Portland Powder Coating, Inc.

www.portlandpowder.com

4740 S.E. 25th Ave., Portland, OR 97202-4740 • 503.236.9412 • fax 503.236.7180

2005 BEST AWARDS

BIZ+ENVIRONMENT=EXCELLENCE

APPLICATION COVER SHEET

BUSINESS NAME - Portland Powder Coating, Inc. No. of employees - 28

Type of Business - Powder Coating Job Shop Web Site - www.portlandpowder.com

Site Address - 4740 SE 25th Ave., Portland, OR 97202-4740
Mailing Address - Same

Contact - Steve Williams Phone - 503.236.9412 e-mail - steve@portlandpowder.com

Project Title - Pretreatment Efficiency Redesign Project

Award Categories - Waste Reduction/Pollution Prevention + Water Efficiency

Authorization

By submitting this application, I certify the information included with this application is true and accurate to the best of my knowledge. I understand that this material will be shared with the members of the BEST Review Panel. I understand that their selection will be final, and agree to abide by their decision. If chosen as an award winner, I agree to allow my activities and accomplishments to be publicized and shared with others.

Steve Williams
President
Portland Powder Coating, Inc.

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Pretreatment Efficiency Redesign Project.

1• Description: We are a powder coating job shop. We process a wide variety of metal parts. The quality of our finish is dependent upon a clean surface for the powder coating to adhere to. The pretreatment of parts prior to powder coating relies upon the use of clean water to rinse off soils as well as alkaline, phosphate, and chromic acid solutions. This is the industry standard. This project analyzed our processes to determine if we were making the best use of water and chemicals.

2 • This project was initiated by the President of Portland Powder Coating, Inc., Steve Williams, as part of an overall study to determine if there were processes that could be improved on that helped realize our mission:

To create a competitive advantage for our customers and employees, by building a team of people who will provide high quality, service oriented, cost effective metal finishing, while protecting the environment.

3 • The goals of this project was to achieve zero discharge of wastewater to the sewer system, improve rinse quality, reduce hazardous waste, and save energy. All goals were met or exceeded.

4 • This project was innovative in that we were able to reuse water for multiple processes. Feed the downstream processes with water without the use of energy, and improve the final stage rinsing in each process. We did this by increasing our process stages which was contrary to prevalent philosophy that more processes meant higher water use.

5 • This project has only been publicized to our customers and suppliers. We have given tours to pretreatment chemical suppliers in the hope that they may share the environmental benefits with others. We have made no other applications or otherwise been recognized for this project.

6 • Steps taken to implement this project:

- Conducted a study of our processes to find areas of waste.
- Studied various existing practices in other industries.
- Designed a study to determine how clean each final rinse stage needed to be.

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Pretreatment Efficiency Redesign Project continued:
Steps taken to implement this project continued:

- Determined how many recovery rinses would have to be added to maintain our desired water cleanliness, based on the evaporation rate of heated process tanks and process solution drag out.
- Purchase additional rinse tanks, ion exchange system, evaporator, and reconfigure pretreat line.

Barriers to implementation:

- Space restrictions - we had a limited footprint and were going to have to add processes.
- Hoist lift height - gravity feed required elevating rinse tanks.
- Budget - we are a small business with limited resources.
- Some processes were incompatible with others and used heavy metals. (chromic acid)
- Ion exchange technology was expensive.
- Water Evaporators were expensive and consumed a great deal of power.

Implementation • We determined that we wanted our final rinse total dissolved solids to not exceed 120 parts per million. Calculating the evaporation rate of solutions at temperature was fairly easy to accomplish, as we already knew how much water we were adding daily to heated process tanks at their current operating temperatures. We were adding 75 - 80 gallons of water daily to each of the two identical process tanks heated to 160˚ Fahrenheit and 45 -50 gallons to each of the two process tanks heated to 140˚ Fahrenheit. Testing proved that our current system of one rinse after each process tank was insufficient to keep the total dissolved solids within desired levels. Our calculations further determined that by adding one back flowing rinse process to the final rinse stage at a rate of 20 gallons per hour in an 8 hour shift for 160˚ tanks and 12.5 gallons per hour for 140˚ tanks would keep our final rinse TDS within limits.

By using the same rinse stages for compatible chemistry processes we only needed to add 3 rinse process for the alkaline/phosphate pretreat line. This worked in the existing footprint. By only having to elevate the 2 rinse tanks per process to facilitate back flowing gravity feed, our current hoist system would still be able to lift parts and transport to the next process. These capital improvements were within budget.

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Pretreatment Efficiency Redesign Project continued:
Steps taken to implement this project continued:

The chromic acid line was treated differently. It was desired to contain this rinse water independently of the other systems. It was determined that an ion exchange system would be used to remove metals from the two back flowing rinse processes, and that a static rinse tank would be used first after the chromate tank to minimize drag out. This static rinse tank would be used to replenish evaporated water in the chromate process tank. It was further determined that if we regenerated the ion exchange resin in house and evaporate the waste water we could reduce the amount of hazardous waste that would be generated.

The contemporary technology for evaporators was to use gas fired burners to evaporate water quickly and required special liners and plumbing to handle our regenerating waste water. As we would be producing very little waste water and we did not want to increase energy costs we chose and atmospheric evaporator that relies on an air diaphragm pump and louvers to increase the evaporative surface area. We purchased this piece of equipment and 4 resin cylinders used from an out of business anodizer/plater and refurbished it.

7 • This entire project was researched, designed, and implemented by Steve Williams, to maintain propriety and minimize expense.

8 • Quantifiable and qualitative results of this project:

- Improved process water quality (reduced TDS) .
- Improved paint performance (increased salt spray performance by 20%)
- Reduced water consumption and sewer fees.
- Zero discharge to the sewer system of process wastewater, resulting in reduced permit fees.
- Elimination of outside water analysis fees.

9 • Portland Powder Coating Inc. core values are stated in it's mission. We choose to only apply powder coatings due to their low environmental impact. The chemical processes we employ are selected based on there performance relative to environmental and health and safety concerns. Our next project is to eliminate heavy metals from all processes, thus eliminating hazardous waste generating processes.