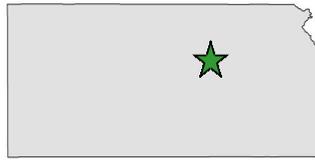


## 2021 Case Study

# VORTEX GLOBAL

Intern: Duncan Anglin  
Major: Industrial Engineering  
School: Wichita State University



### Company Background

Vortex Global owns a series of companies. The first company Vortex is an industrial valve manufacturer specializing in the development of dry bulk handling solutions. The second company is Spectrum Metalcraft, a metal manufacturer creating custom metal fabrications. Based in Salina, Kansas, Vortex serves over 20,000 companies including, Cargill, Kraft Foods, Nestle, P&G and PepsiCo.

### Project Background

The intern was brought in to observe waste streams and look for possible alternatives to current disposal methods or waste reductions. Waste streams to be observed were the electropolishing process, the vibratory tumbling process, excess powder paint waste and machine coolant waste. These waste streams cost a considerable amount to be removed from the facility.

### Incentives to change

With an ever-expanding company comes new waste streams. Environmental and financial burdens from these waste streams, while not concerns, had led to the thought that improvements could be made. The company believed that pollution prevention, or P2, could possibly help in many areas or at least confirm that certain measures are environmentally sustainable.

### Projects reviewed for P2 potential

#### Waste Stream (Electropolishing)

Electropolish is a metal finishing process in which a metal piece is dipped into an acid bath and rinsed with water. Electropolishing has two

separate waste streams, the most waste coming from rinse water. This rinse water is sent to a treatment facility through Safety Kleen, Inc., which removes 3,600 gallons of rinse water from the facility each year. The intern identified an internal treatment method to reduce the amount of water removed by Safety Kleen. This saves the company \$5,400 per year in disposal costs. However, more research is still needed to determine additional water and chemical use reductions that would result when increasing the drip time (drag out) of parts.

#### Waste Stream (Vibratory Tumbling)

Vibratory tumbling is a metal finishing process in which a metal piece is vibrated through ceramic media. Rinse water is fed through the machine to wash away particulate matter. The rinse water is sent to a treatment facility through Safety Kleen, with around 3,300 gallons removed from the facility each year. The intern found an internal treatment method to reduce the amount removed by Safety Kleen as well as cascading bins to reduce around 1,650 gallons of rinse water each year. This saves \$5,460 per year in disposal costs and .011 MTCO<sub>2e</sub> per year in water reduction.

#### Waste Stream (Powder Paint)

Powder paint is a metal painting process. The excess powder paint from the process is vacuumed into a 55-gallon steel drum and is burned down into a solidified form. The steel cans are then hauled to the landfill for disposal. The intern helped to evaluate a proposed disposal method for the excess powder paint. The intern discovered that the proposed method would reduce steel can waste by 1.11 tons of steel per year and 12 MTCO<sub>2e</sub>.

Waste Stream (Used Coolant)

Vortex uses machine coolant in their CNC machines. Coolant is very expensive to purchase and dispose of and can be an irritant to the operator's skin. Safety Kleen removes 4,036 gallons of coolant from the facility each year. The

intern found multiple acceptable solutions. The recommendation is either a coolant recycling system or the installation of a minimal quantity lubrication (MQL) system. These systems can save over \$20,000 per year and around .02 MTCO<sub>2e</sub>.

**Summary of 2021 P2 intern recommendations for Vortex Global**

Project	Annual estimated environmental impact	Estimated costsavings (\$/ year)	Status
Waste Stream (Electropolish transfer and drip increase)	-	\$5,400	More research needed
Waste Stream (Electropolish Rinse Water Spray Rinse)	1,200 Gallons .008 MTCO <sub>2e</sub>	\$0	Not Recommended
Waste Stream (Vibratory Tumbling Sludge Transfer and Cascading Bins)	1650 Gallon .011 MTCO <sub>2e</sub>	\$5,460	Recommended
Waste Stream (Excess Powder Paint)	1.11 tons of steel drum waste 12.84 MTCO <sub>2e</sub>	\$1,191	Implemented
Waste Stream <sup>3</sup> (Machine Coolant Recycling)	3,042 Gallons .02 MTCO <sub>2e</sub>	\$21,429	Recommended
Waste Stream <sup>3</sup> (Minimal Quantity Lubrication)	4,036 Gallons .026 MTCO <sub>2e</sub>	\$23,722	Recommended
Total <sup>1</sup> (Coolant Recycling) <sup>3</sup>	1.11 Tons of Steel 4,692 gallons water	\$33,480	
Total <sup>1</sup> (Minimal Quantity Lubrication) <sup>3</sup>	1.11 tons of steel 5,686 gallons water	\$35,773	
GHG reductions <sup>1,2</sup>	13 metric tons CO <sub>2e</sub>		

<sup>1</sup>Does not include projects "not recommended" or where "more research needed."

<sup>2</sup>EPA P2 GHG Calculator with Cost, 7 April 2016 & EPA WARM Tool- Version 14, Mar. 13, 2018

<sup>3</sup> These two are alternate versions of the same waste streams.