

Optimized process

THIS YEAR, AZO HAS INSTALLED AN INNOVATIVE RAW MATERIAL FEEDING SYSTEM. IT IS CHARACTERIZED BY ITS RELIABLE AND AUTOMATIC FEEDING OF DRY AND LIQUID RAW MATERIALS IRRESPECTIVE OF THEIR TYPE OF PACKAGING. AZO WILL PRESENT THE PRINCIPLES OF THIS SYSTEM AT IBA

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++ figure 1
Indoor silo for flour (left), indoor silo for sugar (right)



++ figure 2
Flour scale asymmetrical (left), sugar scale and kneader (right)

+ Originally, the equipment was designed for a highly renowned manufacturer of long-life bakery products, including a variety of biscuit types, e.g. crackers and cookies. The high performance specifications included a complete system with integrated state-of-the-art process control and visualization to be used for supplying several baking lines with a high degree of reliability. The main task of the complex automatic charging system is to feed large volumes of product, such as flour or sugar, at the right time and in the right quantity to the appropriate kneading or mixing line while guaranteeing process optimization. Other ingredients such as conditioned water and oil are also provided for the kneading/mixing lines as needed.

Automatic feeding of various types of flour

The various flour qualities arrive at the bakery by silo trucks or in sacks. When delivered by silo truck, a TW type screener

installed in the connecting pipe between truck and silo holds back and removes any foreign matter. Alternatively, the silos can be filled from sacks. For a high feeding rate, the feeding hoppers used are equipped with two sided feed chutes. From there, the flour is conveyed into the indoor silos by pneumatic pressure systems. A strong magnet inside the conveying pipe prevents any metal parts from entering the silos. As the distance from the indoor silos to the kneading/mixing lines is very long, temporary day silos are used for quicker access to the raw materials. The discharge of flour from the indoor silos to the day silos via a pneumatic pressure system is supported by the use of vibration bottoms. Flour for cracker and cookie production is stored in two of the day silos. The silos are partially equipped with silo weighing systems for filling level control. The various kneading/mixing lines can be served by an agitator with multiple outlets. AZO vacuum weighing systems have proven their worthiness over several years in the efficient automated handling of large



++ figure 3
Oil tanks

and medium sized ingredients; they feed the kneaders/mixers with large bulk material quantities. Flour from the day silos is fed to the conveyor scales located above the kneaders/mixers by carefully controlled underpressure. Switchover devices for coarse and fine raw materials are located at the dosing units and fine dosing valves ensure extremely precise weighing and dosing even at very high throughputs. The precisely weighed batches are added to the kneading/mixing process in the quantities needed to achieve an excellent mixing result.

Vacuum weighing systems for sugar

Sugar is another important ingredient in the production of long-life bakery products. It arrives either in silo trucks or in sacks. Products in sacks can be emptied through the twin feeding hopper in exactly the same way as flour. Since sugar is hygroscopic, sugar silos are additionally equipped with a silo head drying device to prevent lump formation. From the indoor silos the crystalline sugar is conveyed via pneumatic systems to a sugar mill after which an agitator hopper is used to feed the ground sugar to the day silos. As an alternative, the crystalline sugar can be directly stored in the day silos. The silos are fitted with several outlets. Feeders discharge the product in controlled quantities into the pneumatic conveying lines. In the same way, as for flour, pneumatic suction weighing systems are provided to feed the kneaders/mixers with sugar. In this particular case, sugar is ►

System specifications

- + Fully automatic production of long-life bakery products by integrating all bulk materials and liquids in the automatic feed process.
- + Adjustable output in case of fluctuating demand. Constant high product quality.
- + Highly flexible recipe changes.
- + Maximum process transparency and accurate documentation. +++

Quality is essential



Tailor-made baking solutions meeting effective production systems geared to accuracy, capacity, quality and flexibility

The DFE Meincke type Three ovens are the third generation of indirectly and directly heated convection and radiation tunnel ovens.

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withdrawn from the day silos by vacuum, deposited in the feeder scales and weighed at the same time. Very high weighing and dosing precision is achieved by coarse/fine switch-over devices.

Feeding hopper for the precise addition of pre-weighed small quantities

Small quantities, for example cocoa powder, baking powder, etc. are precisely pre-weighed manually at operator guided ManDos® weighing stations, filled into bags which are then marked with barcodes. The bags are sent to the barcode monitored feeding hoppers installed next to the kneading/mixing lines and added automatically to the mixing or kneading processes. The control makes sure that the hopper only opens after correct identification of the ingredient. This ensures that all small quantities are added to the kneading/mixing process in the correct composition and also provides for complete documentation and traceability.

Optimized integration of liquid ingredients into the feed process

Water required for biscuit production (hot, cold, municipal water) is handled by water mixing and dosing units and conveyed to a water scale. Here, the water's weight is determined and the water is then pumped in optimized quantities into

the kneader/mixer. Oils required for the production of long-life bakery products are also added to the process in optimized quantities. Several oil tanks are available for this purpose. From there, the oils are pumped via heated pipelines to the kneaders/mixers. Flow meters ensure that precise quantities are added.

Central process control and visualization system – maximum process reliability

The entire kneader/mixer feeding process is monitored by the central process control and visualization system. Each of the individual sections has a terminal where important data and information can be entered or displayed locally. With this new advanced system, all ingredients are integrated into the kneading/mixing process in optimized quantity thus providing for consistently high product quality. This makes it possible, if specific recipes call for it, for large quantities of flour and sugar to be added to the kneading/mixing process in portions. In this way, it is possible to control the temperature of dry powders, oils and other liquids with high precision – a vital requirement to achieve an optimized, uniform kneading/mixing result. Here again, the complete process is controlled, operated and monitored by the central process control system. At the same time the documentation function constantly records the high quality. Transparent batch tracking ensures maximum process reliability. +++



+++ figure 4

The entire feeding process to the kneader is monitored by the central process control and visualization system

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