



Bühler drives the pumps, dosing units and a centrifugal stirrer on their JetMix Preferment Machine with AKMH™ Stainless Steel Servo Motors from Kollmorgen

A Perfect Solution in Bakery Automation

Bühler's JetMix Machine Offers a Better Hygienic Solution to the Preferment Process

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Because Motion Matters™

With the JetMix, Bühler has developed a solution for the fully automated production of preferment used in bread making. By using AKMH™ Stainless Steel Servo Motors from Kollmorgen, Bühler has successfully combined high productivity with maximum hygiene.

Combining water and flour into a smooth and lump-free preferment (aka bread starter) is the desired method of bread making in domestic kitchens and the industrial bakery sector. The compact machine from Bühler does not combine water and flour mechanically, but through effective hydration. During this continual process, each flour particle is evenly hydrated by the finely atomized water spray. The result of this process has impressed users because of the high productivity and the quality of the smooth preferment produced by the machine.



Bühler's JetMix processes flour and water into a smooth preferment. Preferments are common elements of recipes in bakeries. Sourdough from rye flour is one of the most well-known preferments.

The Quicker Way to the Perfect Preferment

The JetMix machine has four servo axes: two of them form the pump drive for the water and ensure the preferment is pushed along. Each of these axes drives the dosing screw as well as the centrifugal stirrer. "There, the flour is accelerated radially so that we can create a perfectly formed ring from flour", describes Heinz Laueremann, team leader of Material Handling Powder & Liquids at Bühler. The ring of flour that arises from the centripetal force reacts with the water spray in the mixing tube, which is introduced from the outside through fine nozzles by the servo motor driven pumps. The pressure is accurately regulated by the precisely operated servo drive. This precision is therefore necessary, because when the flour and water come into contact, they coalesce into a lump free dough. "Mechanical kneading methods for dough production are always associated with a high energy input. With the JetMix, the production of preferment is significantly faster and more energy efficient", emphasizes Laueremann.



Heinz Laueremann
Team Leader
Material Handling Powder & Liquids
Bühler Headquarters – Uzwil, Switzerland

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Always enthusiastic about special ideas and alternative solutions, Heinz Lauermann, regards the advancement of the JetMix, fitted with a stainless steel servo motor from Kollmorgen, as a highlight in the industry from a hygiene perspective.

The most powerful of the four AKMH stainless steel motors, drives the centrifuge that produces the ring of flour – comparable to a hand blender. “The broad speed control range of the motor helped us identify the exact speed needed for different types of flour and preferments”. The finely balanced interplay between the spinning speed and the water spray being introduced with a pressure of up to 16 bar guarantees the perfect mixture – and can therefore be stored as a tried-and-tested reproducible preferment recipe in the control system. “If we had small drops of water rather than a fine spray, we would get lumps.” says Lauermann, who explains that after being mix in the JetMix, the preferment is pumped into a storage tank for further fermentation. According to Bühler, the JetMix’s performance stands at 3.0 tons per hour. “If we multiply this amount by four, then we get the quantity of finished dough”. This makes 12 tons – and they are needed. The capacity of the ovens is especially large in industrial bakeries associated with discount stores. 100 to 120 tons of flour are processed daily for bread, bread rolls, cakes, and baked goods.

A High-Speed Control Range for Production and Cleaning

Cleaning machines takes time and reduces productivity. Productivity is important especially in a price-sensitive market. “The longer the cleaning takes, the less the companies earn”, says Lauremann. During the development of the JetMix, Bühler was adamant that it would be equipped for CIP (Clean In Place) i.e. the JetMix must be equipped with a central cleaning system. The AKMH stainless steel motors from Kollmorgen must, therefore, operate at a high rotational speed, as required during the production phase. “That was an important discussion in the design of the drive system, to obtain a water velocity of up to 3 m/s, so that during cleaning, leftover dough does not remain stuck on the sides”. Moreover, the drive systems must deliver such performance that they can even push a so-called “pig” through the pipes. The pipes are shaped in a figure eight, any dough caught in them must be pushed through and into the fermentation tank to reduce product waste and prevent excessive burden to the CIP system.

A More Hygienic Stainless Steel Motor with a Single Cable

Heinz Lauermann even describes the exterior of the AKMH stainless steel motor from Kollmorgen as pioneering. The use of stainless steel 1.4404 makes the AKMH series corrosion-resistant against aggressive cleaning products. The edges are designed to have a radius of at least 3 mm and the surface finishes have a roughness of $<0.8 \mu\text{m}$ to prevent the accumulation of particles. The AKMH stainless steel motors are connected by just one cable to the [AKD servo drives](#), so installation of Bühler’s JetMix is both hygienic and space-saving. Having only one cable cuts installation time in half and the reduced surface area improves hygiene. Using just one cable also means leaks are less likely too. “Integrating the recirculation system into the motor cable through a vented connector is a great example of Kollmorgen



The AKMH stainless steel motors are connected by just one cable to the AKD servo controller. The motors can be conveniently designed for different rotational speeds due to their wide adjustment range.

innovation”, acknowledges Heinz Lauremann.

The compact units, sizes two to six, are also used outside of the baking industry, especially in machine areas with direct product contact and aseptic processes. The AKMH stainless steel servo motor dissipates any lost heat effectively to the outside and therefore lowers derating. Therefore, the FDA certified series, developed according to the EHEDG guidelines, supplies higher continuous torques at lower volumes.

The Bottom Line

Bühler's JetMix clearly demonstrates how hygiene properties and cleaning capabilities of machines in the [food Industry](#) can effectively be improved when stainless steel motors are used. It is not enough, however, to be satisfied with the material selection for the motor housings. Rather, the contour guide, connection technology and function must perfectly meet the requirements of Food Safety. "Our eyes have been opened from a hygienic perspective by AKMH", summarized Laueremann.



Author: *Martin Zimmerman*
Key Account Manager
Kollmorgen, Switzerland

ABOUT KOLLMORGEN

Since its founding in 1916, Kollmorgen's innovative solutions have brought big ideas to life, kept the world safer, and improved peoples' lives. Today, its world-class knowledge of motion systems and components, industry-leading quality, and deep expertise in linking and integrating standard and custom products continually delivers breakthrough solutions that are unmatched in performance, reliability, and ease-of-use. This gives machine builders around the world an irrefutable marketplace advantage and provides their customers with ultimate peace-of-mind.

For more information visit www.kollmorgen.com, email support@kollmorgen.com, or call 540-633-3545.