



**Christopher Yun**  
Chemical Engineering  
University of Minnesota, Twin Cities

## Company Background

Verta Inc. is a provider of sustainable, long-lasting, high-performance architectural metal finishes. Verta has been the exclusive finisher for its sister company, Industrial Louvers, Inc. since they were established in 1985. They employ 19 people in Delano, Minnesota.



*“My summer spent working with MnTAP has been full of learning and new experiences. It was very fulfilling working to save resources and increase efficiency with the company I worked with over the summer.” ~ CY*

## Project Background

Verta’s continuous paint line was installed during the summer of 2018. They wanted to evaluate paint transfer efficiency improvements and options for reuse of cleaning solvents. The paint line consists of manual spray finishing as well as automated sprayers which are linked to light curtain measuring sensors. Prior to painting, parts are chemically washed and rinsed with water purified by a reverse osmosis (RO) system.

## Incentives To Change

Improved paint transfer efficiency and solvent utilization reduces purchase and disposal costs. These improvements decrease solvent air emissions and minimize solid and hazardous wastes. Minimizing hazardous wastes would help Verta switch their waste license classification from a large to a small quantity generator of hazardous waste.



“The MnTAP internship program provided us with new perspective on our coatings process and equipment. At this time last year we had installed new automated equipment and while our operators had a general understanding of its functionality we did not have the resources to fine tune the equipment or our process. The internship program created a research and development resource which we would not have had. The program has opened the door to changes that will increase our efficiency and provide significant cost savings.”

*~ Brett Reinhardt  
President, VERTA, Inc.*

# Solutions

## Recycle Solvent

Paint lines and equipment require cleaning with solvent at the end of each shift and when changing paint colors. Solvent re-use options were evaluated such as settling, filtering and distilling. Several equipment vendors were contacted, and a sample of the spent cleaning solvent sent for testing. Pending test results, purchasing a recycling unit for solvent recovery will allow reuse of 1,300 gallons of solvent annually and reduce hazardous waste disposal by 10,000 pounds.

## Adjust the Light Curtain

The current set-up of the part detecting light curtains places the part load bars in the first spraying zone, which triggers the automatic paint sprayers a large distance above the parts. A gap between the light bars also affects the resolution potential of the light curtain. Moving the bars down, eliminating the gap and reprogramming the automatic paint sprayers will increase the transfer efficiency. Savings are estimated at 85 gallons of paint and 20 gallons of solvent paint thinner which results in a reduction of 600 lbs VOC and 400 lbs of waste.

## Increase the Number of Light Curtain Zones

In addition to adjusting the light curtains, a vendor quote was obtained to reprogram the automatic spray system and increase the number of object detection zones of the light curtains. Increasing the number of zones and decreasing the zone sizes will increase the part resolution and improve paint transfer efficiency with more accurate estimations of the part dimensions. This fix would save an

additional 330 gallons of paint and 60 gallons of solvent, which results in a reduction of 2,100 lbs VOC and 1,600 lbs of waste.

## Extend Rinse Tank Life

Part cleanliness is critical to achieving high quality, durable, outdoor finishes. Reverse osmosis (RO) purified water is overflowed into two cleaning line rinse tanks. These rinse tanks are currently monitored daily for conductivity, emptied once a month and re-filled with RO water. Increasing the period in between tank dumping from monthly to every six weeks would reduce water usage by 9,600 gallons per year.



Recommendation	Annual Reduction	Annual Savings	Status
Recycle Solvent	10,000 lbs of waste	\$25,000	Implementing
Adjust the Light Curtain	600 lbs of VOC 400 lbs of waste	\$11,000	Recommended
Increase the Number of Light Curtain Zones	2,100 lbs of VOC 1,600 lbs of waste	\$42,000	Recommended
Extend Rinse Tank Life	9,600 gallons water	\$200	Recommended

MnTAP Advisor: Paul Pagel, Senior Engineer