

Atlas Copco



# CBA Uses Water for the Right Reason

Atlas Copco GHS VSD+ Vacuum Pump at  
Heart of New Water-Free Bottling Process

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It's no secret that the main ingredient in beer is water. In fact, a typical beer is about 95% water. But did you know that more water is involved in bringing a beer to market than what's in the beverage itself? When Craft Brew Alliance (CBA) set a goal to dramatically reduce water consumption at their Portland, Oregon-based Widmer Brothers Brewery, they focused their efforts on the bottling process.

"As part of our ongoing focus on sustainability, we've significantly reduced water usage," said Julia Person, Craft Brew Alliance Sustainability Manager. "Many people don't realize how much water is used during the bottling process, and since bottles are essential to getting our product to customers, we decided to focus there. As CBA's largest production facility, the Widmer Brothers Brewery in Portland was the ideal location to set an ambitious goal of making our bottling process water-free."

An important utility for bottling is vacuum pressure, which evacuates air from inside the bottle to create an air-tight seal that retains the beer's brewery-fresh taste. Widmer Brothers was using a traditional liquid ring pump, which had long been the industry standard because the pump's performance is not compromised by water.

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However, a liquid ring pump can consume a lot of water—up to 5,000 gallons per day in the Portland brewery's bottling operation. "Water is not only becoming a scarce natural resource, it is also an increasing expense—particularly in the Pacific Northwest," said Person. "Water is taken from the city water source, and we pay to bring it into our facility. We pay again when it leaves our facility as wastewater. For that reason, whenever we reduce water consumption, we reduce our costs twice."

Rather than simply minimizing water usage and recycling the water before it is discharged, the team at CBA set a goal to make the bottling process water-free. To help realize their goal, CBA turned to Atlas Copco.

"When we're looking for new, innovative solutions, we always start with our trusted vendors," said Person. "For many years Atlas Copco has serviced our compressed air operation in the Portland facility, so we were excited to

partner with them to pioneer the first waterless vacuum pump in the craft beer industry. It's been great seeing how this innovation will lead to new energy-saving and water-saving technologies we can share with others in the brewing industry."

"The first thing we had to understand was the application," said Mark Folsom, Industrial Vacuum Sales Manager, for Atlas Copco in Portland, OR. "You can never solve an application with just a product solution, and we knew that in a wet application there would be challenges to bringing in alternative vacuum technologies, such as rotary screw. Our biggest challenge was to remove all fluid from the vacuum application. We looked initially at a solution with a simple water separator and tested a vacuum pump in the application. We reduced the water carried over from the vacuum application, but even this small amount of water getting back into the vacuum pump would, ultimately, destroy the pump."

Undeterred by this initial set-back, Atlas Copco utilized a Foam Dampening Water Trap. "The technology is based on what some people might classify as a Knock-Out Pot, but the application was much more sophisticated."

### The system's innovative features included:

- **Built-in foam dampening mechanism to account for foam variations in different brews**
- **Low-level and high-level sensors to activate the drain sequence**
- **Automatic drain**
- **Vent line**
- **Purge tank with isolation, vent and drain valves that allow gravity drain under vacuum**
- **Secondary failsafe using in-line liquid separator with ball float**

"This was a tough application and we didn't get it right first time," said Folsom. "The first Foam Dampening Water Trap was undersized, and we realized that the piping layout played a significant role in reducing foam and managing flow. But we built a true working partnership and in conjunction with our customer we overcame the challenges."

To address the challenges, the team took these corrective actions:

- Increased the diameter of the trap from 16 to 30 inches to allow for adequate expansion
- Reversed flow to reduce velocity entering the trap
- Increased plumbing diameter from 2 inches to 4 inches to allow for additional expansion and reduce rise from the filler outlet to the trap inlet

This approach enabled the removal of all fluids on the air return to the pump. Now the first-known waterless vacuum pump in a craft brewery saves 5,000 gallons of water per day and eliminates the associated costs of water treatment. Savings: \$35,000 per year. While reduced water consumption was the main goal, additional cost savings are being realized:

### Energy Savings

Replacing the 15-horsepower liquid ring vacuum pump with a 7.5-horsepower Atlas Copco GHS Variable Speed Drive rotary screw vacuum pump saves more than \$4,000 per year in energy costs.

### Less Product Waste

The new vacuum system produces much deeper vacuum, so bottles no longer have to be overfilled to compensate for losses.



### A Cleaner Process

The waterless pump results in a cleaner process that keeps foam and water off the production floor, eliminating a potential safety issue.



"This project made sense on so many levels," said Person. "Our new waterless process made possible by our Atlas Copco vacuum pump cuts water consumption and related costs, reduces our energy bill, reduces product waste, cleans up the bottle area, and eliminates a safety concern. We calculated that our investment in new equipment will pay for itself in 14 months and then continue to save us money whenever we bottle beer, which is pretty much whenever this brewery is operational. The project was a journey for all of the parties involved committed to finding the best-engineered solution. We did it together."

## GHS VSD+: The Pump That Seals the Deal.

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