse Water	2,000,000 gallons	\$14,000	Recommended
Implement Floating Insulation for Open Tanks	1,000,000 gallons 80,000 therms	\$63,000	Implementing
Install Drum Evaporator	19,000 lb hazardous waste	\$8,100	Recommended