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COST-EFFECTIVE FLEXIBILITY
FOR FOOD & BEVERAGE PRODUCTION

The new Batch Control in zenon

What is batch manufacturing? Those of you active within the Food and Beverage industry will find the answer very simple, because batch manufacturing is your bread and butter: it is how most products are created – be they chocolate, cheese, beer or juice.

However, if you are not that familiar with batch manufacturing, let's take a brief look into what this kind of production involves. Similarly to cooking a meal at home, a finite quantity of a final product is produced once. So, what do we need in order to end up with a delicious meal, a tasty chocolate bar or a distinctive soft drink? We need one or several pieces of equipment, specific quantities of ingredients and a recipe – meaning a well-defined description of how to combine and process the ingredients step-by-step. At an industrial scale, the requirements for controlling the process are very strict and therefore the automation, in general, and the industrial software, in particular, play an essential role. To understand what we mean by this, we will take a closer look at an example.

HOW BEER IS PRODUCED...

The main ingredients for beer are: water, malt (malted grains), hops and yeast. The malt is stored in a silo and from there it is crushed in a grinder and mixed with hot water in a unit of equipment called a mash kettle. The sugar-rich liquid which results from this process is then transferred to the next unit, the lauter tun. It is supplemented with additional water, with the goal of separating it from the malt´s grains. All the resulting liquid, named wort – which is in fact, our production batch – arrives in a vessel called a wort kettle. The next process consists mainly of boiling the wort. At this point a new ingredient, the hop, is added, so that the wort gains beer-characteristic taste and aroma. The journey of our batch continues to the "whirlpool" where the wort is clarified. After cooling, the wort is ready for fermentation – following the addition of yeast. The result of this lengthy process, which takes place in the fermentation tank, can already be called "beer" and will be transferred to storage tanks. Before being packed in kegs or bottles, the beer is filtered. When we think about these production steps in such detail, it is very likely that some of our readers – the true beer fans – can already smell and taste the beer. But there's much more to the process, so read on...

... WITH ZENON'S BATCH CONTROL TECHNOLOGY

Our brief description of the beer brewing process, taken from the "Deutscher Brauer-Bund" (German Brewing Federation; www.brauer-bund.de), illustrates the steps of a batch recipe taking place in different units of equipment. In each step, there are various important parameters which influence the final result, from the quality and quantity of the ingredients used, to the processing temperature and process duration.

Different recipe parameters enable different types of beer to be produced using the same equipment. If the same kind of beer has to be produced again and again, it is expected that each batch of beer will be identical. This is not only important because of strict legal industry-specific regulations, but also because true beer fans would notice any change in taste or smell to their favorite beer brand.

COST-EFFECTIVE FLEXIBILITY THANKS TO SEPARATION OF EQUIPMENT AND PROCEDURAL CONTROL

What does the new Batch Control in zenon bring to these industry and customer requirements? zenon follows the ISA-88 principle of separating the equipment and the procedural control. In other words, every equipment module – for example, the mash kettle, lauter tun, wort kettle etc. – have their own defined capabilities implemented in the first layer of automation (basic control). This might include transfer, mixing, heating, adding ingredients and so forth. These specific capabilities are used when the brewing procedure is exactly described within a recipe created in zenon as recipe phases (or operations).

This approach brings a high degree of cost-effective flexibility to production operations. Production teams can use the same production infrastructure for producing different sorts of beer without the need to change anything in the automation environment. How is this possible?

BENEFIT FROM TEMPLATES FOR REPEATABLE BEER BATCHES

Working with zenon, every member of the production team usually assumes a certain role, each with his or her specific competence and responsibilities. During system integration, the automation specialists establish the connection with the equipment, benefiting from zenon's exceptional connectivity. For the brewmaster, zenon provides the necessary software tools for creating master recipes which serve as templates for repeatable beer batches. The brewmaster creates a master recipe for every beer type. The brewmaster doesn´t need any specific automation knowledge to do this. The production steps are drawn graphically and the critical parameters are defined in order to be strictly followed later on. The production planning consists of creating the control recipes, based on the pre-defined master recipes. When the operator starts a batch in zenon, he uniquely executes a control recipe which already contains all the process parameters.

The Batch Control technology is fully integrated in zenon. This means that the brewing teams profit from all the components of a zenon-based solution, during or after the beer brewing process, such as:

- Process visualization
- Alarm & event management
- Trend curves analysis
- Batch reporting
- Communication with other production systems
- and much more

For the brewing teams, all of these functionalities will provide more accurate and easy control, cost-effective flexibility, reduced time-to-market and support for continuous and highly dynamic process optimization. System Integrators, on the other hand, benefit most from the following Batch Control functions within zenon:

- Engineering efficiency based on compliance with ISA-88 standards
- Open integration with new/existing infrastructure
- System reliability supported due to Recipe Execution Engine and exception handling
- Simple extensibility by using zenon´s network technology
- "Parameterizing instead of programming" for easy integration, commissioning and maintenance

Batch Control in zenon extends zenon's philosophy at the core of Food and Beverage manufacturing. Be a part of our success and our continuous open innovation process by sharing your feedback on product development and batch manufacturing using zenon's Batch Control with us! I am looking forward to hearing from you – e-mail me at *EmilianA@copadata.com*. ***Emilian Axinia***

"Batch Control in zenon extends zenon's philosophy at the core of Food and Beverage manufacturing"

Emilian Axinia, Industry Manager Food & Beverage

Figure 1: Batch recipes management in zenon.

Figure 2: Beer brewing process visualization and control in zenon.