



Barnum Mechanical Inc., Georg Fischer and Others Help Seismic Brewing Company Achieve Their Vision.

CASE STUDY



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ISSUE: *Saving and recovering water and energy.*

APPLICABLE TO: *Beverage processing.*

When Seismic Brewing Company envisioned shaking up the craft brewing industry with new artisanal brews, their vision also included a serious commitment to caring for the planet. Founded in 2015 by Christopher Jackson, Andy Hooper and Patrick Delves, the company hopes to set new standards for sustainable brewing practices and to help other breweries conserve energy and resources as well.

Driven by their mission to create high-quality beers in an environmentally sustainable manner, they set out to build the most sustainable brewery in the industry. "We are pioneering new brewing technologies and utilizing renewable energy to help establish new benchmarks of sustainable brewing," said Patrick Delves, Seismic's Director of Sustainability and Logistics. The new 13,200 square foot facility in Santa Rosa was designed for maximum efficiency and is a showcase for innovative brewing techniques and sustainable practices.

Seismic's advanced wastewater treatment system, Cambrian Innovation's EcoVolt MINI, is a modular combination anaerobic and aerobic digester that removes 99% of contaminants from industrial wastewater. The system allows Seismic to recycle their wastewater back into their other processes such as their Clean-in-Place (CIP) systems. Their energy-efficient steam condenser heat exchanger and a carbon dioxide vaporizer work together to significantly reduce water usage.

While most craft brewers typically use seven gallons of water to produce one gallon of beer, (a ratio of 7:1), Seismic has been able to reduce their ratio to an impressive 4:1 and they have announced their intent to reduce it to an even lower 2:1 ratio.

"We recognize that this is a tall order but believe that we can hit this goal and help other breweries do the same," said Delves.

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The Next Level

The brewery is powered by Sonoma Clean Power which uses geothermal energy from local geysers to harness power.

Seismic is taking it to the next level and working toward 'Green Business' certification with other environmentally-sound efforts such as heat capture, water reuse, wastewater treatment, and even feeding spent grains to local livestock.

"Seismic's approach led them to seek the most efficient and sustainable process solutions," said Barnum Mechanical Inc.'s Process Engineer, Kyle Harris. "One way to achieve their energy goals is to ensure energy is not lost in the cooling system. We installed the process and utility piping throughout the brewery and one reason they used GF COOL-FIT ABS Plus (COOL-FIT) for the glycol cooling was the long-term reduction in energy consumption."

COOL-FIT® ABS Plus is a Big Plus!

Traditional breweries use insulated PVC or metal piping for glycol cooling systems, but more and more are converting to using COOL-FIT. Specifically designed for secondary cooling and refrigeration systems, heat exchangers and air conditioning operated with brine, water, ice slurry and food-safe glycol solutions, COOL-FIT is ideal for energy-conscience breweries. The system is essential for process temperature control during fermentation, hop storage, wort chilling, bright tanks, filling lines and cold storage.

The system is made of ABS which is pre-insulated with high density closed cell polyurethane foam and protected with a water-tight UV resistant black polyethylene jacket. The COOL-FIT system includes a wide range of valves and connectors that make it compatible with metal piping systems.

The system is easy to configure and reconfigure for expansion.

There are three primary benefits including environmental resource savings, ease of installation and low maintenance costs (it is maintenance free). "COOL-FIT is so well engineered, so well insulated, that the chiller can operate at a lower run percentage to maintain temperature," said Harris. "You save energy on one of the most energy-intensive pieces of equipment in the process."

For Seismic the energy savings are significant.

The system is diffusion- and vapor-tight which minimizes energy loss along the lines, eliminates thermal bridges and maintains lower pressure drops than conventional piping. The interior surface is six times smoother than stainless steel which allows fluids to move through the pipes easier, reducing pressure drops and losses in the system due to friction. It also adds longevity to the pumps since they are not required to work as hard to maintain flow and pressure.

Conventional piping condensates which indicates the system is losing thermal energy. When that happens, systems require more electrical energy for cooling. The superior insulation properties of COOL-FIT prevent condensation even under the most severe environmental conditions.

COOL-FIT achieves a Total Equivalent Warming Impact (TEWI) value which is 50% superior to metal systems and can improve overall efficiency by 40%. The system has lower CO₂ emissions and the amount of refrigerant required can be reduced by 80 - 90% when compared to conventional systems.

Lower Installation Costs

The system is pre-insulated which eliminates the need to add insulation after placing the pipes. It is 40% lighter than conventional piping making it easier to move, install and suspend. The connections do not require welding which also speeds up installation. Total installation time is typically 10 - 35% faster when compared to post-insulated metal and PVC piping systems.

Lower Maintenance Costs

The water-tight system does not rust, corrode or condensate, making it completely mold-free. The piping does not condensate, thereby preventing problems with dripping on equipment, personnel and flooring. It does not absorb water from the environment which can cause cracking, corrosion and mold. It is easy to clean and can be power washed without damaging the pipes or connectors. The insulation is built into the COOL-FIT system and never needs replacing or repair. The piping is much more durable at lower temperatures than conventional PVC making it very difficult to break.

Cost Competitive with Conventional Piping Systems

The upfront cost of COOL-FIT may seem higher than other piping methods at first glance, but it is comparably priced when the cost of labor and insulation is factored in. When compared to insulated stainless tube, insulated copper, and insulated carbon steel, COOL-FIT is generally priced within +/-10% of these other methods and can be

installed 10-35% faster. "When you factor in the labor savings, COOL-FIT can be less expensive," says Harris. "We've installed many Georg Fischer COOL-FIT systems over the past few years and our customers are very pleased with the performance."

Seismic is committed to helping the planet while balancing the needs of the business. "We believe that by combining best practices with innovative technology we can continue to move the ball forward." said Delves. Barnum Mechanical Inc. agrees.

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You Know Your Product. We Know the Process.

ABOUT THE AUTHOR

Kyle Harris is a process engineer with Barnum Mechanical Inc. He graduated from the University of the Pacific in 2007 with a B.S. in mechanical engineering. Kyle designs process systems for the food and beverage industry and has special expertise in brewing and process sustainability.

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ABOUT BARNUM MECHANICAL INC.

Barnum Mechanical Inc. (BMI) is a forward-thinking design-build firm specializing in the food, beverage and specialty process industries. BMI is known for superior design, project management and installation services. BMI has operated throughout the United States since 1980.



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