



**VOHREN WATERWORKS,  
WASSERVERSORGUNG BECKUM GMBH**  
**Iron content always under control**

Online analysis system with flow injection analysis for  
drinking water treatment

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FLUID CONTROL SYSTEMS

# Automatic water-sample switching reduces investment costs

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Water treatment is a demanding process, especially for drinking water fit for human consumption. Quality monitoring is therefore a top priority for public water utility companies. Quite often “manual work” is still needed: Samples are taken on site at the wells or treatment plant filters and then analysed in the laboratory. Online analysis systems, which automatically determine key parameters, can offer a great deal of potential for optimisation in this field. In close cooperation with the waterworks staff, Bürkert has developed a solution individually tailored to the drinking water treatment at the Vohren waterworks in Germany. The BürkertPlus service team was responsible for installation and start-up and trained staff on site.



## Did you know?

**The fully automatic switching block\* enables the monitoring of individual filter modules with just one measuring unit. This ensures that more detailed information about the water treatment process can be obtained without extensive investment costs.**

### Preparing for the future

The Vohren waterworks belong to Wasserversorgung Beckum GmbH, which employs around 40 people and supplies water to residents in an area of over 1,000 square kilometres in the district of Warendorf and parts of the districts of Soest and Gütersloh. In order to maintain the high-quality standards, both now and in the future, the waterworks decided to replace the time-consuming manual sampling process for water treatment monitoring with a more economical and low-maintenance analysis and monitoring concept featuring flat bed aerators and rapid filtration. "Firstly, we compared decentralised and centralised solutions, weighing up whether it made more sense to use analysis systems directly at each of the six measuring points in the works, or whether a central analysis station for all the filters was more viable for us," explains waterworks supervisor Matthias Schürhörster. It was also important to consider both the technical and financial aspects. On the one hand, automatic monitoring of the sampling points had to be implemented to relieve the burden on the workers and to guarantee high quality, also in the future. On the other hand, it was also necessary to minimise the work involved in installation and maintenance.

### Centralised analysis of water parameters

In the end, the solution did not come 'off-the-peg'. The central stainless steel cabinet for automatic water analysis has been in operation since December 2017. The backbone is the online analysis system Type 8905, which combines microfluidic system modules for continuous analysis of the main water treatment parameters in just one compact device. It automatically determines the pH value, turbidity and the oxygen and iron content in the outlet of the rapid filters. The modular water analysis system works with innovative MEMS technology (micro-electro-mechanical systems) and enabled replacement and expansion of the existing sampling points, thereby making measurements practical and future-proof. Unlike the glass probes widely used previously, the microchips do not require constant replacement. The extended lifetimes and long calibration intervals for the microchips help ensure maintenance-free and reliable operation.

## Flow injection analysis for determining the iron content

“Even the iron content is now determined fully automatically through modern flow injection analysis (FIA),” says a delighted Schürhörster. The FIA module for the analysis of the iron content now combines all the necessary components, including the controller, in the smallest of spaces. What was previously only possible in the laboratory is now done by the small, compact sensor cube of the on-line analysis system. The special feature is a comprehensive miniaturisation using microfluidic components: When using flow injection analysis, the reagent is added to the sample water via a pump. The microfluidic mixing section following the injection provides for even and complete mixing. The homogenous measured liquid then passes through a flow photometer that measures the absorption over time. The iron content can be determined photometrically from the detected peak-shaped signal and is then available for controlling, monitoring and documenting the water treatment process.



Microfluidics determine the iron content: Miniaturised FIA module for the online analysis system

## Device integration via EDIP

Communication takes place via the device EDIP (efficient device integration platform), which enables intelligent networking of all electronic Bürkert devices. Thanks to the digital monitoring concept, all the measuring parameters, switching intervals and settings – e.g. for self-diagnosis – can be displayed on a 7-inch touch display, adjusted and transmitted to the control system of the waterworks via a bus interface. As a result, all the analysis data is available at a central location. Filter contamination can thus be detected and removed in good time before the treatment process is disrupted.

**“Our investment costs fell significantly as a result, since we only needed one monitoring station instead of the six we would have required in the past,” explains Schürhörster.**

## Sample water changeover and automatic sensor cleaning

To ensure each rapid filter can be checked separately, valve switching was implemented for the individual samples. Water is thus fed from each filter to the analysis system and then switched between the individual lines by a solenoid valve.

Automatic switching could be implemented via the device's internal visual programming software; thus no additional programming was required at the PLC.

To minimise the level of maintenance, an additional cleaning unit was installed, meaning the analysis unit can now be cleaned in a time-controlled and fully automatic manner. Depending on the water quality, the sensors need to be cleaned at regular intervals in order to remove limescale, iron or organic deposits and, if necessary, recalibrated. The automatic cleaning system MZ20 carries out all previously 'manual tasks' independently and fully automatically.



The cleaning system cleans the monitoring units independently and fully automatically at routine intervals.

## Benefit

from fully-automatic measuring ...



### Reduced operation costs:

The investment costs were reduced significantly by cutting the number of measuring stations from six to one.



### Modular design:

Sensor cubes can be replaced easily via plug & play without impacting the work of the other cubes.



### Complete monitoring:


The acquired process data can be retrieved at any time and is available for controlling, monitoring and documenting.



### Relaxed start-up:

The Bürkert service team is by your side from initial installation to start-up and will also provide your team with training, upon request.





“The new analysis system ensures we are ready for the future, especially since we are able to integrate additional sensor cubes into the monitoring system via plug & play.”

Matthias Schürhörster, supervisor at Vohren waterworks

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