



Filterstraße 2

Oxidator 2

BROKSTEDT WATERWORKS

Modernisation in waterworks

Regulated air supply during iron removal
increases efficiency & quality

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

MODERNISED DRINKING WATER TREATMENT

COOPERATION WITH BROKSTEDT WATERWORKS

Drinking water is aerated in the waterworks so that the iron ions precipitate as iron hydroxide ($\text{Fe}(\text{OH})_3$) through oxidation reactions – i.e. form particles that can be filtered out. For this purpose, air or technical oxygen is added to the raw water. In many waterworks, the quantity is still an empirical value and is adjusted manually by the waterworks supervisor at great expense of time depending on the pressure and flow rate. There are not any health consequences of there being too much, but the water becomes bubbly white and either more technical oxygen is used than necessary or compressors run unnecessarily long. Both are costly. Underdosing leads to deposits in pipelines and containers and the result is high costs for the labour-intensive cleaning work. This can be remedied by automated control systems that adjust the amount of oxygen or air required for optimum iron removal to the iron content, the raw water flow rate and the pressure. Conversion to a cost-saving solution is possible during ongoing operation.

Did you know?

The new oxidation units were supplied as a complete solution ready for connection. They can be housed either in a stainless steel cabinet or on a mounting plate*, as in the Brokstedt waterworks.



“Old for new could be exchanged 1 to 1, everything worked immediately and has been working to our complete satisfaction ever since.”

Oxidation boxes for pressure-independent aeration

The Brokstedt waterworks in the Steinburg district of Schleswig-Holstein is designed purely as a groundwater plant with four 60m-deep production wells and has been in operation since 1978. It belongs to the water supply association (WBV) Mittleres Störgebiet and, together with another waterworks in Nordoe, supplies approximately 17,500 inhabitants in 33 communities with approximately 1.1 million litres of drinking and process water per year. Yet again, modernisation of water infrastructure and treatment are on the agenda.

At a trade fair in 2019, the waterworks specialists therefore approached Bürkert with their request.

Rolf Horstmann: “In this context, the removal of iron from our raw water also became an issue; we were looking for a more practical alternative for air input. We have had good contact with the fluidics experts for many years. In the previous manual compressor aeration, for example, their solenoid valves demonstrated their worth, and we also wanted to use German quality goods for a new, automated removal of iron with controlled air volume.”

The Bürkert Systemhaus in Menden designed oxidation units for iron removal that were matched to the application and are now installed on each of the three raw water sections. Despite the dynamic behaviour of the water, they ensure that aeration is always precisely dosed, regardless of the state of the filter and, above all, the primary pressure of the raw water, which can vary significantly depending on the number and type of well pumps currently running. Since the air is supplied according to demand, compressor running times and thus energy costs are reduced. The customised control system prevents expensive overdosing and ensures consistent water quality, so nothing has to be adjusted manually anymore. The repro-

ducible, documented process prevents deposits in lines and containers, which significantly reduces cleaning work.

Mass flow controller, proportional valve and water protection system

The mass flow controllers (MFC) are at the heart of the oxidation unit. They take over the “intelligent” regulation and dosing of the air volume. Their thermal MEMS sensors ensure very short response times, a direct acting proportional valve as the actuator ensures high response sensitivity and the integrated PI controller offers excellent control characteristics. The MFCs are calibrated for specific applications and are combined with further components depending on the application. Since conventional systems are often damaged by water pushing back in the event of a compressor failure, Bürkert MFCs are designed to be very robust and are additionally protected with a water protection system. A bypass for manual operation is also integrated. This means that even if the MFC or controller fails, the system can continue to be operated manually and system downtime is prevented.

The new oxidation units were supplied as a complete solution ready for connection on a mounting plate. The dimen-



Rolf Horstmann: “Old for new could be exchanged 1 to 1, everything worked immediately and has been working to our complete satisfaction ever since.”

sions of the plate were chosen to fit into the cabinets already present on the raw water sections. This makes the installation and start-up of the control and dosing systems quick and easy.

