Rotary jet advantages

Using Iso-Mix technology in breweries

The Iso-Mix advantage for breweries

Alfa Laval Rotary Jet Mixer IM 20

The unique Alfa Laval Iso-Mix system, based on the revolutionary and patented rotary jet mixer technology, is an ideal solution for breweries seeking a straightforward, cost-effective way to expand capacity, reduce process time and improve consistency.

Iso-Mix systems can be used in many places in brewery operations to boost the efficiency of different processes. Typical applications include:

- fermentation
- deaerated water production
- yeast management
- mixing and blending.

Iso-Mix systems yield rapid returns on investment, as proven in hundreds of installations worldwide. For example, breweries have been able to shorten beer fermentation times by more than 30%, with a corresponding positive impact on bottom-line results.

How the Iso-Mix system works

The Alfa Laval rotary jet mixer – a patented design – is equipped with two or four rotating nozzles and positioned below the surface of the liquid in the tank.

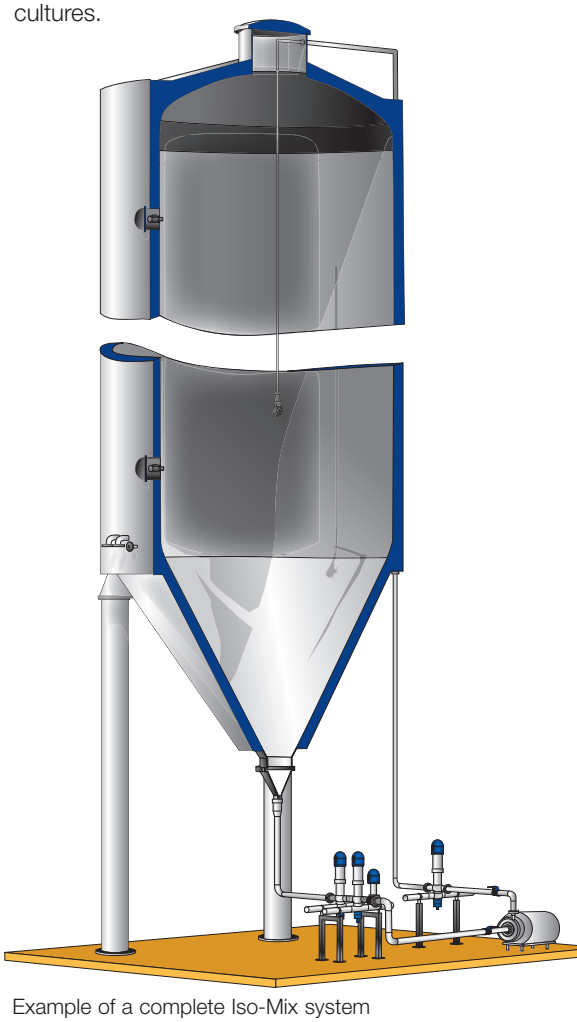
Liquid is withdrawn from the tank outlet by a pump and circulated via an external loop to the rotary jet mixer. The resulting flow drives a gearing system in the rotary jet mixer which makes the unit rotate around the vertical axis and the nozzles around the horizontal axis. This double rotation produces a mixing effect that reaches all the contents of the tank. This results in rapid, effective mixing of the entire tank content.

Furthermore, additives in liquid, gas or powder form can be inserted into the Iso-Mix loop, so that these are mixed into the contents of the tank – efficiently and consistently.

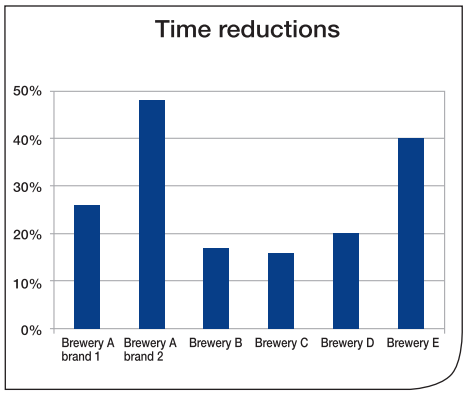
The rotary jet mixer can also be used for cleaning all the inner surfaces of the tank, between batches. Any required cleaning fluids are delivered through the nozzles of the rotary jet mixer, with the double rotation making sure the cleaning fluid reaches all surface areas on the inside of the tank with a high mechanical impact.

Iso-Mix in fermentation

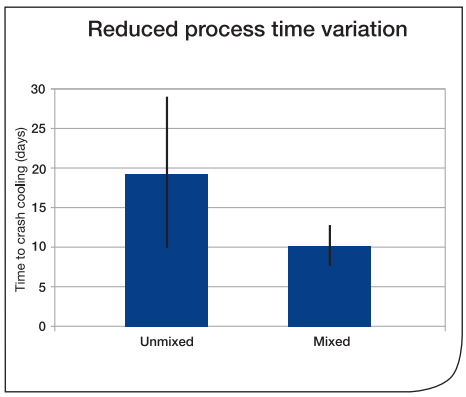
When installed in fermentation vessels, the Iso-Mix system makes sure the yeast is kept in the desired state of suspension at all times, ensuring the best possible contact between extract and yeast. Movement within the tank prevents sedimentation of the yeast in the cone of the vessel, and any supersaturated CO_2 is nucleated by the mixer. This in turn reduces process time and minimizes stress on the yeast cultures.



