



Rotary Jet Mixer helps Carlsberg increase beer production by 600 million cans

Carlsberg Group, Northampton, United Kingdom

Case story



Alfa Laval's Rotary Jet Mixer technology has, in some cases, halved fermenting time at the Carlsberg plant and achieved more consistent and predictable fermentation, which increased production capabilities while maintaining product quality.

As part of a major multimillion-pound plan to upgrade its Northampton plant in the UK, Danish brewery Carlsberg set out to improve its beer-making process. One measure the company took was to introduce Alfa Laval Rotary Jet Mixers throughout the plant's fermentation processes. This novel liquid-mixing technology keeps the yeast in the plant's fermentation tanks uniformly mixed with the wort, which has helped Carlsberg boost process efficiency, improve resource utilization and dramatically increase productivity.

Worthwhile investment

Carlsberg put Alfa Laval's patented Rotary Jet Mixers through rigorous testing. Test results were so convincing that Carlsberg also decided to install the system in 10 storage tanks – each with a 6,000-hectolitre capacity.

The system controls the yeast sedimentation at the bottom of the tank by redistributing the yeast throughout the entire vessel. By improving the contact between yeast and fermentable sugars, the conversion of sugars to alcohol is more effective. This is in contrast to conventional fermentation tanks, where temperature differentials, which arise from cooling jackets along the length of the fermentation tanks, generate convection

currents that have a lesser mixing effect, which is not as significant and effective as Alfa Laval's Rotary Jet Mixer.

Greater throughput

“Over the past 18 months to two years, we have increased our beer-making capability from 4.5 million to 6.5 million hectolitres,” explains Thomas Paludan-Müller, technical operations manager at the Northampton plant. “If we hadn't taken this initiative (of installing the Rotary Jet Mixers) we would have struggled with capacity in the future.”

That 44 percent increase is equivalent to an additional 600 million cans of beer, and the changes to production have been achieved without interrupting beer production.

Fermentation time reduced by 14 percent

The fermentation progress is tracked by measuring two key parameters – the specific gravity of the wort and the presence of the chemical diacetyl, which is produced naturally during fermentation. According to Paludan-Müller, the Alfa Laval Rotary Jet Mixer system speeds the fermentation process by 14 percent, providing a 23 percent faster gravity drop per day and improving the time to diacetyl acceptance by 17 percent.



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In addition, it contributed to improved yeast viability by 4 percent, which means that the yeast can be recovered, rested and re-used in the fermentation processes.

Thanks to Alfa Laval's Rotary Jet Mixer technology, Carlsberg was able to increase the output capacity by converting 10 storage tanks to fermenting tanks. This was achieved by installing additional cooling using a plate heat exchanger in the tanks' circulation loop to ensure that the correct process temperature of 14°C was maintained in the tank.

Alfa Laval's Rotary Jet Mixers increase capacity

In total, 27 tanks of various types and sizes, from 2,400 to 6,000 hectolitres in capacity, have now been fitted, and there remains the potential to convert other tanks if required. The brewery has also removed 57 smaller-capacity fermentation tanks that are now surplus to requirements, due to the capacity increase provided by this new technology. As a result, Carlsberg decided to consolidate all UK production at the Northampton plant where it produces a variety of brands, including Tuborg, Holsten, Skol and San Miguel as well its leading Carlsberg brands.



Installed in 27 tanks at Carlsberg's Northampton plant, Alfa Laval Rotary Jet Mixers contribute to higher production efficiency.

About the Rotary Jet Mixer system

The Alfa Laval Rotary Jet Mixer system consists of four rotating jet nozzles installed about five metres from the bottom of the tank. The jet head is positioned under the liquid surface supported on the end of a pipe. The Rotary Jet Mixer is brought into operation once the jet heads become submerged in the liquid and the speed of the rotation is gradually increased.

The mixing is achieved with the four nozzles rotating around both the vertical and horizontal axes. This double rotation gives excellent coverage of the tank and results in efficient mixing and therefore a better distribution of the yeast. An external pump in the recirculating loop ensures that the contents at the bottom of the tank are recirculated to the jet heads.

The system also handles gas dispersion (aeration, deaeration, carbonation), powder mixing and cleaning in place (CIP), and can be used in tanks between 100 liters and 100,000 cubic meters in size.

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How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.