

Application report

Monitoring Water at an RO Plant in Breweries

Water - basic and major component of any beer

Breweries have different kinds of water supply:

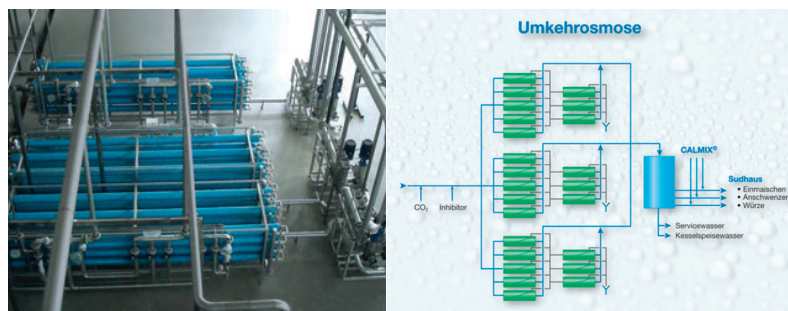
- 1) external water supply from the municipal water supply
- 2) internal water from deep wells or springs

The kind of water supply decides the water treatment and its monitoring.

In the case of brewing water, the degree of hardness plays an important role since it directly influences the flavour, colour and thus the overall type of beer.

To allow every type of beer to be brewed anywhere in the world, the treatment of water plays a significant role in breweries.

During treatment, the water can be adjusted to the necessary degree of hardness. Today's trend is the reverse osmosis plant (RO plants) which can be excellently automated and excel by high levels of efficiency.



Pict. 1: Reverse osmosis plant (RO plant)

Pict. 2: Diagram of the treatment of brewing water with an RO plant

Benefits

The company EUWA, a leading manufacturer of water treatment plants, explains in their information flyer on reverse osmosis plants: "What is therefore important for the smooth operation of a reverse osmosis plant is the sufficient treatment of the water. In addition to an absence of particles, which is assured by fine filters, the load of organic substances should not be too high. It has become more and more customary to place ultrafiltration before reverse osmosis, which significantly lowers the fouling tendency

of raw water. In addition, it is absolutely necessary to avoid the presence of oxidizing agents such as Cl_2 or O_3 since they would damage the membrane irreversibly as a result of the organic polymer structure of the membranes."

To ensure optimal economic operation of the RO plants, the membranes therefore have to be protected from particles and any excess organic load. Furthermore, it has to be made sure that no residual chlorine or ozone is present in the feed water.

The water measuring instruments AquaScat, ColorPlus 2 SAK and AquaDMS are particularly suited to monitor the necessary water quality.

Typical application

In the infeed of a reverse osmosis plant (RO plant), different parameters have to be monitored to ensure efficient operation.

These parameter are as follows:

- 1) Turbidity: if too much turbidity matter reaches the plant (the critical value is approx. 1 FNU), a premature blocking of the membrane occurs. An increase in cleaning cycles results and thus a decrease of the efficiency.
- 2) Dissolved organic content (SAK254): dissolved organic substances (more than approx. 10 E/m) also block the membranes and make a cleaning cycle necessary.
- 3) Residual chlorine Cl_2 and residual ozone O_3 (both should be $< 0.05 \text{ mg/l}$): if these reach the RO plant, e.g. by using municipal water without prior activated carbon filtration, the RO membranes may be irreversibly destroyed.

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Products

SIGRIST products for this application

- AquaScat 2 P (turbidity in bypass) or
- AquaScat S (turbidity in-line)
- ColorPlus 2 Bypass (SAK254)
- AquaDMS (with Cl_2 or O_3 sensor)
- Checking unit AquaScat 2 P
- Checking unit AquaScat S
- Optional: flow sensor
- Optional: water filter unit FEW4
- Optional: control unit SICON / M

Advantages of the SIGRIST AquaScat

Customer benefits

Optimized flow cell with self-cleaning effect (AquaScat P)

- less contamination and thus longer cleaning intervals

The absorber allows the use of the probe (AquaScat S) in various installation positions

- prevents the interference of the measurement as a result of tube reflections, in particular in case of stainless steel tubing

High sensibility

- reliable measurement of smallest amounts of solid matter in the mFNU range

Negligible zero drift

- long-term stable measurement

Re-calibration of the instruments with a secondary standard

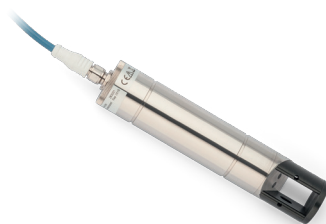
- allows precise re-calibration without the use of formazine
- no purchase, storage and managing of formazine

The design of the instrument ensures a long live cycle at minimum costs for our customers

- Very advantageous total cost of Ownership



Pict. 3: AquaScat 2 P



Pict. 4: AquaScat S

Advantages of the SIGRIST ColorPlus 2 SAK

Customer benefits

Internal compensation of window soiling

- constant and precise measurements

Little maintenance; instrument alerts the user once the flow cell has to be cleaned

- no fixed maintenance interval is necessary

Simple cleaning of the flow cell

- low maintenance costs

Checking of instrument with distilled water and checking unit

- no chemicals are necessary

Very high sensibility

- low detection limits

Influence of turbidity can be compensated with a second wavelength at 700 nm

- more precise measurements



Pict. 5: ColorPlus 2 SAK with SICON

Advantages of the SIGRIST AquaDMS

Customer benefits

Automatic sensor cleaning ASR®

- no manual cleaning is necessary
- no chemical detergents are necessary

- long calibration cycle

Flow stabilization Argon® Stabiflow

- No flowrate fluctuations
- Exact long-term measurement

Optional pH compensation

- Constant and precise measurements



Pict. 6: AquaDMS with Stabiflow

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