Example of a complete Iso-Mix system



Process time saved in a range of different breweries as a result of installing Alfa Laval Iso-Mix systems in the fermenters.



Process time at mixed and unmixed conditions for 18.5 °P lager fermentations. The black lines are error bars indicating the variation in process time.

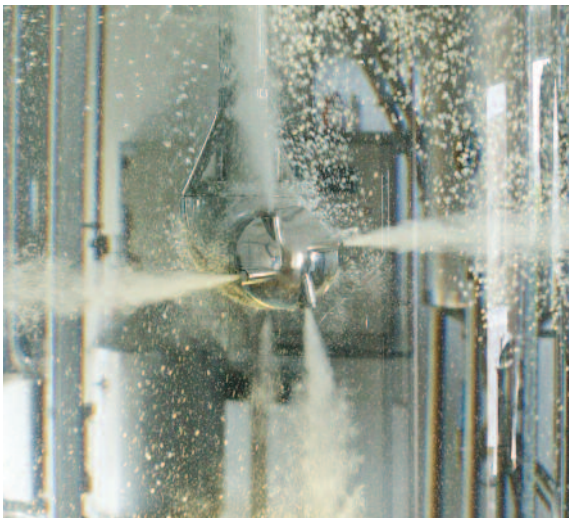
In addition, the forced convection provided by the mixing results in faster, more controlled cooling than in a conventional system without mixing technology.

Installing the Iso-Mix system in fermentation vessels provides multiple benefits:

- Shorter process time, making it possible to increase capacity much more cheaply than by purchasing and installing new tanks, which also take up precious space.
- More consistent process time, which is important for effective plant management.
- Better utilization of the extract present in the wort. This makes it possible to achieve lower residual extract and higher ethanol yields – resulting in more bottles of beer from the same fermentation.
- Faster cooling due to forced convection. Tanks with a limited cooling surface can easily be converted into efficient systems by adding a plate heat exchanger in the Iso-Mix loop.
- Greater operating flexibility, making it easier to adapt to changing market needs.

All these benefits can be achieved with no negative effects on the taste or quality of the product. The beer remains true to type and yeast viabilities are higher or similar than before installing Iso-Mix.

This means the Iso-Mix system provides breweries with cost-effective fermentation facilities, with the added advantage of a more consistent, reproducible process.



Iso-Mix in DAW production

For smaller breweries that do not need a continuous supply of deaerated water (DAW) or a fully automated system, the Iso-Mix system can provide a very cost-effective deaeration system. The system will produce high-quality DAW with oxygen levels down to 20 ppb.

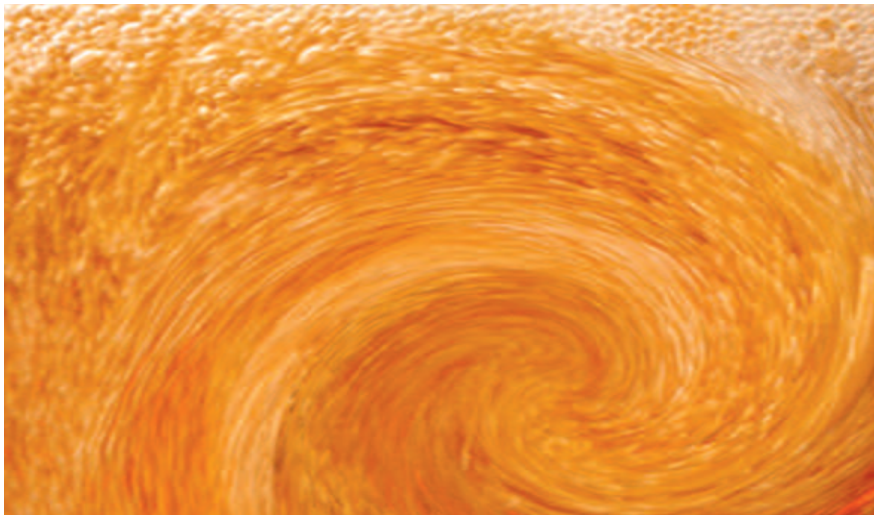
The Iso-Mix technology is used to produce DAW in a straightforward, reliable batch system. In such installations, the rotary jet mixer is installed in a tank containing the water, and CO_2 or nitrogen is injected into the circulation loop, causing any oxygen present in the water to be stripped out.

Iso-Mix in yeast management
In most breweries cropped yeast is serially repitched. The yeast crop is kept in a storage tank until it is needed. If the contents of this tank are not kept in motion the yeast will settle. This means subsequent pitching ends up taking place with a slurry of varying composition, making it very difficult to carry out this key operation consistently.

