

For Glockenbrot, REWE trusts in comprehensive and system-wide process control technology

Increased depth of added value

With an annual turnover of about € 160 million, Glocken Bäckerei GmbH & Co. oHG, an affiliate of the REWE Group, is one of Germany's major bakers. At its head office in Frankfurt, the company has recently implemented a new, future-oriented automation concept. Plant iT designed by ProLeiT, Herzogenaurach/Germany, enables the consistent automation of the entire production. For the smooth processing of incoming orders, Plant iT also ensures seamless interfacing with REWE' ERP system. At the same time, a new extra-high standard has been achieved for reporting and IFS traceability.

The Glocken Bakery's success story dates back more than 100 years. The company, which is based in Frankfurt-Fechenheim, became an REWE affiliate in 1986. Since then, it has pursued a steady course of expansion. Thanks to the nationwide delivery of its products to REWE supermarkets, Glockenbrot is represented all over Germany. In peak periods, 200 tons of flour and other ingredients are processed into about 300 tons of dough. The Frankfurt production facility is equipped with ten fully automatic bakery production lines. In order to utilize the performance of the plants even more efficiently, a controller modernization proved indispensable. With its decision in favor of the most recent version of ProLeiT's Plant iT automation system, Glockenbrot is striving to automate all bakery areas in an integrated and consistent manner. The advanced modular design of Plant iT is a major prerequisite for consistent automation – from incoming goods receipt and production to delivery of the finished goods – and also for the precise customization of workflows and user interfaces to suit the requirements of Glockenbrot specialists.

In addition, Plant iT's modular design provides the basis for the effective connection of REWE's higher-level ERP system and the highly precise entry of production orders. But this is not all: The automation system also enables the creation of a highly transparent database which ensures the traceability of each product and production step in accordance with International Food Standards (IFS).

At the core of this automation solution is the Batch iT module which has been specifically designed for recipe-controlled processes and can thus be ideally customized to the requirements of bakery production. During the entire modernization project, the comprehensive process engineering expertise of specialists from the Technology und Production departments of the Glockenbrot Bakery was given due consideration. In close cooperation with the ProLeiT automation specialists, this future-oriented automation solution could be implemented successfully based on speedy and highly precise customization.

Modular design structure

All recipe details are stored in Batch iT. What is unique about Batch iT is the fact that all the ingredients for a mixture, the quantities of raw materials and the specifications for the production process are represented and processed separately from each other based on parameters. Thanks to Plant iT, the automation is not programmed according to strict rules, but rather the operator has the option to adapt the system flexibly to specific recipes and production requirements. All parameter settings are separated in so-called bills of materials for the product and process descriptions for the entire process. When starting a mixing recipe, the plant operator selects the bill of materials, and the system automatically suggests the related process description. This linkage is the prerequisite for an executable control recipe processed by the controllers (PLCs). Since the technical and technological functions of the process control system can be parameterized to a large extent, the specific requirements and optimization requests of plant operators can be realized precisely and without compromise. Furthermore, the parameterization provides the basis for the smooth integration of system extensions into the overall automation concept. Thanks to this sophisticated approach, the Glocken Bakery was able to put a new Diosna kneading line into operation parallel to the controller modernization. At Glockenbrot, Plant iT now manages more than 250 different recipes and 200 raw materials.

INFO

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GLOCKEN BÄCKEREI

Company:	Glockenbrot Bäckerei GmbH & Co. OHG
Sector:	Food
Location:	Frankfurt
Country:	Germany

