HydroGroup

Edition 29/2018

Water News

WATER TREATMENT

Reverse osmosis system with retentate treatment

The new low-pressure reverse osmosis system (LPRO) with retentate treatment was officially put into operation at the Oberwald groundwater works in Sandweier, Germany, in early August 2018. Since then, the southern German city of Baden-Baden has largely been supplied with PFC-free drinking water. Activated carbon filtration rids the concentrated retentate of PFC before it is fed into the discharge system. This is probably the first time that this process technology has been used in such a configuration in Europe.

Low-pressure reverse osmosis system (LPRO) to soften and remove PFC from water

Under normal circumstances and in the winter months, up to 80% of water requirements for the some 55,000 inhabitants of Baden-Baden are covered by soft spring water. In summer, flows from springs are greatly reduced, so harder groundwater is needed to cover up to 90% of water requirements.

The use of spring waters and groundwaters with different hardness levels means there are two supply zones with varying water quality. When PFC was detected in different deep groundwater catchment wells in summer 2013, the municipal utility company needed to expand its existing concept plan for a groundwater softening facility to include a low-pressure reverse osmosis system to reduce PFC. This required a significant increase in treatment capacity and, consequently, filter performance to ensure that drinking water supply would be available even in the event of a breakdown.

Retentate disposal posed a particular problem. In the end, retentate treatment with activated carbon in the reverse osmosis downstream was decided as the best solution.

The existing pre-aeration and deacidification system and the technologically antiquated open sand filter system were decommissioned in 2014/2015 for technical reasons. They were replaced with a closed, fully automatic pressure filter system with six filter systems by Hydro-Elektrik GmbH. The maximum treatment capacity for the ten filters is 1,500 m³/h. The pH adjustment system comprises regulated, downstream flatbed aerators.

The existing buildings were in a good state and have been extensively reused. The largest building contained the open filter system, which was taken out of service once the new pressure filters had been commissioned. The space above the filters, partially recessed into the floor, was more than enough to house both the deacidification systems and the nanofiltration systems. An end-to-end bearing structure made of structurally dimensioned steel girders has been installed over the filter walls for this purpose. The old system's backwash pumps and blowers were demolished to make way for retentate treatment piping, the CIP system and the anti-scalant dosing system.

Treatment in the NF system has been designed to achieve a hardness within a range between 8.0 and 10° dH after processing and completely PFC removal downstream from the system with a permeate treatment capacity of 600 m³/h. Variations in volumes of up to about 20% also needed to be taken into account. The treatment capacity was divided between six racks, each with a permeate capacity of 100 m³/h and a maximum feed of 125 m³/h. A maximum yield of 80% was determined due to the downstream retentate treatment and the long discharge pipe to minimise the risk of efflorescence.

Thanks to a design with pioneering pressurised system pipes, highly space-saving modules were created during on-site installation. The racks are highly accessible all the way round and thus operator- and maintenance-friendly thanks to the raw water feed to the systems beneath the bearing structure and the pipelines for permeate, retentate and CIP above. Optimally efficient vertical centrifugal pumps have been fitted and operate via frequency converters.

The power distribution and switchgear assembly for the NF racks have also been positioned in the filter room. The power distribution and switchgear assembly for the deacidification and pressure filter systems have been installed in an intermediate building. Both switchgear assemblies communicate with one another via a glass fibre cable and can be fully monitored and controlled on the 15" touch panel built into each switchgear assembly.

The activated carbon filters for retentate treatment have been placed outdoors. Three filters have been installed, although a maximum of two are operated at the same time. The third filter is not switched on until one filter is no longer effective. The water volumes channelled via the filters are measured and recorded on a continuous basis as are the retentate volumes released into the Sandbach brook. The filters feature thermal insulation and are equipped with connections to flush out used activated carbon and jet in the new carbon.

The nanofiltration system was built as a joint project within the HydroGroup®. Hydro-Elektrik GmbH produced the stainless steel pipelines, the filtration system, the NF racks and the switchgear assembly. RWT GmbH manufactured the dosing technology and the CIP station for membrane cleaning, including all polypropylene pipelines, in a very narrow time frame of around a mere six months. That is a masterly achievement for a system of this size.

