

# application profile

## Complete process automation for the new brewing site

### The New Grolsch Brewery - Modern, Efficient and Environmental-Friendly.

Known throughout the world for its premium beer and immediately recognizable by its characteristic bottles with yoke closure, Grolsch has opened its new, and probably the most efficient, brewery in Europe. A brewmaxx system that conforms to ISA S88.01 from ProLeiT AG with its ultra-modern technology is used for the complete process cell automation in this project.

### History

The Königliche Grolsche Bierbrauerei NV can look back on almost 400 years of brewing tradition. It was founded in 1615 in a locality in the Netherlands with the name Grol (Groenlo). Peter Cuyper took over the brewery from his father-in-law and started to brew a high-quality and appetizing quality beer that very quickly gained popularity. Even today after four centuries, Grolsch, which literally means „from Grol“, still stands for premium quality beer.

### Today

The Grolsch NV enterprise is a public company traded on the Amsterdam stock market. In 2003, Grolsch achieved sales of € 301 million and employed approximately 880 workers. The total volume of 3.18 million hectoliters was principally produced at the two existing breweries in Groenlo and Enschede, and under license in England.

### Efficiency, flexibility and environment

Grolsch at the start of this project had decided to observe one of the company's most important rules: efficiency. „This would not have been possible for the renovation and the expansion of the existing process cells“, stated project director Leo van der Stappen. „With the investment volume of € 277 million, this new construction is the largest industrial project of the last decade in the Netherlands: a „state-of-the-art“ brewery with

regard to technology, efficiency, flexibility and environmental-friendliness integrated over all process stages and fully automated“.

Flexibility was the second important company guideline. All beer types should be produced at a single location. „It does not suffice just to combine efficiency with flexibility“, said Van der Stappen. „Flexibility often results in additional higher costs, but in Boekelo we have managed to satisfy both of these important requirements.

The third company guideline concerns the protection of the environment. All building materials, all process units with water and energy consumption, but also with regard to noise production and odor emissions, have been selected and optimized to cause minimum environmental pollution. Grolsch sets itself the goal to save 25% in the water consumption and to be one of the ten best breweries in the world with regard to the energy consumption.

### The project partners

The Danish consultant Danbrew advised Grolsch both during the planning and in the engineering phase. Four process cell manufacturers were chosen for the brewery's production block: Brabant van Opstal in the silo area, Huppmann for the brewhouse, GEA Tuchenhausen in the fermentation room and storage cellar, the pressure tank cellar and the CIP process units, Filtrox in the filter cellar. In the filling process cells, six lines for bottle and can filling were from SIG Simonazzi in Italy. The keg filling unit was built by Briggs from England. brewmaxx from Herzogenaurach, with the system with the same name and configured by the ProLeiT AG, was responsible for the complete automation.

### Horizontal and vertical integration with brewmaxx

The first part of the automation job covers the process control and the process cell data acquisition for the complete brewery, from the fermenting room and storage cellar to the filter

### INFO



<b>Company:</b>	Grolsche Bierbrouwerij Nederland B.V.
<b>Sector:</b>	Breweries
<b>Location:</b>	Enschede
<b>Country:</b>	Netherlands

cellar to the effluent treatment. Equipped with 4 servers, 14 workstations and 12 Simatic S7 PLCs, the software collects and controls more than 350 drives, 3600 single- and double-seat valves and 2400 measured values and counters. The video mode (process pictures can be viewed as far back as 2 weeks) specially developed for Grolsch offers diagnostic capabilities far exceeding those provided by the usual process picture display.

The second part of the automation job, namely the complete process data acquisition for the filling process cells covers the data processing for 7 filling lines with approximately 150 associated controllers used to cyclically read approximately 21,000 digital and 2,000 analog data points.

The third part of the automation job covers not only all MES functions for the complete management system, the process data preparation and transfer to the higher level SAP R/3 ERP system, but also the complete management reporting system. Numerous information from the production and filling process is automatically provided in Web-based form to the process cell management to serve as an important planning basis. This allows the user to search, plan and analyze in a familiar Internet environment.

