Drinking water for the University of Aachen Medical Faculty

Almost all of the University of Aachen Medical Faculty’s facilities are located in the truly gigantic building that is the University Clinic. The Clinic employees around 6,300 people, and treats around 45,000 in-patients and 120,000 out-patients each year. Furthermore, each year 900 children come into the world at the Uni clinic in Aachen!

Around 6,300 employees work in the 33 clinics, 21 institutes and the administration department of the University Clinic of Aachen. The University Clinic is still the largest hospital building in Europe.

The Situation
Naturally, a building which caters for such a large number of people requires a lot of drinking water -approximately 500 m³ every day. However, not only must the amount of water be right, the correct water pressure is also required. Fed centrally, at 4.5 bar the pressure of Aachen's municipal drinking water supply network is not sufficient for all parts of the University Clinic building. Therefore a booster system also had to be installed.

Once it was decided that the booster installation (DEA) that was first installed about 20 years ago had to be replaced, engineer Jürgen Peters (Head of Sanitation and Gas Supply at UKA) and planner Kurt Carels (Construction and Real Estate Operations, NRW Aachen) together with Franz Josef Wirtz (Ingenieurbüro TEN) looked for a replacement. "On the one hand, the old installation was no longer state of the art. In addition, it was over-dimensioned due to our drinking water optimisation measures."
THE GRUNDFOS SOLUTION
Since July 2004, three Hydro 2000 ME series booster installations, each fitted with four CRE pumps, have been in operation in the Uni Clinic. With a maximum volumetric displacement of 160 m³/h per installation, and pressures of 8.2 bar, 8.1 bar and 8.0 bar, they ensure that all consumers in the Clinic (medical wards, patient and laboratory areas, fire extinguishing technology which is also connected) are supplied with drinking water.

THE OUTCOME
Carels and Peters found the technology of the Hydro 2000 ME beneficial thanks to its ease of operation and maintainance, and its compact, space-saving dimensions. When replacing 'old with new', there is often only a limited amount of space available, and this was the case in Aachen. In addition, the Grundfos technology proved to be a winner with its high-level consistency in flow pressure and flow rate. The use of speed-controlled pumps also minimises the risk of water hammer.

Serious fluctuations in water pressure upstream of the DEA can have significant effects on the DEA components themselves or on the supply pressure. This can lead to a drastic increase in pump switching frequency ('flutter switching') or to unwanted pressure fluctuations/hammer for the consumer. Fast and frequent changes in consumption after a DEA are also undesirable - they can lead to pressure hammer, noise and a high degree of strain on installation parts downstream. In the worse case, the permitted nominal pressure of installation parts can be exceeded.

The use of speed-variable pumps in a DEA is far and away the most effective and economical way to supply water for dynamic demands. Motors with integrated frequency converters not only meet the increasing demands with regard to performance (consistency of pressure, minimised pressure hammer - important in older pipe installations) and general demands with regard to the functionality of such installations (connection to higher-ranking management systems, etc.). They can also be installed in an extremely space-saving manner, which is of great significance for booster installations in building technology.

For building managers who operate active preventive measures against Legionella, the criteria "Materials", "Installation concept including control technology" and "Hydraulic design" also play an important role with regard to drinking water hygiene. Hydro 2000 ME series booster installations from Grundfos are controlled according to FIFO pump management ('first in, first out'); this prevents stagnation through a regular change of pumps in operation. Fundamentally, only stainless steel pumps are used in this series. Chromium nickel steel has a very high innate resistance to corrosion and has particularly smooth surfaces; the stainless steel precision casting procedure also increases hygiene protection. The stainless steel manifolds on the intake and delivery side are made using orbital welding technology which guarantees particularly smooth and clean weld
seams. The manifold outflows are connected using necking technology, which is also hydraulically beneficial (no stagnation, no splitting).

The specially designed hydraulic equipment prevents stagnation zones. Benefits: Smooth surfaces with low drag coefficient and optimally designed hydraulic components counteract the formation of biofilm.