FRIEDRICHSBERG WATERWORKS

Clean drinking water

Highest water quality thanks to
permanent diaphragm monitoring

We make ideas flow.

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Reliable operation thanks to fully-automated sampling

COOPERATION WITH THE CITY OF PFORZHEIM

Water is the elixir of life and its quality must be protected, both now and in the future. In reverse osmosis and nanofiltration plants for drinking water treatment, high-performance filter diaphragms perform several important tasks simultaneously, such as removing microorganisms, particles, salts and other substances. Therefore, safe monitoring of their correct operation is essential for high water quality and reliable service. The public utility company Stadtwerke Pforzheim uses a scalable and flexible permeate monitoring system for its new reverse-osmosis plant that detects, documents and flags up even the smallest of leaks or diaphragm ruptures in the shortest possible time. This not only guarantees clean drinking water at all times, but also saves the plant operator the time-consuming job of manual water sampling.

Did you know?

A trend report* that provides information on the diaphragm integrity of the individual pressure pipes can be prepared for each pipe separately. This allows problems to be quickly located and rectified and unscheduled plant downtime to be avoided.


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“The investment has paid off, as the system saves costs in the short, medium and long term due to higher plant availability and reduced inspection and maintenance expenditure.“

Time-consuming manual measurements are a thing of the past

Reverse osmosis is a physical process for concentrating substances dissolved in liquids whereby the natural osmosis process is reversed through pressure. The reverse osmosis plant at the waterworks in Pforzheim consists of two lines, each featuring 20 filter modules of 1 m in length in which the wrapped membranes are located. With a yield of 80% permeate and 20% concentrate, almost 300 m^3 of desalinated and purified water are produced per hour in order to ensure reliable drinking water quality. The decisive factor for filtration is that the wrapped membranes, connectors and seals do their job perfectly. If correct operation is adversely affected, it is important to react promptly, as unwanted substances may enter the drinking water in the event of a membrane rupture. As a rule, conductivity is measured by means of a permanent online measurement in the permeate manifold. Since the “dilution” of leakage water due to the permeate is very high, defects are only detected at a very late stage. In addition, the pressure pipes are regularly checked through manual measurements, the values are entered into the computer system by hand and the condition of the membrane is subsequently assessed. This is extremely time-consuming for the on-site plant operator.

Increased safety through early detection of membrane damage

Acting on a recommendation of Technologie Zentrum Wasser (TZW) in Karlsruhe, an expert partner in all aspects of water quality, including that of drinking water, and water technology, Stadtwerke Pforzheim decided to install Bürkert’s permeate monitoring system in their new drinking water treatment plant. Instead of the usual measurement in the permeate manifold, this monitoring solution now monitors the operation of each individual filter module fully automatically and detects even the smallest of leaks that would previously have gone undetected, or would have only been detected at a very late stage. The complete system provides all of the hardware and software required for this purpose.

Permanent plant monitoring for predictive condition assessment

The permeate monitoring system automatically samples the water from the 40 pressure pipes of the reverse osmosis plant, one after the other, to carry out a water analysis. Whilst one pressure pipe is being inspected, the next water pipe to be sampled is rinsed. This helps to avoid down times, and minimises the sampling water used, while ensuring almost permanent monitoring of drinking water quality. The system measures various parameters, including conductivity, turbidity, pH value and chlorine content, and triggers a warning if the set thresholds are exceeded. Since all measurement data is recorded, membrane ruptures can also be detected at an early stage using a trend analysis.

The Friedrichsberg waterworks is the oldest and largest waterworks belonging to Stadtwerke Pforzheim. The extension to the original building conceals cutting-edge technology: In 2018, an ultrafiltration and low-pressure reverse osmosis plant was added to the waterworks.

Since the permeate monitoring system is based on valve terminal Type 8640, it is highly scalable and suitable for small to large plants in which up to 200 pressure pipes may be monitored in one control cabinet.

Easy installation and integration

Installation of the online analysis system was very fast thanks to pre-assembled control cabinets and defined interfaces. All common interfaces are available for integration into the plant-specific communication system. In Pforzheim, the permeate monitoring system communicates via a Profinet interface with the higher-level control system of the drinking water treatment plant. This means the relevant employees always have an overview of the state of the filter modules.

Preventive maintenance reduces operating costs

The solution has demonstrated its value in terms of operations. The fact that it is possible to react faster to any possible issue with the filtration membranes impressed the employees of the waterworks. Manual sampling and entries into the computer system can now be dispensed with fully. The new permeate monitoring system also completely eliminates the need for lengthy troubleshooting in the event of a leak.

Take advantage

of fully-automated sampling:

Reliable processes:
The monitoring solution monitors the function of each individual filter module fully automatically and detects even the tiniest leaks at an early stage.

Greater operational reliability:
An automatic warning is triggered if the set parameter thresholds, including conductivity, turbidity, pH value and chlorine content, are exceeded.

Reduced time and costs:
The complete system ensures the time-consuming job of manual water sampling is no longer required.

All from a single source:
The complete system provides all of the hardware and software required.


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