Mixing is therefore essential for keeping the concentration and temperature of the yeast consistent throughout the tank, and to aid steady, controlled release of carbon dioxide from the slurry. In addition, the tanks must be cleaned between batches, using CIP procedures.

The rotary jet mixer has the big advantage of being an effective slurry mixer and an efficient tank cleaning machine. Hence the Iso-Mix system provides a cost-effective, uncomplicated way to combine a high-efficiency yeast storage setup with exceptional levels of hygiene.

In modern yeast propagation, good mixing is crucial to prevent formation of oxygen gradients, and good gas transfer ensures that there is sufficient oxygen available for the efficient propagation of the yeast cells.

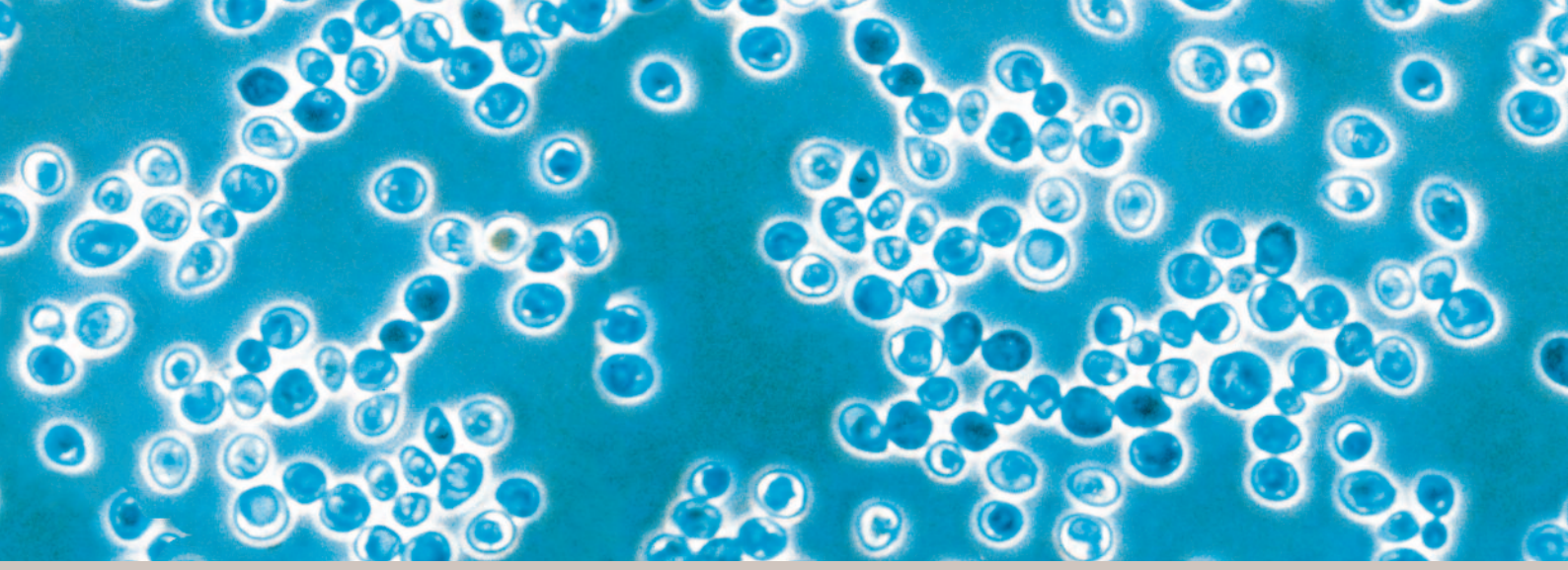


The Iso-Mix system is exceptionally effective as both a mixer and a gas distributor, making it suitable for use in yeast propagation facilities.

Iso-Mix blending
The Iso-Mix system is ideal for many brewery tasks that require rapid, efficient blending. One example is in bright beer tanks where syrups, flavourings, etc. are added and final CO_2 adjustments carried out by the use of the Iso-Mix system.

The Iso-Mix advantage
Using Iso-Mix systems in breweries provides multiple benefits:

- Faster throughput that boosts production volume
- Better control of key parameters in many different processes
- A wide range of opportunities for process optimization
- The ideal way to add fermentation production capacity at low cost, and when space is limited
- More consistent fermentation time and conditions for tank contents
- Lower operating costs, due to lower residual extract and higher ethanol yield in fermentation.



Producing beer on a commercial scale involves a constant focus on making sure operations are efficient, reliable and consistent.

Profit margins depend on being able to build new plants at lowest possible cost. The cost-effective retrofit, expansion and upgrading of existing installations to achieve greater production capacity is also crucial.

Alfa Laval Iso-Mix systems are the ideal way for breweries to meet all these requirements with a minimum of investment.

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions. Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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