

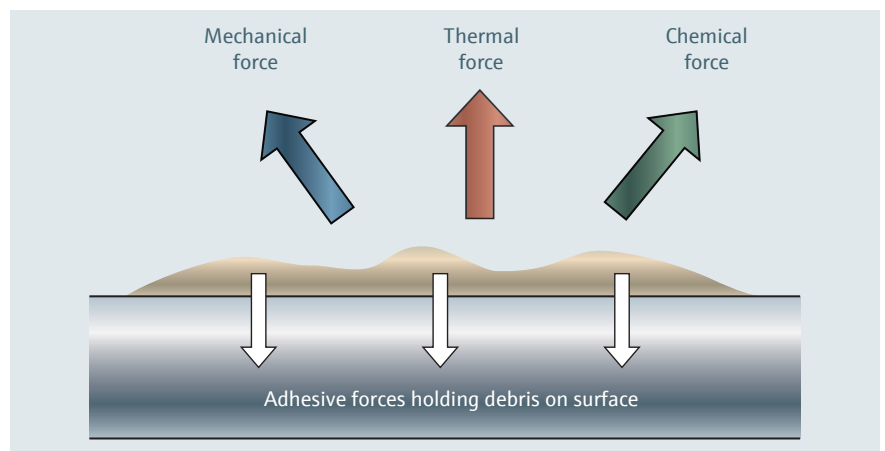
Liquitrend QMW43

Increase productivity with dedicated CIP management



What does 'clean in place' mean and how does the process work?

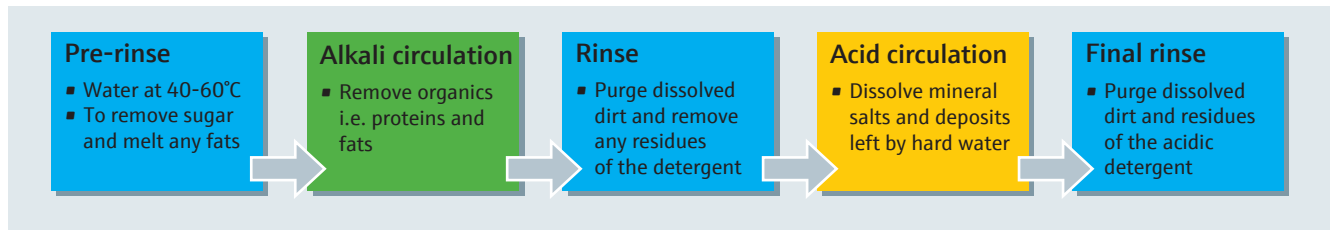
Keeping a sanitary environment is a high priority in the food and beverage industry as it guarantees the production of high-quality and hygienic products for the consumer. In order to achieve this and to remove product residues completely from tanks and pipes, plants are cleaned chemically, thermally 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.

The cleaning agents are pumped through the pipe one after the other, as in the example below, 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.

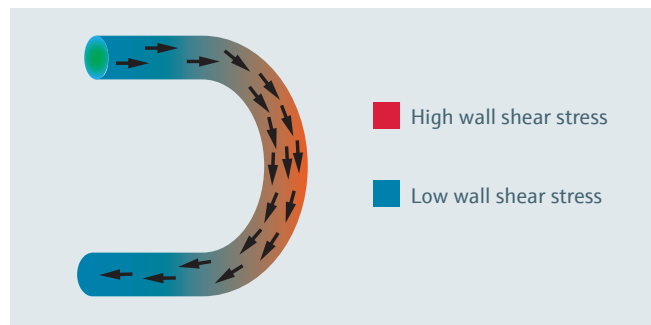


Typical CIP sequence

What are the challenges of CIP?

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

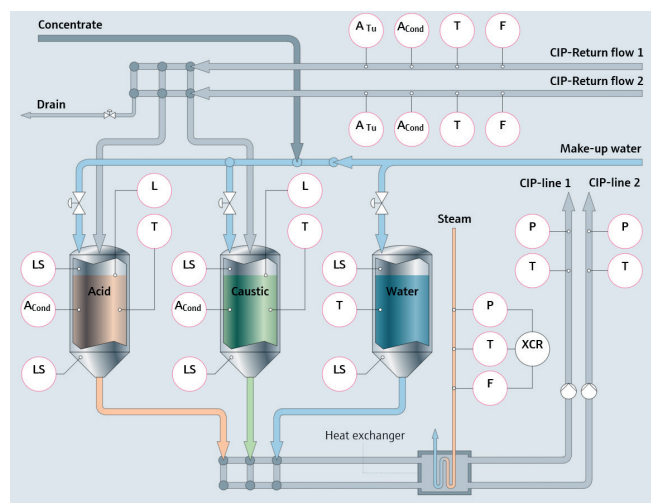
Mechanical factors can complicate the process. Pipe bends, for example, cause flow profiles that affect cleaning. These and other critical points must be checked separately to ensure the desired cleaning effect has been achieved. This is a challenge in closed systems and is even more difficult as residues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



Simulation of wall shear stress in a pipe bend

How is the cleaning process automatically checked and verified today?

