Knowles Precision Devices Reviews Water and Wastewater Reduction Opportunities

Knowles Precision Devices

As a division of Knowles Corporation, Knowles Precision Devices (KPD), focuses on production of a wide variety of highly engineered capacitors and components for use in critical applications in military, medical, electric vehicle, and 5G market segments.

Challenge

The KPD facility in Cazenovia, New York produces solid state capacitors including barium ceramic-based capacitors. Key operations include plating, sputter gold coating, polishing, and dicing for the various ceramic capacitors. KPD plans on increasing overall production and is concerned about the pending increase in high purity water demand as well as increased wastewater output.

The facility currently treats their wastewater on-site by evaporation before shipping concentrated material as hazardous waste at an annual cost of approximately $2,000. Water that cannot be evaporated due to random treatment equipment problems or spikes in production is sent out as liquid hazardous waste, resulting in disposal costs of around $49,000 in 2018. KPD currently does not have a process wastewater discharge permit, therefore they wanted to identify sustainable options for reducing and/or reusing their process water.

Solution

The New York State Pollution Prevention Institute (NYSP2I) collaborated with Train Develop Optimize (TDO) to investigate and identify water and wastewater reduction opportunities. To better understand how water is used through KPD’s manufacturing operation, NYSP2I collected data and created a water map. Based on the information gathered, options were then investigated on how to reduce and reuse water throughout their operation. Lastly, an economic analysis was conducted to help determine feasible solutions for KPD.

Challenge

- Knowles Precision Devices (KPD) wanted to identify viable, sustainable options to reduce/reuse their process water, which has the potential to decrease the amount of hazardous waste within their operation

Solution

- NYSP2I partnered with Train Develop Optimize (TDO) to investigate practical options for KPD to reduce their water use and subsequent wastewater through more efficient use of their water and/or process water recycling

Results

- NYSP2I identified options for KPD to reduce wastewater generation through source reduction and recycling methods
- Membrane tests performed on lapping/polishing wastewater to evaluate possible water reuse options showed that sufficiently clean water can be produced while reducing wastewater loadings to waste treatment by 95%
- Reducing wastewater flow to the evaporators by almost 40% would help avoid overloading and excess disposal costs
Results
As a result of the work performed, options were identified for KPD to reduce wastewater generation through source reduction and recycling methods.

- If improved process control in the dicing room and recycle of water from lapping/polishing are implemented, significant reductions in wastewater sent to evaporators can be realized.
- Improved control of overflow water from the dicing operation can significantly reduce wastewater sent to waste treatment.
- Membrane tests performed on lapping/polishing wastewater to evaluate possible water reuse options showed that sufficiently clean water can be produced while reducing wastewater loadings to waste treatment by 95%.

Expected capital investment to install a membrane system with tanks to reuse water is approximately $25,000. Despite the lack of direct return on investment as related to normal operating costs, reducing wastewater flow to the evaporators by almost 40% would help avoid overloading and excess disposal costs, for example $49,000 in 2018, while accommodating manufacturing expansion.