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## The first brewery with the brewmaxx system that satisfies ISA S88.01

The guidelines of the international ISA S88.01 standard served as the specifications for the complete automation concept of the brewery. This standard defines three models for the structuring of batch processes: a physical model describes the process cell structure, a procedural model describes the execution structure of the process. The combination of these two models produces a process model that describes which sequences are to be performed where and with which recipe nominal parameters in the process unit. ISA S88.01 also defines the model how recipes are to be structured.

This requirement demands a new concept for the software structure. The new S 88 structure demands a complete order-controlled production system.

The first brewery with integral SAP coupling. The higher-level SAP R/3 ERP system coordinates the complete manufacturing process from the raw material acceptance through to the shipping of the finished products. The standardized interfaces (brewmaxx Connect iT) to the PP (Production Planning) and MM (Material Management) modules ensure a non-interrupted communication between SAP R/3 and the ProLeiT MES system. The production planning that runs in the SAP system manages the material data and the bills of materials. All articles are uniquely identified with an SKU (Stock Keeping Unit) number; performed production jobs are reported in real-time as soon as the warehouse entry is made.

## A powerful MES system

After the orders have been dispatched, all further procedures are performed by the order management of the MES system. An optimum routing is defined based on the product type and the current process cell assignment. Although batches are normally specified automatically, if necessary, they can be manually entered or changed by the operator. The monitors of the operator stations clearly show which production orders are active in which batch areas. The current production data can be queried in real-time according to the shift, day or production order.

The MES system is also responsible for the complete material management over the complete production process. Material acceptances

and material consumptions are recorded by the system and passed in batch reports to the SAP system. This closes the loop of raw material use and consumption.

The central component of the MES system is the Tracking and Tracing function. The data processed here ensures a complete batch pretracking and tracing in accordance with the EU base decree VO178/2002 and provides detailed analysis and evaluation capabilities.

The numbers of the shipping unit (NVE or SSCC = Serial Shipping Container Code) for the corresponding filling jobs are also assigned and logged in the MES system.

The MES system also provides a comprehensive technical reporting system that makes transparent any weak points and relationships over system and process boundaries. Because productivity becomes measurable using OEE (Overall Equipment Effectiveness), this permits an efficient cost control.

## Filler Stop Tracker

The newly developed Filler Stop Tracker Tool is used for the first time in the filling area. This tool is used for the documentation and error tracking of any filling stops that have occurred. It is installed on the operator station in the immediate vicinity of the filling machine and monitors there in the background the pending filling stops. A dialog is displayed if one of these stops lasts longer than the parameterized duration. The operator is requested to assign a cause to the associated filler stop. This ensures that the filler stop is documented and will be available for subsequent analysis in report form. A differentiation is made between process-cell-related, process-cell-external and product-related fault causes.

## The major challenge

For the first time, it is now possible to satisfy the two most important items of the production controlling in a brewery at „the press of a button“:

- Complete tracking of the process execution from the arrival of the raw materials through to each individual pallet in the finished product warehouse
- Complete transparency for the production costs of each individual production batch, each work shift and each warehouse storage unit

The principal goal of this project was not the lowest cost/benefit relationships for the construction, but rather the lowest TCO (Total Cost of Ownership) in the subsequent operation and maintenance.

The following requirements were to be satisfied:

- Minimum personnel requirement for the process cell operation, including cleaning and change to new production runs
- Minimum requirements with regard to maintenance time and cost
- Maximum process cell availability for the production, minimum time loss for product change, CIP and new production runs
- Optimum reliability, efficiency for the product transfer to the warehouse
- Lowest possible consumption values for electricity, water, heating and coolant

All these factors were evaluated by an expert team of the Grolsch breweries using a very precise measuring procedure.

The results led to the not exaggerated statement that the new brewery with its ultramodern technology will become a model for future breweries throughout the world.

Grolsch is entitled to be proud of this achievement.