

## **Raising accuracy in dosing improves product quality for bakery**

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**An industrial bakery has increased product quality and reduced production costs after installing high accuracy ball valves. Bürkert's high speed ball valves and actuators have increased flow control accuracy and repeatability of the ingredient dosing process. Optimised ingredient control has increased the value the bakery provides to retailers and consumers while improving bakery efficiency.**

At a large industrial bakery in the UK that produces a wide variety of products, the plant's liquid improvement system demands accurate doses of additives into dough mixtures. These additives are essential for the baking process, and impact attributes such as taste and shelf life. The liquid additives include water, vinegar and oil, as well as ingredients suspended in liquid solutions, such as yeast.

Accurate dosing is a vital aspect of industrial baking, and imprecise levels of ingredients can impact product quality, including taste, form and shelf life. Moreover, this reduces efficiency with a higher level of inferior product and wastage. The unnecessary addition of expensive ingredients also increases the cost of production.

### **Inaccurate dosing impacts quality**

The bakery works with 500 kg batches of dough, while adding ingredient quantities as little as 100 g. As a result, an error of just 3-4 g can significantly impact the end product. The bakery was equipped with an automated system, but it was providing insufficient accuracy. The primary cause was the system's angle seat valves that generated excessive dosing volume as well as variability, creating inconsistent

dosing. As a result, the bakery and its engineering partner turned to Bürkert to upgrade the valve system and ensure optimum accuracy.

The bakery's engineering team integrated its PLC-based system with a suite of Bürkert electromotive ball valves with high-speed actuators in ½" and 1" dimensions. Various spring combinations were tested with the fast acting, rapid-closing valves before the optimum shut-off rate was achieved.

### **Ball valves provide improved accuracy and repeatability**

The result was vastly improved flow regulation, enhancing the speed, accuracy and consistency of dosing control. For the bakery, this meant an increase in product quality and a reduction in production costs.

"Integrating our ball valves not only gave greater accuracy in dosing control, but it also provided greater consistency of flow rates," says Kieran Bennett, , Industry Account Manager, Food & Bev. Bürkert. "As a result of the improvement to product quality and the production process itself, the bakery has now implemented the system on wider dosing applications across its plant."

### **High speed valve control**

The primary challenge in establishing dosing accuracy came from the type of valves originally installed. Angle seat valves were previously specified but they didn't provide sufficiently fast or consistent closure rates to ensure flow control accuracy.

The valves' seats had also deteriorated over time and changed their form, which meant an inconsistent flow rate that was exacerbated under high flow conditions. A previous attempt by the plant's engineering team to improve accuracy by installing stroke limiters to restrict the valves' orifice sizes was insufficient to resolve the issue.

Analysing the situation, Bürkert advised that integrating a ball valve and actuator combination would achieve a significant increase in dosing accuracy. The valve's fast-closing action could provide high-speed control over the inflight allowance, with rates of accuracy lower than +/- 1g from a 100 g ingredient dose.

### **Repeatable performance with reliable valve operation**

Predictability of the valve closure rate is an important factor for dosing consistency, but it had to be matched with an impermeable barrier. Seepage when the valve is closed also impacts dosing accuracy. However, Bürkert's ball valves were also specified as they provide optimum sealing, preventing any penetration even against the most aggressive solutions.

A secondary benefit of the valves' fast closure rates is that if the system experiences a shutdown due to an unexpected power loss, the closure rate is extremely rapid. This secures the media and prevents unwanted excess flow.

Within the bakery, orifice plates have also been installed to restrict flow to specified areas. These restrictors aid control accuracy, stabilising flow and reducing variation. Combined with the new valves, hammer effect has also been removed, contributing to a reliable and robust installation.

"With stainless steel bodies and highly durable seals, the bakery can confidently expect a typical lifetime of 10 years or more from Bürkert's ball valves," says Kieran.

Crucially for the bakery, high accuracy valve control has not only decreased the cost of production, but product quality has also been optimised. This has increased value for supermarkets and retailers, and ultimately, has improved satisfaction for consumers.

**Image captions:**

**Image 1:** Bürkert's high speed ball valves and actuators provide increased flow control accuracy and repeatability of the ingredient dosing process within the bakery.

**Image 2:** At a large industrial bakery in the UK that produces a wide variety of products, the plant's liquid improvement system demands accurate doses of additives into dough mixtures.

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