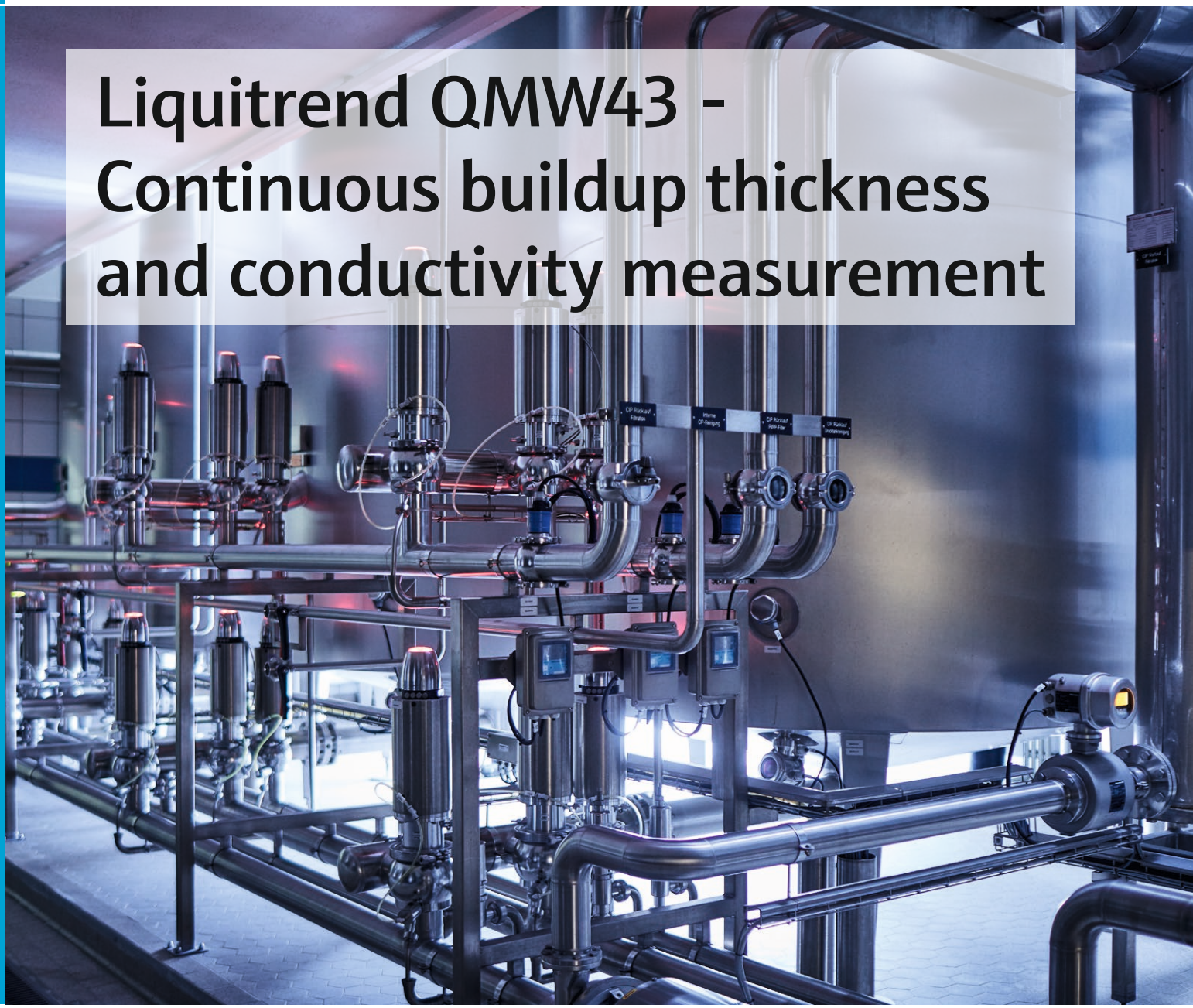
Success story

Increase productivity with dedicated CIP management



Liquitrend QMW43 - Continuous buildup thickness and conductivity measurement

Endress+Hauser
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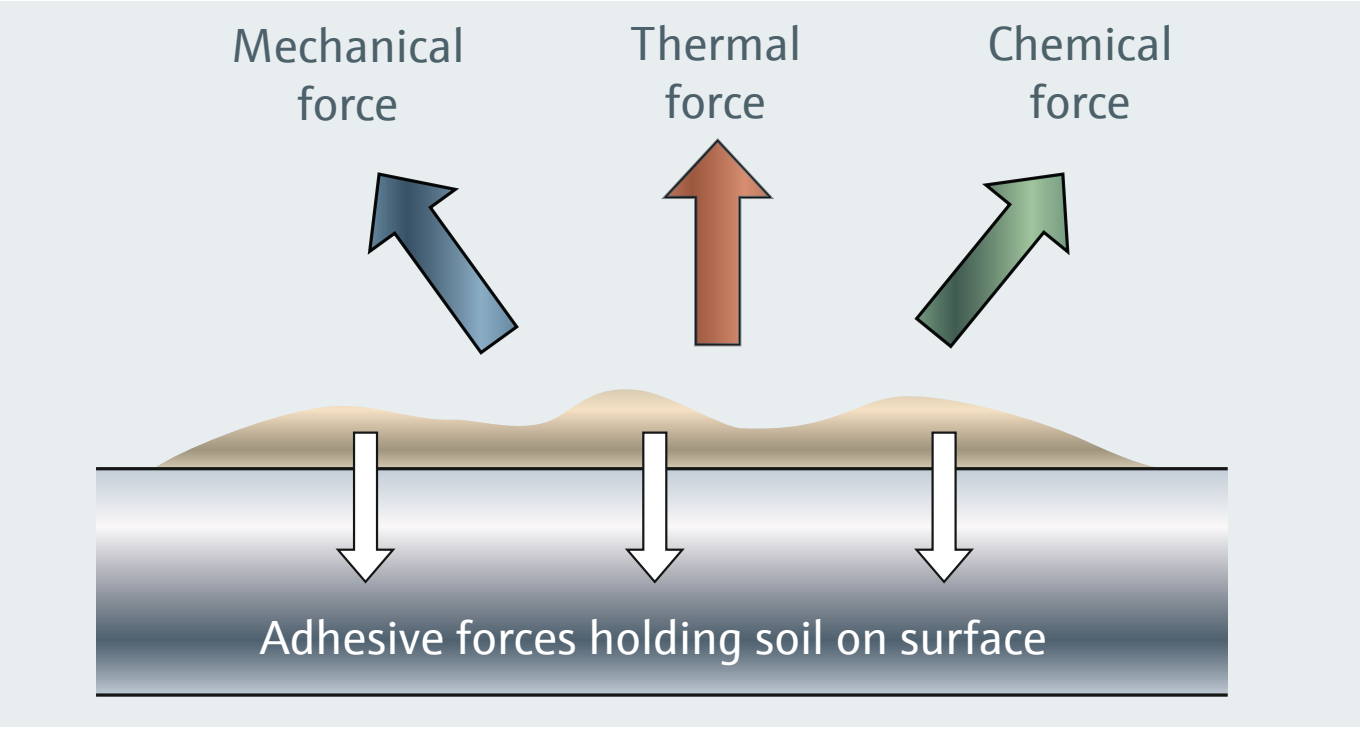
What does „Clean-In-Place“ mean and how does the process work?

Keeping a sanitary environment is a high priority in the food and beverage industry as it guarantees the production of high-quality and hygienic products for the end consumer. In order to achieve this and to remove product residues completely from tanks and pipes, plants are cleaned chemically, thermally and mechanically between different batches. The cleaning time is a decisive factor for an optimal cleaning effect.



Forces acting on the contamination during cleaning

Many of the manufacturing processes in the food industry take place in closed systems. When pipes or tanks are opened, there is a risk of contamination of the system through the ingress of bacteria. For this reason, Clean-In-Place (CIP) is used for automated cleaning in closed processes.

