

Transparency thanks to automated data collection with zenon

System automation for maximum liqueur enjoyment

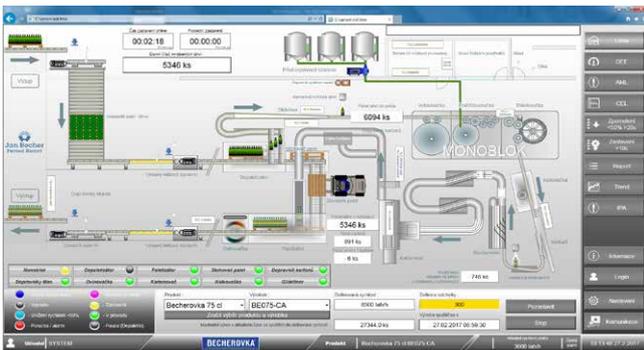
The recipe behind the herbal liqueur Becherovka is 200 years old and top secret. It is unofficially known as the 13th mineral spring in the Czech town of Carlsbad. The effectiveness of the filling and packaging system, however, is no longer a secret since the company implemented a process control system based on the zenon software from COPA-DATA. This provides the foundation for further efficiency enhancements.



For many years, Carlsbad (Karlovy Vary) in the Czech Republic was the most famous and fashionable spa resort in the world. The healing water from twelve springs has been used for spa baths since the 14th century, and also for drinking treatments since the 16th century. The 13th spring was created in 1807, when Josef Vitus Becher developed a herbal liqueur which was originally used as a medicine. With its lack of bitter taste, the liqueur quickly became popular among a large number of loyal fans. Under the name Becherovka, the drink is now an integral

part of Bohemia's culinary traditions, and is sure to be found in any well-stocked bar.

Jan Becher has been producing the liqueur on an industrial scale and exporting it worldwide since the 19th century. Since 2001, the company has been owned by Pernod Ricard, the world's largest manufacturer of spirits. The old factory is now open to the public as a museum and production takes place in a factory that opened in 2010 on the outskirts of Carlsbad.



zenon offers a comprehensive overview of the entire system. This facilitates troubleshooting in the event of a fault and the evaluation of the system effectiveness.



An up-to-date OEE overview is always available on the panel, which is access-protected via a RFID login, and online via web clients – without manual data collection.

A LONG TIME TO MATURE, A SHORT TIME TO BOTTLE

It takes 90 to 100 days to produce a batch of Becherovka. First, a mixture of around 20 different international herbs is produced according to a top secret recipe in the so-called “drug chamber”. The mixture is then packed into a kind of oversized tea bag and is kept for a week in a closed container with pure alcohol, which is initially hot and then slowly cools down. Other ingredients, primarily water and sugar, are added to the alcohol, and the liqueur is then left to mature in oak barrels for two months.

After filtering, the herbal liqueur is chilled to -5°C and then transferred to the central filling line. “We sell Becherovka in bottles of different sizes ranging from miniatures containing five centiliters to the famous flattened bottles with a capacity of up to three liters,” says Tomáš Bryzgal, plant director at Jan Becher - Karlovarská Becherovka. “The entire filling process runs with a high degree of automation – from depalletizing the empty containers to palletizing and labeling the filled bottles, and providing them with a tax stamp.”

HANDWRITTEN DOCUMENTATION AND ESTIMATES AS SOURCES OF ERRORS

Each of the ten system sections is equipped with an individual controller. They were linked by simple hardware interfaces between the units since the filling line was first installed. “This configuration worked very well during normal operating periods,” reports Bryzgal. “Difficulties were caused by the lack

of centrally accessible information in the event of a problem, e.g., in the case of system downtimes.”

In such situations, it was often difficult to quickly determine the cause of the downtime. This not only delayed the troubleshooting process, but also made it difficult to calculate the system efficiency later on. The production workers manually logged the information for each system downtime. “As they were logging the information while they were looking for and repairing the fault, the information was not always very precise,” admits Bryzgal. “The downtimes in particular were often quite inaccurate, as they were mostly retrospective estimates.”

