

PROJECT INFORMATION

New building and renovation of the Arzheim elevated tank in Landau

Built in the 1960s and already renovated numerous times since, the elevated tank in Arzheim is the largest tank in the Landau (southern Palatinate) supply area.

For reasons of ensuring a continued supply, it was therefore also necessary to maintain operation of the tank system during the new construction work. The total of three stainless steel tanks therefore had to be fabricated at different times, namely during the winter half year in each case because this is the period when water consumption is at its lowest. Only the shell remained of the old tank system during the core removal, with the two new tanks being given an outer facade to match the appearance of the existing tank.

The stainless steel tanks fabricated on site have a capacity of 1x3000 m³ and 2x1500 m³. This equates to a total water capacity of 6000 m³.

In the first phase of construction, two additional



stainless steel tanks 15.75 metres in diameter and with a capacity of 1500 m³ each were set up initially, before being integrated into the system both electrically and hydraulically. The tank system with its state-of-the-art air filtration technology was

IMPORTANT DATES

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ready for start-up at the beginning of 2014, and replaced the concrete tank that was still being used at that time. The third stainless steel tank measuring 24 m in diameter and with a volume of 3000 m³ was then built in the modified old water chamber.

All three tanks were fitted out with the patented high-pressure cleaning system for floor and roof cleaning. The high-pressure unit required for this, with a capacity of 87 l/min at 120 bar, was specially developed by the Hydro Group. All tanks are fitted with safety valves to safeguard against overpressure and negative pressure.

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New deferrisation system for the community of Oberdischingen

For over 50 years, the community of Oberdischingen has been using water from an artesian well as its drinking water supply. The waterworks with an old deferrisation system was no longer suitable for renovation and needed to be replaced. During the construction work, the water supply was temporarily maintained from the neighbouring water board via a connection line. The entire process plant with a capacity of 36 m³/h was set up by Hydro-Elektrik GmbH.



The oxygen-depleted well water containing iron must be enriched with oxygen for the purpose of oxidation. The oxygen is produced on site with a Hydroxymat 15. Following oxidation, the water is filtered via a TWK 40/36 (D = 1900 mm, H = 3000 mm). The treated water is temporarily stored in a stainless steel tank and is then fed to the elevated tank by means of two pumps (28 m³/h at 60 m elevation). The tank is also used for storing the required backwash water for filter reverse-flushing. The entire stainless steel system was set up in a timber building.

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Ølve waterworks in Kvinnherad

Another system incorporating the ozone bio-filtration process for treating surface water went into operation in Kvinnherad (Norway) in October 2015.



The system is constructed in two entirely separate lines and was designed for a treatment capacity of 80 m³/h. The process steps are CO₂ enrichment - ozonisation - contact column (D = 1300, H = 6000 mm) - hardening via marble filter (D = 2500, H = 4000 mm) upstream - multilayer filtration (D = 3000, H = 4000 mm) for bio-filtration and particle separation downstream - UV radiation.

Two HydroGroup ozone producers, each with 4 plasma blocks with an individual capacity of 70 g O₃/h each at an ozone concentration of 10% (wt), provide the ozone. Two Hydroxymat 30 are used to supply the oxygen. These systems deliver up to 3.2 Nm³/h of oxygen with a purity of approximately 92%. The process system, including the associated control technology, was realised by Hydro-Elektrik GmbH in collaboration with Hydro-Elektrik AS and the Sweco engineering company.

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Torpa waterworks in Nordre Land municipality

A small system TWK 20 with the ozone bio-filtration process for drinking water treatment was supplied to the Norwegian Unik company. Start-up was in August 2015. The system was entirely prefabricated at the plant in Ravensburg and was designed for a treatment capacity of 12 m³/h. The process steps are ozonisation - contact column (DN 300, H = 4000 mm) - multilayer filtration (D = 1300, H = 3000 mm) for bio-filtration and particle separation - UV radiation. Two plasma blocks with an individual capacity of 20 g O₃/h each at an ozone concentration of 5% (wt) provide the ozone. Two Airsep Topaz compact generators are used to supply the oxygen. These systems deliver up to 0.8 Nm³/h of oxygen with a purity of approximately 92%. The complete process system, including the stainless steel pure water tank with a volume of 14 m³ and the associated control technology, was realised by Hydro-Elektrik GmbH in collaboration with Hydro-Elektrik AS and the Unik company.

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Improved water quality thanks to softening and nanofiltration

A completely new waterworks with a capacity of up to 240 m³/h has been built in the community of Venningen (part of the municipality of Edenkoben).

The entire process installation, including the electrical control system and the stainless steel tank system, was supplied by HydroGroup. The groundwater from the deep well is initially filtered via two stainless steel pressure filters with a diameter of 3500 mm and a cylindrical height of 3500 mm for the purpose of de-ferrisation and demanganisation.

A partial stream is fully softened via a downstream nanofiltration system, the softened water is mixed with the hard water and is physically deacidified via a high-powered aerator, before it is temporarily stored in the tank system comprised of two stainless steel tanks (duplex steel) each with a volume of 1000 m³ (13.5 m in diameter and 7 m in height). The high-quality drinking water is pumped to the Venningen (120 m³/h at 67 m elevation) and Henken (96 m³/h at 140 m elevation) supply zones by means of two speed-controlled, pressure booster systems optimised



for energy efficiency.

The waterworks - a HydroGroup collaboration between RWT GmbH (treatment technology) and Hydro-Elektrik GmbH (tank system) - is fully fitted out with stainless steel pipes and will go into operation in December 2015.

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New elevated tank „Alte Rebschule“

The water supply in the communities of Rhodt und Weyher which also belong to the municipality of Edenkoben, and in the town of Edenkoben itself, is ensured at peak times or in the event of power failures by, among other things, a new 2 x 100 m³ water tank.



The complete stainless steel tank system (duplex steel) with the associated electrical and hydraulic V4A stainless steel installation and the conversion

at the Henken waterworks (including a new pressure booster system, 48 m³/h at 130 m elevation), in the Edenkoben pressure-reducing shaft and in the Rhodt elevated tank was realised by Hydro-Elektrik GmbH.

The conversion work facilitates the supply of the Edenkoben elevated tank from the Rhodt elevated tank and return by means of the pumping station from the Rhodt elevated tank into the Edenkoben elevated tank, but also into the Rhodt high zone. All of the conversion work represents an important contribution towards safeguarding the water supply in the municipality of Edenkoben.

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KNOWLEDGE

Reverse osmosis vs. nanofiltration

Both processes can be used to separate out substances dissolved in the water. Open-pored membranes with pore diameters of around 1 nm are used in nanofiltration (NF), with closed membranes being used in reverse osmosis. Here the water must diffuse through the membranes, resulting in an almost complete holding back of the substances. Nanofiltration on the other hand allows low molecular-weight compounds and monovalent ions to pass through. The energy costs of both processes differ greatly due to the different working pressure: Nanofiltration up to approx. 10 bar, reverse osmosis up to 80 bar. In water treatment, nanofiltration is primarily used for softening, while reverse osmosis is used in complete desalination or eliminating or reducing trace substances.

LEGAL INFORMATION



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