

Technical Report

# Do not waste anything.

How sensors help the food industry save water and costs.



The food and beverage industry is a stable sector with above average future prospects. Yet it also has its own challenges to face:

- Everywhere, especially in Asia, the steadily increasing world population results in a growing demand for food and energy, which forces the manufacturers to increase manufactured quantities.
- Urbanization and the growth of the Middle Class lead to greater quality demands for food and beverages and increase the demand for aseptically packaged processed food and beverages.
- Environmental protection legislation leads to increased energy costs, fueling the interest in efficient production processes and energy-saving machinery that is optimized by intelligent technology.

Intelligent technology can help manage these challenges, especially when it comes to optimizing efficiency and resource utilization. A 2013 study on water consumption for the cleaning of beverage fill-

ing systems concluded that “in all breweries, regardless of size or age, considerable amounts of water and energy can be saved in some cases.” The efficient use of resources is increasingly also relevant for customers: A study on the future of food conducted by the Nestlé future forum found that “over 50 percent of study participants ... envisioned a future in which healthy eating habits are combined with the conservation of resources.”

The following example shows how beverage producers can save thousands of liters of water and cleaning agents annually by using modern system technology and suitable sensors.

## Clean-in-place for beverage filling

Whenever food manufacturers fill beverages they must regularly clean their systems with hot water and cleaning agents. This applies to pipe systems, tanks, as well as heating and cooling elements. This takes place at least once a day and up to 30 times in hygienically criti-



cal areas, at the latest when the beverage to be bottled is changed. This process is called “clean-in-place”. This allows the beverage manufacturers to remove microbes and remnant particles to comply with hygiene regulations without having to dismantle their filling systems. Especially with a drink like milk, which is extremely susceptible to perishing, it immediately becomes clear why this process is necessary.

At the same time, this cleaning process requires a large amount of water and chemicals, resulting in considerable costs. In addition, the manufacturers cannot fill beverages during the time in which the system is being cleaned. But how can time and money be saved in this process while maintaining the hygienic standards that are so important for food quality?



#### **Liquid analysis with a conductivity sensor**

A conductivity sensor can be a good answer to this question. According to its name, such a sensor measures the conductivity of liquids that pass through the system during the clean-in-place process, not only identifying the specific liquid, but also its concentration. Milk, beer, lemonade, hot and cold water, or cleaning agents all conduct electricity differently. Therefore, this conductivity is excellently suited for sensor-based monitoring of a beverage filling system. This way, all conveyance processes of beverages, water and cleaning agents can be specifically controlled and automated.

However, for additional savings of water and cleaning agents, speed is required in addition to measuring accuracy. Firstly for the detection of liquids to allow the controller to react quickly. And secondly for adjusting to changing temperatures. Because when the temperature of a liquid changes, its conductivity also changes. Ideally, such a sensor should therefore measure very fast not only the liquid but also its temperature, compensating for any differences to prevent them from affecting the measurements.

#### **More efficient control of the cleaning process**

This gives beverage manufacturers significantly better control of their cleaning processes and allows them to carry out the individual steps faster. This in turn saves them water and cleaning agents, as the system can detect much more quickly at which point all beverage



CombiLyz AFI

and cleaning agent remnants have been removed and at which point the concentration of the cleaning agent is low enough to reuse the so-called grey water rather than disposing of it. Each second counts to recommence filling as fast as possible after each cleaning process.

For this purpose, Granarolo, a leading Italian food manufacturer, relies on the AFI conductivity sensor of the Baumer *CombiLyz* product range. The inductive sensor complies with both 3-A sanitary standards and FDA regulations and is certified by the EHEDG, making it ideally suited for use in contact with food. In

addition, it offers high-speed temperature compensation. The use of the *CombiLyz* sensor allows Granarolo to save approximately 100 000 liters of water annually. Add to that the increasingly efficient use of cleaning agents that is not only good news for the environment but also the company's budget. Plus: Quicker cleaning cycles provide more time for the original purpose of the systems: the filling of beverages. All in all, a win-win situation for all involved.

**More information:**  
[www.baumer.com/CIP](http://www.baumer.com/CIP)



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