Pasta Montana
www.pastamontana.com
Location: Great Falls, Montana
NAICS code: 311824
30,000 square foot facility
125 employees

Pasta Montana has manufactured pasta since 1997 in Great Falls, Montana. As of 2022, it manufactures more than 70 types of dry pasta in a single facility, with an annual production capacity of 85 million pounds. Everything from the plant's state-of-the-art processing and packaging machinery to its 30,000 square foot storage warehouse reflects the company's desire to innovate and improve.

The Montana Pollution Prevention (P2) Program, located at Montana State University's (MSU's) Institute on Ecosystems, brought together MSU's food and bioenergy systems, food enterprise-hospitality management, and chemical and biological engineering departments to offer a 10-week summer internship for MSU students. Pasta Montana Chief Operating Officer Randy Gilbertson was intrigued by the opportunity because he benefited from a similar internship opportunity during his undergraduate studies in food science. In the summer of 2021, an MSU P2 intern who recently completed his master's degree program in sustainable food systems was placed with Pasta Montana.

Problem:

Pasta Montana achieves the vibrant gold color of its products by mixing pasta flour under a vacuum to prevent oxidation of the lutein and carotenoids in the semolina flour. To create the vacuum, Pasta Montana uses liquid ring vacuum pumps. The vacuum pumps use a large volume of water, which makes up 50 percent of the facility's total water usage. Through a previous resource reduction project, Pasta Montana discovered that an opportunity to reduce the water usage existed in the liquid ring vacuum pumps. Before hosting a P2 intern through MSU, Pasta Montana installed flow meters to measure the water flow rate to the pumps for all four of its pasta production lines to create the necessary vacuum. These flow meters indicated that the actual water flow rate was much higher than necessary. All the water used to create the vacuum was sent down the drain after use.

P2 intern Edwin Allan with Chief Operating Officer of Pasta Montana, Randy Gilbertson

Solution:

The P2 intern worked with Pasta Montana to determine the minimum amount of water required for the pumps to operate properly without causing cavitation of the pump or discoloration in the pasta product. Pasta Montana's project team consisted of employees from quality control, operations, and maintenance, as well as the P2 intern from MSU. The project team began by determining the accuracy of the flow meters of the liquid ring pumps, then researching the minimum water required per the pump manufacturer specifications. The team suspected that the flow meters were inaccurate. After calibrating the flow meters, they found that three of the four pumps were operating above the maximum recommended inflow rate of 8 gallons per minute (gpm).

The water supply for each of the four pumps was gradually reduced from 8 gpm to 4 gpm with no significant change in the vacuum pressure created in the mixing vessel. Pasta Montana reduced water flow to the liquid ring vacuum pumps from 8 gpm to 4 gpm and installed partial recirculation valves on the pumps to further reduce water flow to 3 gpm.

> *"The water use was something that we identified as an issue among many issues. When approached by Montana State and the Montana Pollution Prevention Program, I thought we had the perfect project to team with an intern on. It's painful to think of all the water and money that we wasted while we waited for this project to start, but the outcome exceeded our expectation[s]."*
> —Randy Gilbertson, Chief Operating Officer, Pasta Montana

Results:

Through teaming with the Montana P2 Program and hosting a P2 intern, Pasta Montana reduced its water use by more than 13 million gallons of water per year. This led to more than $81,000 in annual savings, and the payback period for the cost of installing the partial recirculation valves on three of the four pumps was only eight days!

Production Lines	Initial Flow Rate (gpm)	Annual Water Use (gallons)	New Flow Rate (gpm)	Annual Savings (gallons)	Annual Water Use (gallons)	Savings per Year
Pump 1	8.72	4,219,085	3	2,767,565	1,451,520	$17,233
Pump 2	8.56	4,141,670	3	2,690,150	1,451,520	$16,742
Pump 3	7.98	3,861,043	3	2,409,523	1,451,520	$14,995
Pump 4	13.91	6,730,214	3	5,278,694	1,451,520	$32,851
Total		**18,952,012**		**13,145,932**	**5,806,080**	**$81,811**

Liquid ring vacuum pumps for lines 1, 2 and 3

Liquid ring vacuum pumps for line 4