More info: https://www.hydrogroup.biz/media-center/specialist-reports.html

DRINKING WATER TREATMENT IN NORWAY

Filter system to demanganise drinking water

Owned by the Norwegian municipality of Ringerike, the Kilemoen waterworks currently supplies drinking water to some 24,000 inhabitants in the area. Conveyed from six groundwater springs, the water has a heavy manganese content and is processed in a new treatment system with a capacity of up to 225 l/s.

The existing system consisted of an aerator to add oxygen and deacidify the water. This caused oxidised manganese dioxide to be deposited in the storage tank, bringing about malfunctions and requiring the system to be flushed out. As the manganese content increased over the years and the maximum limit for manganese in drinking water was exceeded significantly, the municipality of Ringerike decided to build a new waterworks.
Hydro-Elektrik managed to impress with its convincing concept based on state-of-the-art systems engineering in the bidding process for the new system. The treatment process comprises ozonisation to oxidise the water with downstream filtration. The two modular ozone generators in a redundant design produce ozone at a rate of up to two times 720 g/h. The oxygen required to generate ozone is produced directly on site using Hydroxymat systems in three redundant lines.
Filtration is provided via ten stainless steel multistage filters, 3.2 m in diameter and 4 m high. An added layer of calcium carbonate has been installed for deacidification. Used deacidification material is refilled fully automatically from a storage silo. Disinfection completes the process in three parallel UV systems.
The plant has been connected to the network since Monday, 19 February 2018, and reliably supplies drinking water to consumers.
Hydro-Elektrik AS supplied the complete processing plant, including the associated plant control system.


Demanganisation filter systems

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WATER TREATMENT IN INDUSTRY

Two-line ion-exchange desalination system

RWT GmbH designed, manufactured and delivered a desalination system divided into two lines with a capacity of 160 m³/h for an Indian client. Based on ion exchangers, the system is fully automated and is operated on a visualisation panel.

The treated process water contains both key organic compounds for the production process, corresponding to 1–3% of the volume, and undissolved substances, such as suspended substances, dissolved anorganic salts and other organic compounds which inhibit the process.
In its first step, treatment comprises a filtration stage with cartridge filters to eliminate undissolved substances, such as suspended constituents, from the process fluid. The dissolved anorganic salts are removed in a floating bed process in a counter-current system with anion-exchange resins, providing a residual conductivity of less than 5 µS/cm. Disruptive dissolved organic compounds are removed in anion exchangers. Due to the high organic load, the anion-exchange resins must be treated with pre-heated regeneration water and intensive sodium hydroxide solution and sodium chloride.
A special feature of the system is that the required organic compound remains in the water during treatment and as much process liquid as possible is recycled during the regeneration and flushing intervals.
The entire system, including pipelines and cabling, was pre-assembled in the Gütersloh plant and the electric and hydraulic installations for individual system processes were tested (FAT) to ensure the system installation and commissioning time would be as short as possible on site. After the FAT, the system was disassembled, packed and transported ready to be reassembled and commissioned under the instructions of a supervisor on site.


Pre-assembly in the plant

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INFO

Construction progress at Tannheim location


Late November 2018

Scheduled completion of the extension:
1st quarter 2019; the office building: 2nd quarter 2019.

FACEBOOK AND INSTAGRAM

You will now find HydroGroup® not only on Facebook (HydroGroup), but also on Instagram (hydrogroup_rav).
With this presence, we have thus added another digital medium to complement our website. You can gain insights into current projects with engaging information and photos or into activities at the Hydro locations in Ravensburg, Tannheim, Gütersloh and Bergen. Just pay us a visit. We'll keep you up to date with news.
Share, like, write to us. See you soon on social media!

IMPORTANT DATES

24. Januar 2019
TIEFBAU-FORUM 2018
Donauhalle (Ulm exhibition grounds), Ulm, Germany - Civil engineering exhibition and seminar

5.-8. November 2019
Aquatech Amsterdam 2019
Amsterdam RAI, Europaplein, NL-1078 GZ Amsterdam - Trade show for process, drinking and waste water

LEGAL INFORMATION

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