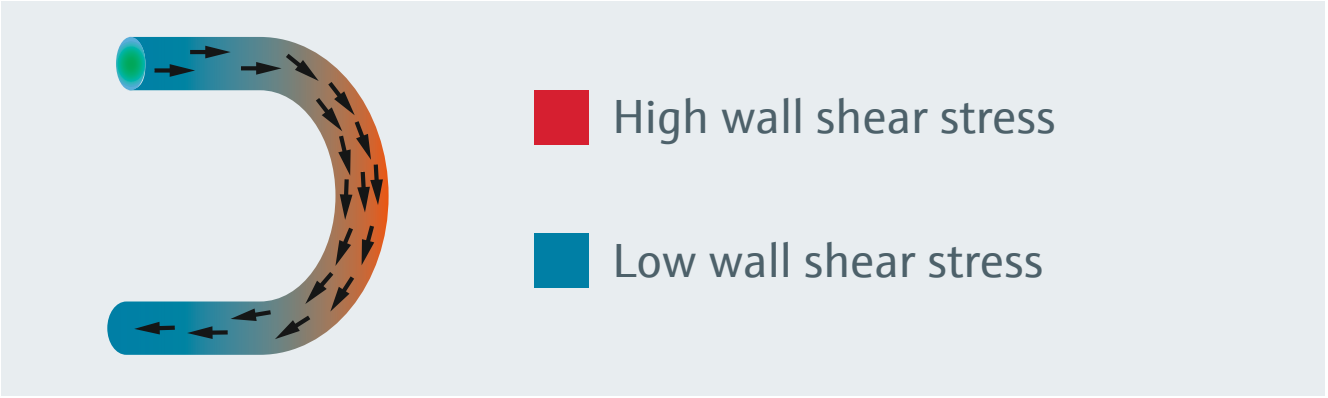
Typical CIP process steps

The cleaning agents are pumped through the pipe one after the other, as in the example, or distributed in the tank using spray nozzles or jet cleaners. Mechanical cleaning is carried out through shear force which is generated by flow velocities of at least 1.5 m/s.

What are the challenges of CIP?

Automated cleaning in a closed process ensures the plant is operation in sanitary conditions. The cleanliness of the plant cannot be assumed based on empirical values. Hygienic conditions must be verifiable.

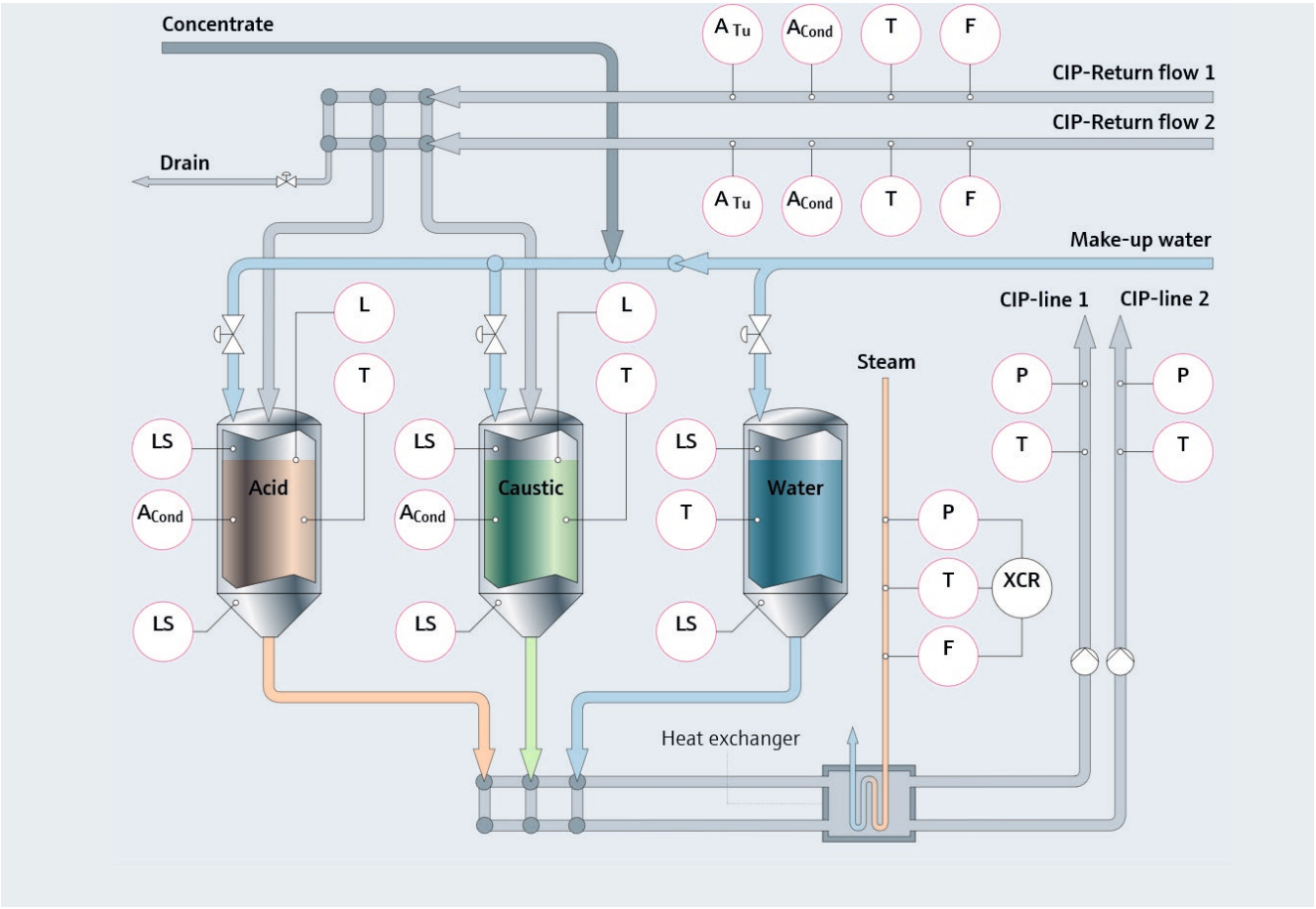
Mechanical factors can complicate the process. Pipe bends, for example, cause flow profiles that affect cleaning. These and other critical points must be checked separately whether the desired cleaning effect has been achieved. This is a challenge in closed systems and is even more difficult as residues vary from product to product depending on the media properties. Manufacturers often try to attain increased process reliability over longer cleaning cycles. However, they risk wasting cleaning agent, which increases disposal and energy costs.



Simulation of wall shear stress in a pipe bend

How is the successful cleaning automatically checked today?

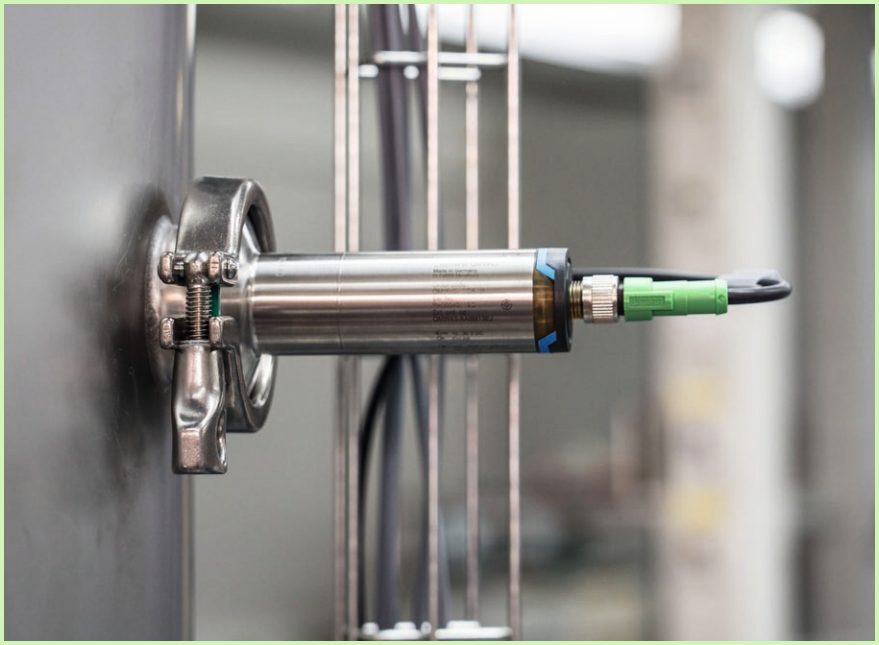
In addition to conventional measurement technologies, such as conductivity and turbidity measurement in the CIP return, the Liquitrend QMW43 measures the buildup thickness. Contamination on the sensor surface is continuously monitored before, during and after the cleaning process. Installed at critical points in the process, it verifies the cleaning status and provides information about the cleaning efficiency.



CIP Process

How does Liquitrend QMW43 increase the plant efficiency?

In addition, the evaluation of the conductivity measurement can be used to draw conclusions about the type of buildup, i.e. whether the residue comes from the produced product or cleaning agent. Thus, the Liquitrend QMW43 supports the plant operator in determining the cause of contamination. If the sensor no longer shows any buildup or conductivity, cleaning of the cortical point can be considered complete. This allows optimization of the cleaning process according to the actual conditions on the tank or pipe, realizing time and cost savings.



Installation of Liquitrend QMW43

Possible savings using an example from soft drink production

before	CIP cycle	1 x week
	CIP total duration	2.5 hours
	Product	soft drink (0.75 l / 20.0 oz bottle)
	Retail selling price	approx. 2.85 € / $ 1.99 per bottle
after	Time savings	about 15 min CIP time per cycle
	Increase of production capacity	2,830 l/99,600 oz soft drink per week (line size 2") or 147,030 l / 38840 gal. yearly
	Production plus	196,000 0.75 l / 20 oz soft drink bottles
	Additional turnover	550,000 € / $ 390,000

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