It was also inconvenient that they needed to transfer these handwritten records into spreadsheet forms for evaluation, and these forms only offered limited options for analyses. In addition, the data and evaluations were isolated from both the company IT and the automation systems, so they could not easily be used for controlling measures.

FLEXIBLE MONITORING SYSTEM REQUIRED

In order to better monitor the system’s efficiency and to maintain it at a high level, the management decided to replace this isolated data system with a modern integrated overall solution. To this end, the complete filling and packaging system needed to be provided with an overarching process control system. To ensure that the company did not have to change



The trend solution created using the Faceplate technology in zenon ensures clarity.



All evaluations are also incorporated into an automated reporting process

its well-functioning subsystems, the solution needed to be implemented without interfering with their PLC programming.

The requirements were extensive: The system should enable the entire filling and packaging system to be monitored centrally and the Overall Equipment Effectiveness (OEE) be evaluated. Among other information, the reports should also comprise the evaluation of downtimes and micro-downtimes (up to ten seconds) without any significant effort, including displaying a Pareto chart. On the one hand, the system should be accessible via a web server independent of the location. On the other hand, it must be protected against unauthorized access by means of a RFID login.

OPEN SOFTWARE SOLUTION – PERFECTLY ADAPTED

Kropf Solutions, with its branch office in the Czech city of Cheb, was awarded the project order. The company specializing in industrial automation has been working closely with COPADATA for more than 20 years. “The zenon software is tailored to flexible, open, and reliable applications,” says Ronny Duchek, head of the technical department at Kropf Solutions, who led the project. “With this solid foundation, we can create tailor-made solutions that are highly dynamic and ergonomic for our customers.”

The first part of the overall solution for Jan Becher was grouping all the subsystems within the filling and packaging system into an overarching Ethernet network via gateways. This connects the production systems to a zenon server, which

also provides the connection to the company’s network. An industrial Multi-Touch panel is available for direct, machine-related interventions. The panel also has a RFID reader, which is used to log-on the user in zenon.

Customers and system integrators extensively tested the zenon project before it was released for live operation. New requirements, which no one had thought of in the definition phase, emerged again and again during this testing phase. However, due to the open structure of zenon, these requirements could easily be integrated into the implementation when it was almost finished. Kropf Solutions were therefore able to hand over a solution that was ready for practical use after a very short test phase.

COMPLETE OVERVIEW WITHOUT MANUAL LABOR

The zenon-based process control system has rendered all the manual records that were previously required unnecessary. The fully automatic system permanently records the operating states of all the system components to the second and without the possibility of human errors, such as transposed digits. It is also no longer necessary to transfer the data, as it is immediately available for all types of evaluations in the database after recording.

The Overall Equipment Effectiveness is now calculated in a standardized manner throughout the group. The application specialists from Kropf Solutions programmed the corresponding evaluations in the integrated zenon Logic PLC system on the

“ Thanks to zenon, the engineers at Kropf Solutions were able to implement all of our specific requirements, including those that only appeared during the test phase. ”

TOMÁŠ BRYZGAL, PLANT DIRECTOR
JAN BECHER - KARLOVARSKÁ BECHEROVKA, A.S.

basis of predefined formulas. These are presented in various forms as a live overview or trend diagram – on the panel in production on the one hand, and in various offices with the help of web clients on the other. Downtimes and forced reductions of the filling line speed can be displayed as detail views, but also as a Pareto chart.

The automated creation and sending of daily and monthly reports are not only essential for the operation and control of overall production, but also provide a basis for subsequent decisions within the group.

DATABASE FOR FURTHER OPTIMIZATIONS

“Thanks to its versatility, adaptability to our specific requirements, and user-friendly design, zenon has made our production processes more transparent and has removed the need for employees to carry out documentation tasks,” says Bryzgal. “The next step is to use the system to further optimize our production processes.”

ZENON AS PROCESS CONTROL SYSTEM FOR JAN BECHER - KARLOVARSKÁ BECHEROVKA

- ▶ Central system monitoring
- ▶ Elimination of manual data collection and isolated evaluation systems
- ▶ Evaluation of the Overall Equipment Effectiveness (OEE)
- ▶ Evaluation of the downtimes and speed fluctuations incl. Pareto chart
- ▶ Comprehensive, automated reporting process