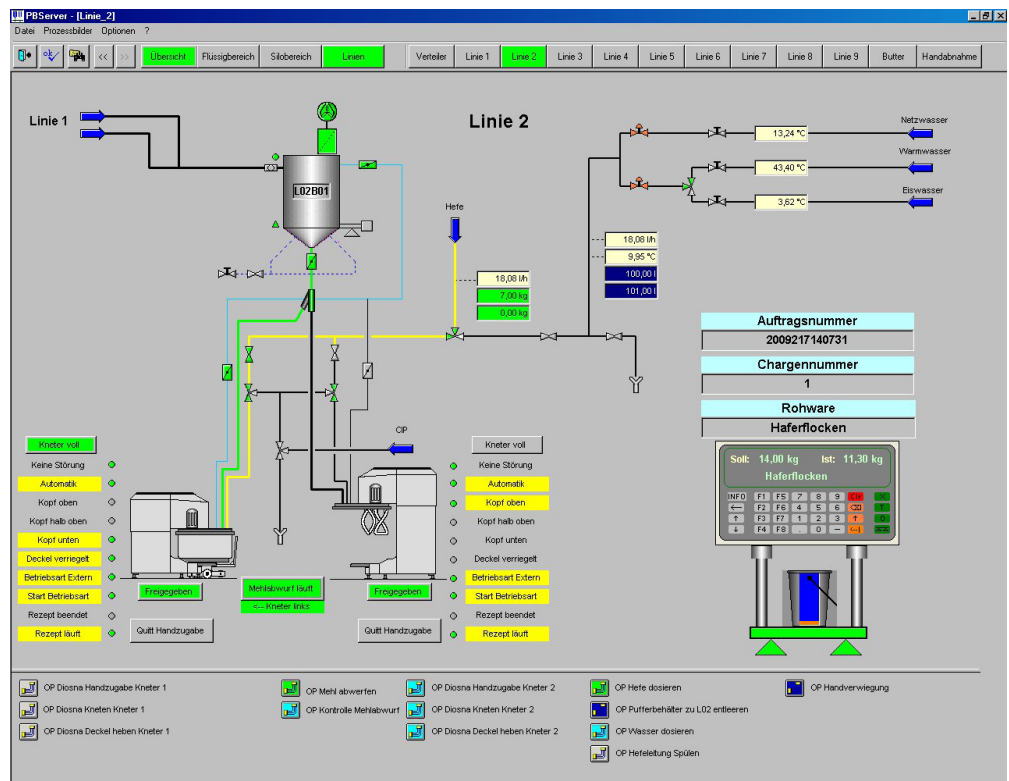
For each material, the materials management, recipe control and silo management recognize all important parameters, dosing organs and dosing paths. Only in this way can all the accounting records required for full traceability and other diagnostic routines be created and stored on the server. Furthermore, the definition of control parameters provides the advantage that the strict assignment of certain machines and components to the relevant programming sequences can be overcome. Thus, for example, the entire weighing system can be converted to standard components – Siwarex in the case of Glockenbrot. With Plant iT, the programming of the water dosing in so-called water mixing units, which previously had often to be performed separately, is a thing of the past. This task is now performed by the ProLeiT system – based on Glockenbrot's new water mixing unit consisting of servo solenoid and shutoff valves – and it manages the processes in the same way as for all other parameterized recipes. The dosing of liquid yeast and the downstream temperature sensing unit are parameterized according to the same principle. The flexible structure of Plant iT has provided the basis for the specific adaptation of the automation system to a bakery's requirements. For example, this structure enabled the design of highly variable batch

application profile

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sequences: To meet current requirements, individual dosing steps do not follow a strict sequence, but rather the operator can access silos and dosing paths depending on the plant utilization. This approach increases plant capacity. Furthermore, the entire Plant iT control and computer hardware is based on standard systems. In addition to a main server, the Glocken Bakery is equipped with a modern Siemens S7 as a centralized PLC. The integration of all field devices into the Plant iT process control system is also based on freely definable parameters via the Direct iT module. This approach enabled the automation of the operating, supervision and visualization functions for the workstations at the individual bakery units. In the final expansion stage with up to 30 workstations, Plant Direct iT thus provides a consistent visualization concept for system-wide transparency and clear arrangement. The Glockenbrot specialists particularly appreciate the consistent operating concept, because individual units can be operated directly in the process image from each workstation. In large bakeries in particular, both machine operators and unskilled workers move along their assigned bakery production line. From all workstations, they can intervene in the process and respond quickly and conveniently to messages or operator notes. Moreover, shift supervisors can control all bakery lines in detail.

The user interface is sub-divided into different hierarchical levels. The individual operator, no matter whether he be a shift supervisor or an unskilled bakery worker, is always provided with the information required for his area of responsibility. All user rights are assigned to the individual login user name. The Plant Connect iT communication interface, which can also be parameterized, serves for the connection of external systems, such as REWE's AS400 ERP system, to Plant iT. REWE uses this option for the optimized management of Glockenbrot's order planning and bills of materials. As soon as the production orders from the group headquarters have been entered, Plant iT automatically groups the different orders according to economic considerations. If, for example, the dough recipe for a particular kind of bread is identical to the corresponding recipe for rolls, Plant iT will group the two recipes, calculate the batch size for the quantity of bakery products ordered and thus create the target parameters for the mixture.



Glockenbrot kneading line with manual input

Fast retrofit

For the retrofit of the Frankfurt production facility, the expertise of ProLeiT and Glockenbrot technicians has been of primary importance in order to cope with the following two challenges: To enable convenient batch tracing, an existing and still smoothly operating kneading plant had to be integrated in Plant iT. Since, however, no precise descriptions were available for this plant, a preliminary analysis of the control functions had to be performed without the support of the kneading plant manufacturer, based on observations and an inventory of the electrical installation. In a next step, the existing kneading plant was integrated in the overall engineering concept. The second challenge to be taken into account was the fact that the Glocken Bakery is run in three-shift operation. The conversion to the new Plant iT has to be performed within a time frame of only twelve hours on one particular Saturday each. So far, one production hall has been converted to Plant iT. The direct comparison of the bakery line converted to Plant iT with conventional lines shows a significantly more stable operation after the upgrade. Operation is more user-friendly and safer. The operator is highly satisfied with the support Plant iT provides in case of error diagnoses. With the aid of a

so-called workshop tool developed specifically according to Glockenbrot's technical specifications, maintenance and repair orders can be booked into the repair shop directly from Plant iT. Furthermore, shift supervisors in the production and technology departments, the organization's technical management and even the company management are always up to date with regard to repair and maintenance workflows and are provided with precise information on the plant's availability.