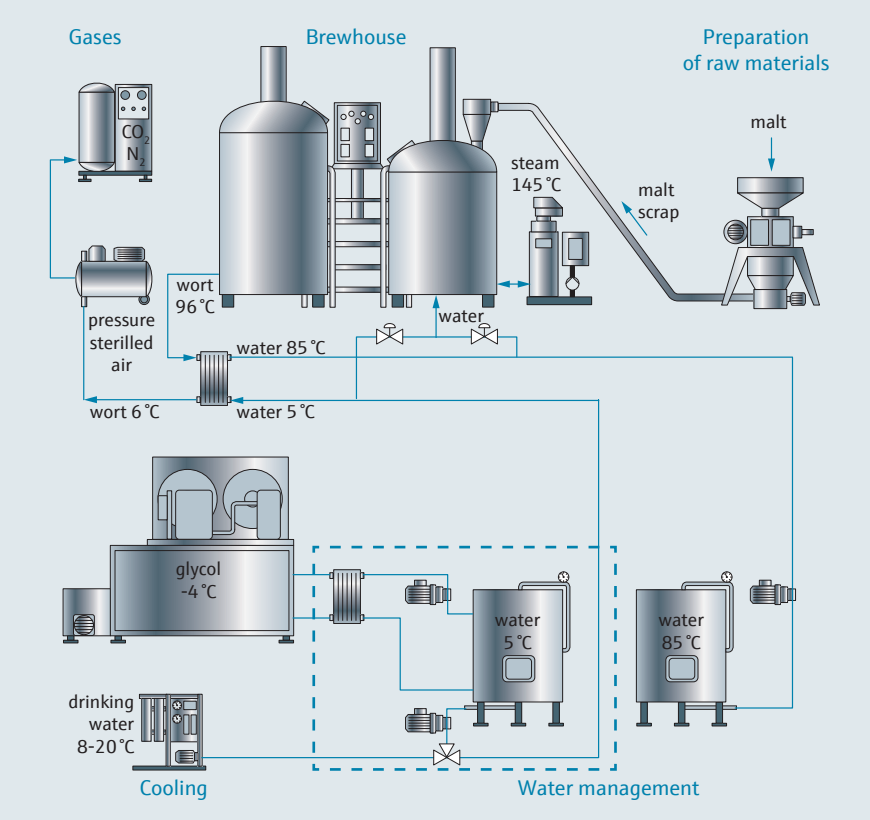
Liquitrend QMW43

Improve efficiency by optimizing the cleaning cycles of your water circulation system

- Check water quality by monitoring buildup signal behaviour during production
- Growth/low buildup levels can be detected
- Raise profit and turnover by > 70,000 Eur/year and prevent production stops

Customer process

A customer in the brewing industry uses cold water during the first stage of wort cooling. This water is required to be at a temperature 5 °C to maintain cooling efficiency. To have the water at the specified temperature, he uses a water circulation system which helps to maintain the water at 5 °C and prevents pipes from freezing during winter which might cause them to be damaged (burst). Generally, water used in circulation systems has low levels of chlorine to prevent pipe corrosion.



Schematic of customer process

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Customer Challenge

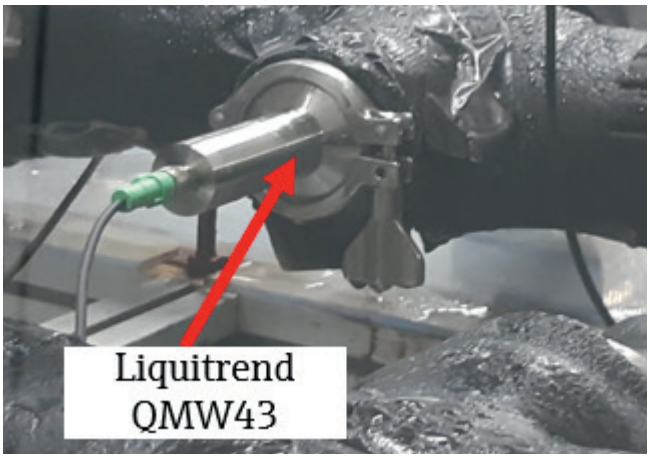
The absence of high levels of chlorine in water does not inhibite biological growth.
Additionally, scaling creates uneven surfaces in pipes which serves to harbor bacteria that can adversely affect the water quality. Accumulation of scales and biological materials in pipes can isolate installed measuring devices like temperature and pressure transmitters, hence affecting their accuracy.
In this case, customer often experienced the challenges highlighted above with respect to cooling efficiency and critical parameter measurements such as temperature, pressure, and microbiological state. He found that the displayed temperatures were often higher than the actual cooling temperature which caused the water to freeze in the pipe leading to pipe blockage. The pressure transmitters also displayed lower readings than actual. The dismantling and subsequent cleaning time affected plant availability and product quality.

How did the customer ensure a clean installation?

Given the above challenges, the customer instituted a periodic cleaning process which included descaling of the pipelines. To ensure pipe cleaning, the customer stopped production and drained the entire pipe network which contributed to water losses and downtime affecting plant productivity. The system was circulated with chemicals to remove deposits or scales. However, since the customer lacked the crucial knowledge that determined when to clean, he often either cleaned too early consuming expensive chemicals and taking up time that could otherwise be used for production or cleaned too late affecting critical quality parameters like water quality, temperature and pressure measurements. The customer also lacked the means to ascertain the cleaning effectiveness after cleaning. This required him from time to time to dismantle parts of the installation for visual inspection. This was a time consuming and expensive venture, which was the main reason why cleaning was often left too late.
Therefore, the customer was looking for a solution to tell him when to clean to prevent cleaning too late or too early.

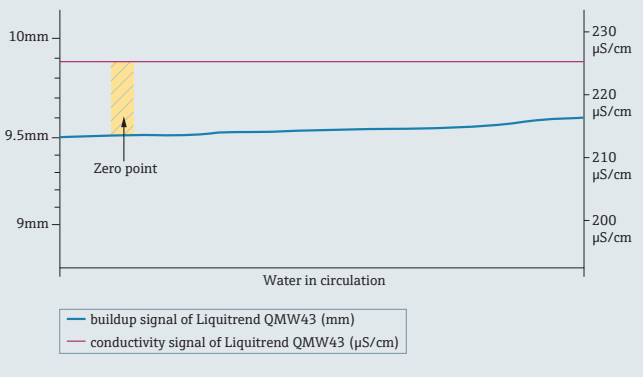
Installation of Liquitrend QMW43 to address the Customer Challenge

The Liquitrend QMW43 was proposed as a possible solution. The Liquitrend QMW43 is a smart new device which measures buildup thickness and conductivity in pipes and tanks using conductive and capacitance technologies. The Liquitrend QMW43 was installed in the water circulation system loop to monitor both buildup thickness and conductivity of the flowing media.



How was the Liquitrend QMW43 used in this application?

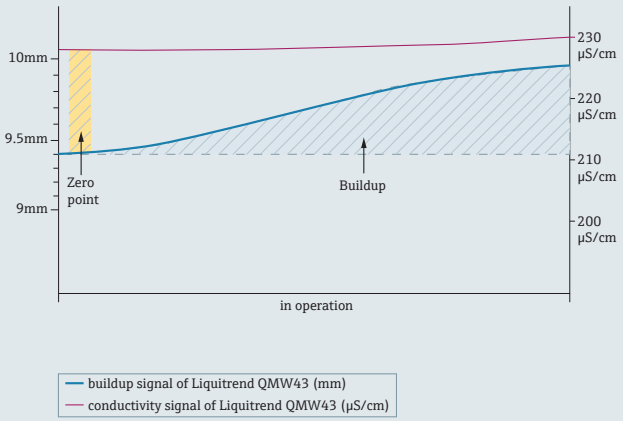
The entire installation was adequately cleaned after the installation of the Liquitrend QMW43 as was determined by the output signals (buildup thickness & conductivity) of the emptied clean installation which displayed 0.0 for both buildup thickness and conductivity measurement. The emptied clean installation was completed filled with water at 5°C with continuous circulation. The zero point/ base line values of the cleaned filled installation were determined (see picture on the right).



Buildup formation during water circulation

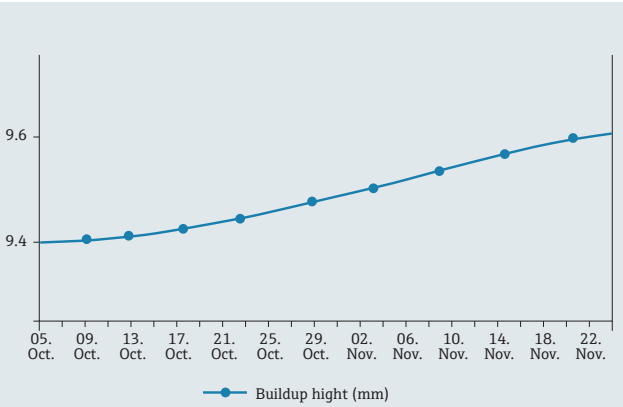
After two months of test, a slight increase in the buildup thickness was observed due to accumulation of deposits on the sensor and the pipelines. The customer wanted to confirm whether the buildup change represented an actual accumulation of buildup in his pipe so he drained the installation to do a visual inspection see the picture below. The deposit on the pipe surface was confirmed. Thus, using the Liquitrend QMW43, the customer was able to determine when the accumulation was formed and its severity without the need for manual dismantling.

Buildup of biological materials and scales



How to know when to act?

Monitoring the trend for buildup thickness during water circulation, the customer was able to determine that the rate of fouling increased after a two month period of time which was seen by an increase in the buildup thickness from the initial state of 9.4 mm (baseline state at full clean pipe) to 9.6 mm (buildup thickness of the soiled pipe) in a filled installation. Using the zero point/baseline as reference, the customer determined which buildup thickness was tolerable to prevent measurement errors and quality problems which was used as a trigger to initiate descaling and CIP. In this application the trigger point was set at a Liquitrend QMW43 buildup thickness measurement of 9.7 mm. Confirming accumulation of deposits which required CIP or descaling.



Conclusion:

With these signals, the customer was able to mirror the status of his installation by monitoring deposit accumulation during water circulation. He could ascertain the cleaning status without the need for manual dismantling after cleaning which increased plant availability. The customer also knew exactly when to stop for cleaning without the need for guessing which previously led to deterioration of the water quality especially when the cleaning was started too late. He also eliminated material (water and chemical) wastage due to cleaning too soon. Hence, the customer migrated to a status-based cleaning regime which was automated.

Savings and profit of using Liquitrend QMW43 for buildup monitoring in a water circulation system

	Values **before** Liquitrend QMW43		Values **with** Liquitrend QMW43
Dismantling/reassemmbly	2/year		–
Duration of dismantling/reassembly	75 min.		–
Persons for dismantling/reassembly	2		–
Manhour cost	100 €		–
Retail selling price product	1.98 €/L		1.98 €/L
Flow rate product (DN80 pipe)	29 m^3/hr		29 m^3/hr
Profit on product/L	0.7 €		0.7 €
Man **cost** dismantling/reassembly	**250 €/year**	–	–
–	–	**Turnover** by additional production time 1.25 h/year	**~72,000 €**
–	–	**Profit** by additional production time 1.25 h/year	**~25,000 €**

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