

Future-proof water supply thanks to the construction of a connecting pipeline through the Monheimer Alb

Mobile pressure boosting system plays a central role



Mobile pressure boosting system with container and water tank with 10 m³ capacity. The entire pump system is always on board and ready for action.



At the transfer site in Wemding: The mobile pressure boosting system has been unloaded from the truck. Everything has been connected. Here, water was collected for in-situ production of concrete for the Donauwörth-Treuchtlingen railway crossing.



The entire pump system, as well as its control system, is mounted in the container. The system can be used at any time – even at short notice.

Longer dry periods without rainfall combined with rising temperatures are forcing many water suppliers to react. Because some local groundwater sources are no longer able to supply the population with sufficient drinking water, the search is on for new ways to ensure a future-proof water supply. Bayerische Rieswasserversorgung, the water utility provider for the state of Bavaria, was one of many local providers faced with this challenge. In order to ensure that around 120,000 inhabitants in the districts of Donau-Ries, Dillingen and neighbouring Middle Franconia are supplied with drinking water, an approximately 22 km-long supply pipeline is currently being built through the Monheimer Alb mountain. In doing so, the Bavarian company will create a connection to the Franconian water supply (Wasserversorgung Fränkischer Wirtschaftsraum, WFW). Up to 140 litres of water per second will be able to be fed into the Bayerische Rieswasserversorgung network via this DIN 500 pipeline, and a purchase quantity of 2700 m³/day has been agreed. This will cover a large portion of the total drinking water required (during peaks this is approximately 34 million litres per day). By establishing this connecting pipeline, the water suppliers are creating an infrastructure that adapts to the changing conditions.

Constructing the connecting pipeline

The project is remarkable. The connecting pipeline runs from Warching, passes by Monheim then carries on westwards to Wemding. Here, the water from the Franconian supply is fed into the Bavarian network via a shared facility.

Max Wild GmbH and Norbert Schütz GmbH & Co. KG were jointly commissioned with the construction of the pipeline and the associated structures. Both companies have many years of experience in the relevant fields. All work is expected to be completed by November 2021, after which plenty of high-quality drinking water will be available via the connecting pipeline. Throughout the works, a mobile pressure boosting system was used for various tasks and played a central role during construction.

Mobile pressure boosting system: technology for a range of applications

Both when updating old systems and constructing new connection and supply pipelines, ensuring a constant supply for users is key. Sufficient high-quality drinking water needs to be available at all times, but finding a balance between construction and supply is not always easy.

In the past, Norbert Schütz had to set up the required pump technology on-site on a temporary basis. This was very costly, both in terms of time and material, especially as it then had to be disassembled after use. To optimise this project, the plan was expanded to include building a mobile pressure boosting system that could be used in a variety of ways and transported by truck as and when required. The system consists of a container unit and a stainless steel tank with a capacity of 10 m³. Both parts of the system can be dismantled if necessary.

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Possibility in every drop



Reviewing operations in the container at the Wemding transfer site. Left: Christopher Filchner, Key Account Manager, Grundfos GmbH, Right: Anton Schütz, Pipe Network Foreman, Senior Site Manager and Managing Director of Norbert Schütz GmbH & Co.KG, Boos, Germany



Open-cut pipe laying. A specialist vehicle lays the DN 500 pipes using a process developed by Norbert Schütz.

Facts and figures

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| Customer: | Bayrische Rieswasserversorgung, Nördlingen, Germany |
| Construction project: | Installing an approx. 22 km-long DN 500 pipeline connecting the Franconian Wasserversorgung Fränkischer Wirtschaftsraum and the Bavarian Bayrische Rieswasserversorgung water supplies, from Warching to Wemding |
| Built and installed: | September 2020 to November 2021 |
| Executed by: | Max Wild GmbH and Norbert Schütz GmbH & Co. KG. |
| Civil engineering: | Max Wild GmbH, Berkheim, Germany |
| Piping and system construction: | Norbert Schütz GmbH & Co.KG, Boos, Germany |
| Pump technology: | Grundfos GmbH, Erkrath, Germany |

Customer benefits:

- Pump, control and dosing technology all from a single provider
- Highly reliable
- Reliable water supply
- Economical operation/energy-efficient pump technology
- Energy-optimised pump control at the point of optimum efficiency
- Low noise level

The container unit contains the following system components:

1. A pressure boosting system with a 2 CRIE 15-4 pump and a special control system adapted to the application ($V=20.5 \text{ m}^3$, $H=81.5 \text{ m}$). The control system is located in a separate control cabinet.
2. A 1 CR 5-36 frequency converter/control system, also located in a separate control cabinet.
3. A DDA 7.5-16 dosing pump for dosing disinfectant. This determines the counter pressure in the pipe and is almost entirely self-regulated.

This technology is able to tackle a wide range of tasks, eliminating the need for time-consuming construction and disassembly. The container is transported to the site and positioned. Once it has been connected, the system can be put into operation. This saves a huge amount of time, whilst also increasing operational reliability. This is particularly true of the built-in disinfection system, which is able to disinfect the pipes according to the client's requirements. Site conditions or restrictions have little influence on the technology, as the system is largely self-sufficient.

The main areas of application are:

- Emergency supply for residents while existing facilities are being renovated or new systems constructed, as in this case.
- Filling pipe sections: The system runs automatically, ensuring that pipe sections are hygienically and correctly filled (with no air).
- Testing section pressure: This is often done with piston pumps. However, this can lead to fluctuations in fill. The pulsing action of piston pumps can also cause pressure surges. The automatic, smooth functionality of the pressure boosting system avoids these issues. Years of technical knowledge and experience have been used to develop the pressure boosting system. This results in: A tool that saves time and makes work easier and operations safer.

The pump technology used

All high-pressure centrifugal pumps boast sophisticated technology, high-quality materials and low-wear bearings. Another key feature is the unique cartridge mechanical shaft seal, made of highly wear-resistant materials. Thanks to the cartridge design, the sealing elements can never be incorrectly assembled. The delicate sliding surfaces never come into contact with greasy fingers or dirt. This significantly reduces the chance of failure due to improper installation. Major changes were made to increase pump efficiency. Tests had shown that a gap of just 0.1 mm between the chamber and the impeller resulted in a 5% loss of efficiency. By using a floating gasket ring, internal losses due to leaks are reduced to a minimum. The pumps used here have a separate frequency converter/control system, which provides soft pressure build-up and reduction without pressure surges. Only the pressure that is actually required is generated, and the individual pumps each work at their optimal duty point. The DDA 7.5-16 dosing pump used for this project also has a number of special features. The dosing quantity of a classic dosing pump is adjusted by changing the stroke length or frequency. Experience has shown that errors can occur when calculating use parameters. This process is also very time-consuming. If the stroke length is calculated incorrectly, air pockets, intake malfunctions and dosing gaps can occur. The "Smart Digital Dosing" developed by Grundfos avoids such problems. The stepper motor used allows the operator to control the stroke speed precisely. The pressure stroke length varies depending on the dosing quantity set, and the maximum volume is always drawn in. This results in continuous dosing with very little pulsation, which is a key factor in reducing operational issues. The pressure boosting system works particularly well with the 2 CRIE and CR-5-36 pumps in combination with the DDA 7.5-16. The technology of these components (as well as the control system) work in perfect harmony, flawlessly balancing cost efficiency and operational reliability.

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