

## WATER MANAGEMENT IN Chemical Plants

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### Brewery wastewater treatment system relies on submersible pumps

Membrane development is aimed at higher temps, extreme pH and rigorous cleaning.

By Mike Bjorkman, BJM Pumps

The Brewers Association recently reported that the craft brewing industry has grown an average of 10.9 percent over the last decade. With burgeoning enthusiasm from consumers, it is no surprise that breweries are expanding their operations to meet the increased demand. Expanding operations successfully means implementing reliable equipment.

After meeting at the Craft Brewers conference, a successful brewery collaborated with ClearBlu Environmental, a full-service design-build firm that specializes in applying sustainable

technologies to process wastewater treatment and reclamation. Since business was growing rapidly, the brewery wanted to expand its operations in Blanco, Texas. Instead of working with separate engineering and construction companies, the brewery hired ClearBlu Environmental because it had the ability to design and build the entire system from end to end, implementing custom solutions to meet their specific needs.

An efficient treatment system was required to process the wastewater generated by the brewery. ClearBlu Environmental designed the pretreatment system, which included screening,

settling and pH balancing as well as the pond design, aeration system, bacterial treatment and final-stage flow monitoring. It was determined that three lift stations would need to be installed, with two pumps to operate in each lift station. Robert Bixby, president of the company, considered three main challenges before selecting submersible pumps for the primary lift station:

**Acidic wastewater** — With a pH of 4, the brewery's wastewater was highly acidic. The majority of submersible

Three main challenges were considered before selecting submersible pumps for the primary lift station: acidity, high temperature and effective solids handling.



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pumps are made from cast iron material, which would not last in a highly acidic environment.

**High temperatures** — The brewery's wastewater was consistently higher than 140°F. Most submersible pumps cannot withstand pumping liquids at temperatures higher than 104°F.

**Effective solids handling** — As with any brewery or winery, the wastewater contains solids that can potentially erode pump components or clog the pumps, reducing pump reliability and risking operational delays.

Bixby selected two submersible pumps to be installed in a duplex arrangement within the cylindrical fiberglass primary lift station. "You need reliable pumps, especially in a primary lift station where you have issues with solids, settling, acidity and temperature — it was well worth it to use special pumps," Bixby said.

The submersible pumps were the best solution for handling the brewery's wastewater for the following reasons:

- Manufactured from durable 316 stainless steel, these submersible pumps are designed to operate in highly acidic and corrosive environments.
- The pumps are engineered to pump hot liquids up to temperatures of 200°F.
- The pumps utilize non-clog, single-vane impellers designed to pass solids while delivering a high volume of liquid and optimal lift performance.
- Designed to be wear-resistant, all

parts exposed to the hot pumped liquids are made of 316 stainless steel, including all wear and "wet" parts such as the impeller, wear plate, oil housing, pump housing and inner pump top.

- To enhance reliability, double mechanical seals protect the motor; the lower seal is made of silicon carbide/silicon carbide; and the upper seal is made of carbon/ceramic. An additional lip seal is installed above the impeller to help prevent abrasives from entering the seal chamber.
- For additional motor protection, these pumps utilize winding protection and National Electrical Manufacturers Association Class R motor insulation with a thermal cutout switch that allows the stator to have a winding temperature of up to 300°F (150°C), which is superior to pumps with Class A and Class B insulation.

Since their installation in June 2013, the submersible pumps have performed reliably, operating at 460 volts and pumping up to 200 gallons per minute. Flow control within the system helps regulate the amount of brewery wastewater that travels to

the small town's wastewater treatment plant, ensuring the flow is spread out evenly over a 24-hour period. The lift stations have been kept clear of settled solids and have not overflowed.



Mike Bjorkman is vice president of BJM Corp. and has more than 30 years of experience in the pump industry. He serves as marketing and IT director for BJM Pumps LLC and All Test Pro LLC, subsidiaries of BJM Corp. BJM Pumps supplies electrical submersible pumps to industrial and municipal markets throughout the U.S., Canada and South America. All Test Pro LLC provides electrical testing equipment. For more information, call 860-399-5937 or visit [bjmpumps.com](http://bjmpumps.com).

ClearBlu Environmental focuses on applying sustainable technologies to process wastewater treatment for discharge or water reclamation.



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#### INSIDE

- ➔ AODD PUMPS EXCEL IN FACILITY OPERATIONS
- ➔ TAILINGS POND SOLUTIONS
- ➔ THE BENEFITS OF CONDENSATE RECOVERY