Valve island – compact, secure & intelligent

The valve islands, which are responsible for the pneumatic control unit of the process valves and flaps in the waterworks, also had to be replaced at the end of 2019. They were in use for more than 20 years; there were always breakdowns and the procurement of spare parts became increasingly difficult. A failure of these important automation units would have shut down the waterworks. Bürkert supplied a future-proof replacement with the very compact valve islands Type 8652. They were installed in robust control cabinets that could be easily placed at the plant thanks to their small dimensions (W/D/H: 400x210x500



mm). A total of six of these cabinets are now installed close to the process valves.

Old for new – quickly exchanged

The standard AirLINE Quick adapter plate made installation easy and reduced the use of pneumatic hoses and cables, saving costs while minimising potential leakage points. The automatic monitoring of pressure, wire breakage and slide travel times detects defects before system failure occurs and thus increases safety. Error messages are shown in plain text on the display in a user-friendly manner. In addition, there is a manual override and the individual valves can be replaced during operation. The valve islands communicate with the higher-level controller and the control system of the waterworks via Profinet.

The start-up of the new valve islands also went smoothly. The automation company commissioned with the project was also pleased with the good cooperation. Bürkert coordinated the software and protocols with them in advance. As plug-and-play complete solutions, the new valve islands could be integrated into the plant and put into operation within a short time without disturbing the drinking water production. While one water section was being converted, operations on the others continued without interruption.

Benefit

from an optimised and cost-effective air input:



Increased precision:

Always precisely dosed aeration despite dynamic water behaviour, regardless of the filter status and, above all, the primary pressure of the raw water.



Process reliability:

Thanks to very robust MFCs and a water protection system, even a compressor failure will not damage the system. A bypass enables manual operation in the event of a malfunction.



Reduced costs:

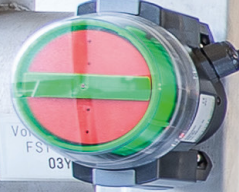
No expensive overdosing and consistent water quality without manual adjustments.



Everything from a single source:

Customised, reliable and intelligent solutions from engineering to start-up.

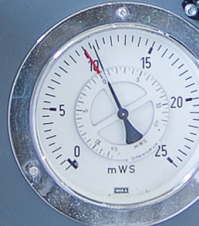
Filter 2



Differenzdruck Filter 2 03LT12

Spülwasserklappe FS1 03Y21

Spülwasserklappe FS1 Filter 2 03Y24



Reinwasser Vor



Absenkungsklappe FS1 Filter 2 03Y26

Spülwasserklappe FS1 Filter 2 03Y28

“Despite the installed technology, the new solution is very clear and easy to operate by every employee, e.g. in the event of a malfunction. An additional rotameter shows everyone at a glance whether everything is working reliably“

Rolf Horstmann, waterworks supervisor at WBV Mittleres Störgebiet



WE LEARN FROM YOU
EVERY DAY – ALSO WITH
CREATIVE THINKING.

WHEN IT COMES TO DEALING WITH LIQUIDS AND GASES, BÜRKERT HAS BECOME A SOUGHT-AFTER PARTNER ALL OVER THE WORLD.

WHY?

PROBABLY BECAUSE WE HAVE BEEN LEARNING FOR AND FROM OUR CUSTOMERS FOR MORE THAN 75 YEARS NOW. THIS ENABLES US TO ALWAYS THINK THAT CRUCIAL STEP AHEAD. OR EVEN AROUND THE CORNER.

Are you looking for a partner who is on your wavelength? We look forward to your challenge.

Bürkert Fluid Control Systems

Christian-Bürkert-Straße 13–17
74653 Ingelfingen
Germany
Tel.: +49 7940 100
info@buerkert.de
www.buerkert.de

Burkert Schweiz AG

Bösch 71
6331 Hünenberg ZG
Switzerland
Tel.: +41 41 7856666
info.ch@buerkert.com
www.buerkert.ch

Burkert Austria GmbH

Diefenbachgasse 1–3
1150 Wien
Austria
Tel.: +43 1 8941333
info@buerkert.at
www.buerkert.at

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS