

Cloud replaces coal jetty

Bergmannsheil and Kinderklinik Buer GmbH (Gelsenkirchen) uses the MIXIT all-in-one mixing loop solution and the Grundfos BuildingConnect cloud platform for its modernised heat distribution system

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Possibility in every drop

Distributing the heat required modernisation

“For effective energy management, consumption needs to be transparent and able to adapt to demand,” says Gerrit Neugebauer, Technical Director of Bergmannsheil and Kinderklinik Buer GmbH in Gelsenkirchen. “That was not the case for our heat distribution system, which saw expansion over the course of several decades. For that reason, we used an upcoming modernisation as an opportunity to set up an intelligent control system for our mixing loops.”

The hospital is part of the miners' association medical network and it's 1,200 employees provide inpatient care for around 24,000 patients a year. The building consists of the main building built in 1929 to buildings built in the 1980's, and more recent new buildings and modernisations.

The hospital's heating system is located in the basement of the ward block, and the structure dates back to 1929. Where previously there was a coal jetty which was used to supply the “black gold” from the coal field, today there are three heat exchangers providing district heating and heat energy from a combined heat and power plant. Distributing the heat required modernisation. “The heat distribution system mostly dated back to the 1970s and was very oversized, because it was originally intended to supply more buildings,” explains Gerrit Neugebauer. “There were oversized and sometimes superfluous pipes that were inadequately insulated, which of course meant a considerable degree of heat loss.”

Another major disadvantage was the lack of adaptability. “The heat could only be adjusted centrally via the heat exchangers, not separately for the individual heating circuits,” says Neugebauer. “If there was anywhere that wasn't getting enough heat, all we could do was increase the flow for the

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entire system. That meant we had a flow temperature of around 75 degrees going into every heating circuit.”

Mixing loops: an all-in-one solution

The hospital's heat distribution system was modernised during ongoing operations in summer 2022. The project consisted of three parts: fitting new pipes with a smaller diameter and insulation, replacing obsolete pumps and installing adjustable mixing loops. The pipes from the three heat exchangers were divided into two groups for flow: a larger one with five heating circuits for the main building with the inpatient wing, and a smaller one with three heating circuits for annexes. The pumps used were the highly efficient Grundfos TPE as a feeder pump and various Magna3 types in the heating circuits.

The core of the project was the installation of the Grundfos MIXIT mixing loop solution in all eight heating circuits. MIXIT is an all-in-one solution that integrates all the necessary components – valves, actuator, sensors and intelligent temperature control – into one compact control unit. For the mixing loop, only two components need to be designed and installed: the MIXIT control unit and the Magna3 secondary circuit pump, which communicates wirelessly with the control unit.





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Integrated components and the flexibility of the solution make planning and installation much easier. This is confirmed by Martin Borgmann, whose company Sanitär, Heizungs- und Lüftungsbau Borgmann (Bottrop) has been serving BKB for a long time and carried out the planning and installation of the new heat distribution system with support from Grundfos. “I’ve known the hospital’s heating system for 40 years, but even so there were still quite a few sections of pipe that were a mystery to me and that were difficult for us to work out,” says Borgmann. “So it was very helpful that MIXIT doesn’t specify a particular Kvs value at a given nominal size, but smoothly covers an entire range. Because of that, we didn’t have to set the values too precisely. That’s a huge advantage for older systems in particular.”

Flexibility is also provided by the control valve, which is designed as a three-way ball valve with a T-opening and is suitable for a variety of hydraulic circuits. At the Bergmannsheil hospital, the eight MIXITs are used as three-way valves in mixing circuits.

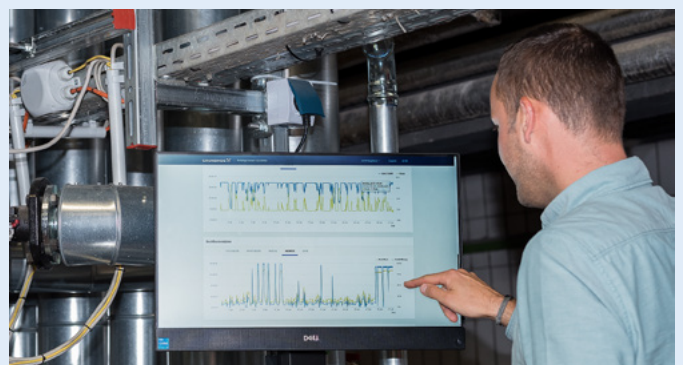
Operating data accessible from anywhere

The key advantage of the new heat distribution system is the intelligent mixing loop control. The mixer and pump supply more than 100 data points that can be used to optimise the operation

of the system. The hospital uses Grundfos BuildingConnect (GBC) as the control system. This cloud platform is used for monitoring and controlling systems, and it enables access to all the data from the mixer and pump and allows the operation to be controlled in detail even without a connection to a control system. Access takes place via an Ethernet interface that is integrated into the control unit at the factory.

“We don’t have a general control system for heating and cooling; we have individual control systems for various different systems, such as the heat exchangers,” explains Gerrit Neugebauer. “That’s why we were open to a separate mixing loop control system. We chose BuildingConnect because it requires less work, it offers advanced options for monitoring and control and, as a cloud solution, it can be accessed from anywhere. What that means in practice is that, if the on-call service receives a fault message for example, they can see the current system data from the office or from home, which saves a lot of time. The solution is also much more economical than a control system and we can change any of the settings ourselves at any time.”

Since spring 2023, all the MIXIT loops have been online and controlled using the cloud solution.



They can be accessed from a monitor in the heating system, from the technician's workstation or from a tablet or smartphone as needed. Grundfos has trained the hospital's technical team members and helped to monitor the system in its initial phase in order to support the hospital in establishing an efficient operation.

Flow temperature lowered by 10 degrees

Individually controlling the heating circuits opens up the potential for considerable savings. "The heating circuits have very different heating needs," says Gerrit Neugebauer. "For example, in the ward building we have a comfort ward with underfloor heating that can manage with a much lower flow temperature than wards with radiators. In the past, the flow had to be based on the largest consumption and suppressed with a thermostat where necessary. Today, we can supply heat to each heating circuit and optimise it individually."

For the hospital, transparency is another key point in favour of the new solution. "With the old heat distribution system we never knew exactly what temperatures we were reaching or how much heat was being consumed in each place," says Neugebauer. "With the data we get from BuildingConnect, we can assign different quantities of heat to different consumers or for different needs. This is very helpful both for energy savings and for internal cost transparency."

Although not all mixing loops were fully adjusted in the first heating period after the modernisation, the Bergmannsheil hospital is already seeing positive early results. "Before the modernisation, we required a flow temperature of nearly 75 degrees," reports Gerrit Neugebauer. "Today, we can manage

"With the possibilities that the Grundfos solution offers us, we realise significant energy savings"

Gerrit Neugebauer, Technical Director
Bergmannsheil and Kinderklinik Buer GmbH

with around 10 degrees less. Although the heat consumption data from the supplier has not yet been adjusted in detail for factors like weather and occupancy, we can already say that the new heat distribution system is saving us at least 20% on heat." However, there are still more potential savings to be made. "The optimisation of mixing loops is an ongoing process," says Matthias Dierselhuis, Key Account Manager for Digital Solutions at Grundfos, who also managed the project at the Bergmannsheil hospital. "MIXIT supplies the data and BuildingConnect makes it easy to use that data. Experience from actual operation is then needed for fine-tuning. That means the settings can be optimised more and more over an extended period of time."

"We're very satisfied with the project," says Gerrit Neugebauer in summary. "Thanks to the possibilities offered by the Grundfos solution, we're making significant energy savings and we've formed the basis for forward-thinking energy management in our heat distribution system, all very straightforwardly and without the significant work required for a control system."

