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500 years of the German Purity Law

Automation for a cutting edge: from the traditional vat to the high-tech brewery

Traditionally, beer was simply brewed locally using age-old hand crafting methods. Today, the use of wooden vats and open fires has become practically obsolete, and the equipment used for this once common process is only to be found in museums. Modern breweries make use of high-tech plants which will provide the assurance of a consistently high standard of quality. Beer is brewed under the most stringent hygienic standards. The brewery technology for which Germany has gained a worldwide reputation has been continuously improved over the years: It was over three decades ago that Siemens first set the standard in the use of process control systems in the brewery industry with Braumat. Today, this state-of-the-art technology provides the assurance of reliable, qualitatively stable production in breweries everywhere.

This automation process allows a number of areas such as the brew house, cellar, filtration or energy generation to be simultaneously managed and visualized. All the processes used in the production of beer appear on a modern graphic user interface, allowing the brewer to conveniently monitor and control valves, pumps, measured values or controllers. Any faults can be quickly localized and remedied. The system focuses on efficient and effective recipe control, allowing craft brewers to individually collate and adapt their recipes with the utmost flexibility. This is a key criterion not only for large-scale breweries but in particular for small and medium sized operations too. The availability of varying types of hops, as well as different malt and yeast varieties is opening up wider choice to today's breweries.

The current trend for craft brewing is becoming ever bigger business. This movement originated in the USA, where pubs took a stand against the small number of dominant brands and have been brewing their own beer since the 1960s. The craft beer producers are small, independent brewers using traditional craft methods

to produce a small annual output of beer. The latest trend to conquer the craft beer industry is for products laced with a whole range of different flavors – from cherry through chocolate to citrus. Salty, bitter, fruity – there are no holds barred.

It is precisely here that individual recipe formulation and dispensing of ingredients come into play. “When it comes to flexible technology, fundamentally it makes no difference if we are talking about a large-scale brewery or a small craft beer production facility,” explains Gunther Walden, responsible for the Food&Beverage area at Siemens. “The system can be scaled to meet individual needs.”

The recipe for successful beer today: efficient brew house operation

The competition for market share in the beer industry is tough. Efficiency is the key to success. If there are new varieties to be produced and delivered rapidly in time for a change of season, for instance, then smart process control can make fast, flexible work of changing over both the production and filling process. This is a decisive competitive benefit for any producer venturing to explore something new – whether it be a new “bitter” variation within the guidelines of the German Purity Law or something more exotic from a craft brewery such as beer with gold flakes or cranberry flavor. Walden puts it in a nutshell: “To optimize their costs, breweries have no option but to improve their processes, and make them more transparent and flexible. Our answer is digitalization.”

Digitalization provides effective support for brewers in the form of sensors to monitor temperature and boiler pressure measurement and actuators to control valves used across the entire brewing process. By ensuring trouble-free and reproducible processes in the brew house, digitalization keeps the beer flowing reliably, with the process control system managing everything from filling levels in the fermentation tanks to the placement of orders for new raw materials.

“Breweries have become very creative, with seasonal Christmas or Easter beers, stronger beers and novelty flavors. The variety just continues to expand. In many cases, although overall capacity doesn’t increase, the number of different brews and product variants grows. So the challenge here is to ensure that the right label goes on the right bottle,” explains Walden. In terms of quality management, the issue of traceability and product safety is growing in importance as breweries seek to ensure compliance with regulatory requirements. Modules such as “Unilab” record quality

data and document sampling processes, enabling manufacturers to precisely verify the compliance of the beer in their tanks with stringent food legislation stipulations. For security reasons, the allocation of access rights has to be precisely defined. Data protection takes high priority, as in the food sector particularly, any manipulation could have fatal consequences.

Digital beer: automation is taking breweries by storm

Environmental considerations naturally also play a key role: The new technology is able to reduce energy consumption by up to 30 percent for each hectoliter brewed compared to more traditional plants. The same applies to the reduced use of process water: with up to 30 washing cycles performed on each bottle, there is plenty of scope for potential savings here.

In brief: Today's breweries rely on transparency and practical user guidance. "Although we can gather a huge amount of data, the most important aspect is putting it into context. This depends on determining its meaning and ensuring that intelligent connections are made. We offer the right tools to permit logging of aspects such as productivity per shift or energy consumption per beer type," summarizes Walden.

This background information and further material are available at www.siemens.com/press/500-years-reinheitsgebot

Contact for journalists:

Ines Giovannini

Phone: +49 911 895-7946; E-mail: ines.giovannini@siemens.com

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