

Technical Report

Sensors – your optimisation friend.

Getting the balance right between an optimised process and product safety is a fine line that engineers have to walk every day. We spoke to Thomas Hedemark, Global Industry Manager at Baumer Group for advice on how sensors can help get this balancing act right.

What are the key design features that engineers should be looking for when specifying sensors for use in food production applications?

It is important that any sensor used in areas where they might be subjected to washdowns, are robust, resistant to chemicals and have a high degree of cleanability. This requires a small sensor footprint, smooth surface and angles that are easily cleaned – with no threads, buttons, screws etc.

Where a sensor may come into direct contact with food products it is good practice to choose both sensors and connections that are approved to 3A or EHEDG hygiene standards. Where the sensor is directly exposed to the product there will be contamination risk. Specifying an approved sensor means that the connection should not contain any features that would result in product penetration, debris being trapped or which would

encourage growth of microorganisms. Also, at the installation point, it is desirable to minimise stagnant/dead zones where product can become trapped and remain after the system is drained.

Baumer has developed a system that can reduce 'dead zones' inside the process to allow bacteria to collect and thrive and which can also reduce the costs associated with extended CIP cycle times to reach these dead zones and thoroughly remove all bacteria. See illustration below.

What role can sensors play in helping optimise a process?

As an example, fast temperature signals improve heating control on pasteurising systems. This contributes directly to limit energy waste as the product is not exposed to more thermal stress than necessary. At the same time it helps improve quality.

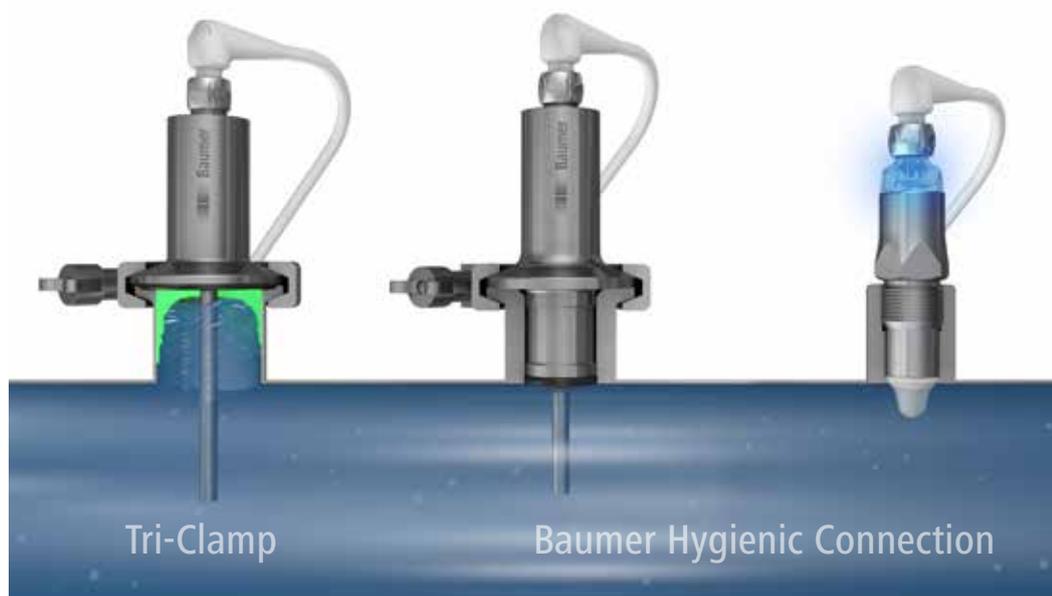


Illustration on how Baumer hygienic flush mounted connections are integrated to a process compared to the traditional tri-clamp. A heavy reduction in places for bacteria's to hide.



Baumer PFMH hygienic pressure sensor mounted onto a pipe. Front flush installation removes dirt traps to improve cleanability and actively reduce CIP cycle times.

Another example is high safety alarms on tanks, where light or heavy foam occur on open tanks – for example excess yeast tanks or CIP caustic tanks. Installing sensors that can reliably detect foam has led to less required maintenance (cleaning). Fast response time and fast temperature compensation can contribute to savings on the CIP return line and lead to water, chemical and energy savings too, as accurate and fast communication to the PLC is improved. Similar cases could be made for storage tanks, filtration systems, separation systems, UHT, homogenization etc.

Food processing systems rely heavily on the performance on the sensors installed both in terms of food safety and general optimisation. Also how sensors are installed plays an important role in terms of accurate and reliable measurements. Most sensors come with an installation manual and following these instructions will also contribute to optimisation.

Everyone is talking about digitalisation today – how can engineers start to future-proof their processes today to ensure they are IoT ready?

You could say that digitalisation starts with the sensor. Sensors precisely record many different measured values. Valuable additional information is already generated during the processing of the measured values in the sensor. Standardised digital communication interfaces such as IO-Link can be used to access that information and significantly improve business processes. Industry 4.0 and digitalisation are already opening up some benefits for the food and beverage industry. For example, predictive maintenance of sensors to avoid costly downtime. I am following the development closely myself and it will be interesting to see how digitalisation can contribute to an even more safe and efficient production in the future.

More Information: www.baumer.com



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