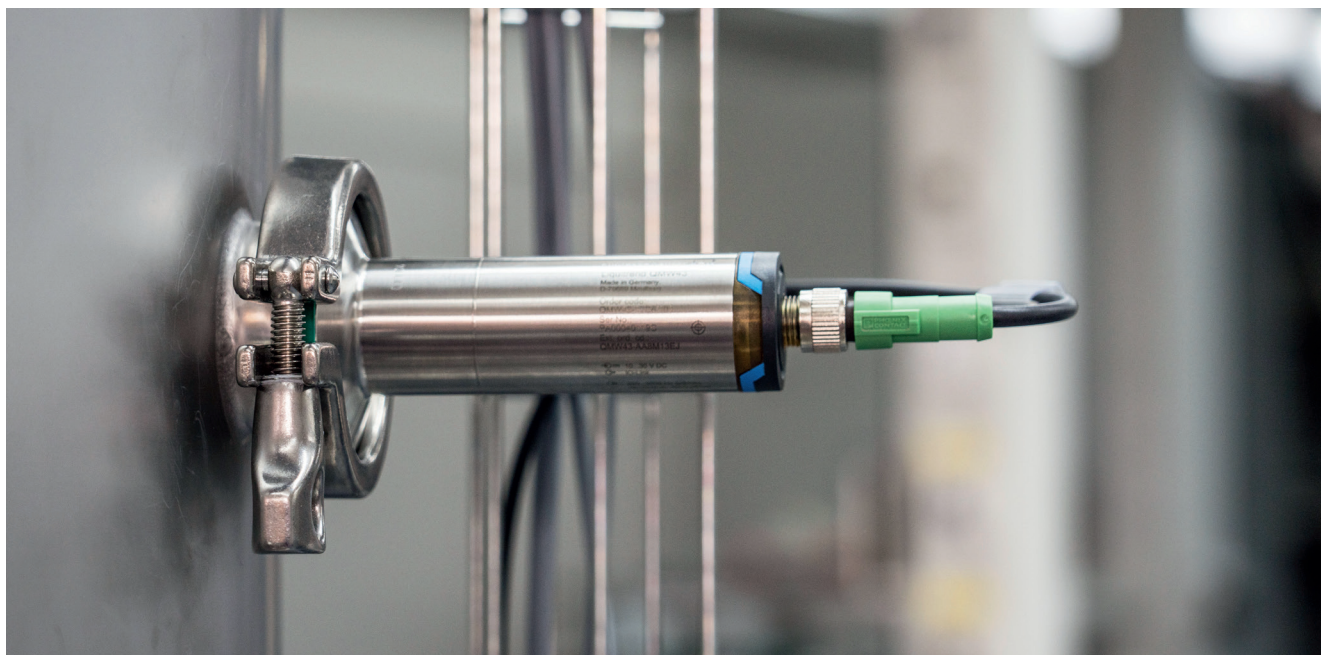
In addition to conventional measurement parameters, such as conductivity and turbidity in the CIP return, the Liquitrend QMW43 offers new possibilities to optimise cleaning time. The device is installed at critical points in the system, where it verifies the cleaning status and thus provides information about the cleaning efficiency. Liquitrend QMW43 measures the buildup thickness on the sensor. Contamination on the sensor surface is continuously monitored before, during and after the cleaning process. Due to the flush-mounted installation, the sensor represents the surrounding conditions in the pipe or tank.



Typical CIP system

How does Liquitrend QMW43 increase 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 product or cleaning agent. In this way, the Liquitrend QMW43 assists the plant operator in determining the cause of contamination. If the sensor no longer shows any buildup or conductivity, cleaning of the critical point can be considered effective. This allows optimisation of the cleaning process according to the actual conditions on the tank or pipe, realising 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 litre bottle)
	Retail selling price	approx. £2.85 per bottle

after	⇒ Savings of about 15 min CIP time per cycle using Liquitrend QMW43
	⇒ Additional production capacity of around 2,830 litres of soft drink per week (line size 2") , which equates to a yearly capacity increase of 147,030 litres.
	⇒ Additional production of 196,000 0.75 litre soft drink bottles and thereby an additional turnover of £550,000.



Find out more about our Liquitrend QMW43 online:
www.uk.endress.com/QMW43

www.addresses.endress.com

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