

# Perfect automation

THE FRENCH EQUIPMENT MANUFACTURER ESTEVE IS GLOBALLY KNOWN AS A SPECIALIST FOR HANDLING AND SUPPLY OF RAW MATERIALS IN ANY QUANTITY, FROM 10 G AND LESS TO 350 KG AND MORE



++ figure 1

++ figure 1  
The central metering station is supplied with raw materials from the flour silos and the in-house minor component silos

++ figure 2  
The centrifugal screener makes sure that the flour is fed to the dosing plants in a uniform flow

**+** In a modern bakery the management of raw materials is no longer limited to the storage and metering of flour and other bulk ingredients. The necessity for process safety and efficiency is the reason why everything upstream of the dough preparation has been grown into a complex system where raw materials are stored, monitored, traced back, conveyed, screened, metered and mixed according to the recipe while all processes are also precisely documented. At the same time the system makes sure that deviations and errors are identified and remedied immediately without interrupting the production process. The same applies to the replacement or filling of storage tanks and silos.

Therefore, when advanced raw material plants are constructed today, equipment, process-oriented thinking and control know-how are all required equally. The Esteve company from Rians specializes with customers from the industry and large

craft bakeries. In the last year, a large industrial plant has been built in St. Bauzire, France, which is a good illustration of Esteve's performance. 66,000 hamburger buns and 12,000 loaves of sandwich bread are produced there every hour. All dry and liquid ingredients are measured, screened and conveyed within the production line with no human intervention providing for complete material and process traceability. Only one operator is needed for the control of the

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++ figure 2



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metering and mixing processes. The system consists of 30 automatic in-line storage containers for minor or micro ingredients, five flour silos holding 50 t each, and several big bag stations where 20 products are automatically supplied. The raw materials from bags or big bags are extracted without arching, clogging or retention. Several batches can therefore be added on top of the other in the same hopper. Each batch is identified, measured and conveyed ensuring the cycle times, the different mixing stages, the contamination constraints, retentions and precision.

Flour and other dry ingredients are metered in real time, transferred by vacuum and screened in a sifter with automatic filter cleaning. The new in-line sifters from Esteve allow the materials to be filtered directly in the pneumatic flow with no intermediary stages at an output of 6 t/h and for a mesh opening of 600 microns. The sieves are inspected during the process and may be replaced in less than 2 minutes with no special dismantling tools. They also have a jet pulse device for cleaning. The design of the filter allows them to be rinsed and all residual matter in the body of the sieve to be removed batch after batch. Magnets in the production line complete the sieving process and provide complete safety.

Metering circuits for shortenings, oil and liquid yeast with a CIP system are integrated as well as a 3-stage production plant with a capacity of 5,400 kg/h. Liquid materials such

as shortenings are stored in containers on swinging platforms for complete discharge. An automatic bypass allows the change-over from one tank to the other as soon as the product is no longer detected by the filling level control. A buffer tank allows low stock warning and periodic cleaning to be managed by a loop circuit. Two horizontal mixers and one vacuum speed mixer with automatic dough temperature management complete the arrangement.

One important part of the installation is the IT solution that handles the recipe management and planning as well as the ingredients warehouse management. Added to that, it offers traceability of the raw materials and the entire processing data including the compilation and visualization of the Overall Equipment Effectiveness (OEE). It also forms a network with all PLCs integrated in the entire process. The Overall Equipment Effectiveness is a key performance indicator that quantifies how well a manufacturing unit performs relative to its designed capacity. In this concrete case, Esteve compares the maximum quantity of products that can be baked from the ingredients used with the quantity that is actually dispatched. By tracking the data along the entire processing chain it becomes clear where scrap and faulty products occur. The analysis of such a series of data shows not only system errors and efficiency reserves but also mismanagement and uncooperative behavior. +++