

## Quality from the start

The municipal utilities company "Stadtwerke Deggendorf", the authorities which are responsible for the water supply to the town and the surrounding municipalities, plans the use of a UV system for water purification. However, since there is a suspicion that the quality of the water varies during the course of one year, this has to be clarified in advance.

Depending on the quality of the raw water, the system can be designed in such a manner that the amounts of water distributed to the individual households are safely disinfected.

Deggendorf's water supply consists of 12 elevated tanks with a total capacity of 7080 m<sup>3</sup>, nine pressure booster systems with an overall ejection of 41 l/s and five de-acidification plants with a total of 72 l/s. Per day, about 5500 cubic meters of water are distributed to the 6500 households via a network of pipes of 200 km and 80 km of house service connections.

More than half of the water originates from local wells, the rest from the WBV (Wasserversorgung Bayerischer Wald, water supply Bavarian forest) from Flanitz.

As a result of their extensive modernisation in recent years, the Stadtwerke Deggendorf was able to win out over low-cost competitors with a stable price/performance ratio. Their customers trust in the high quality of their drinking water. The municipal utilities meet these requirements. For disinfection compatible with the environment, a UV system is planned, which realises sterility without the addition of chemicals.

However, the raw water contains numerous different substances and, depending on their natural origin, they are partly loaded with a high content of various materials.

The physical-chemical parameters and threshold values of the water used for the supply of drinking water are defined in the German Drinking Water Ordinance (TrinkwV).

*"Since variations in the quality of the water as a result of torrential rain falls or flooding has to be expected in the course of the year, we have conceived and constructed a measuring section for the Stadtwerke Deggendorf in close cooperation with Sigrist. This enables us to detect the measured values of the UV absorption. They serve as essential key performance figures of the sterilisation plant. The planned UV system can thus be exactly tuned to the actual quality of the water" says Maximilian Franke of ProMaqua, a company specialised on potable water technology. He further explains: "With the measurement of absorption at a wave-length of 254 nm, we detect some essential composite parameters, such as iron and manganese compounds and humic acids, which absorb and diminish the UV-C-radiation. This diminishing is specified by the spectral absorption coefficient SAK254 [1/m]."*

## Photometer / absorption measuring instrument

Adjusted to the existing conditions, an absorption measuring instrument / photometer of Sigrist in combination with the Disinfection Controller of ProMaqua was installed in the Kohlberg station. The photometer is equipped with a UV light source for measuring the SAK254 values. The Disinfection Controller detects analyses and stores these data. With the SAK measurement, raw water was examined and monitored as regards the actual substances contained for a period of five months.

After a period of about five months, insight into the seasonal variations in the quality of the water was obtained. Thus, in mid-January 2011, after a spell of warm weather in connection with the snow melt, heavy rain and resulting flooding, highly elevated SAK-values were determined. Likewise, elevated values could be detected after the backwashing of the de-acidification plant.

## Summary

*"Based on the analysed data", Marcus Voss, key account manager Potable Water Germany explains, "a UV system certified by the DVGW of the series Dulcodes UVCA Z with four lamps is suitable for the disinfection of the Deggendorf raw water." Marcus Voss also adds, "If we had not carried out this SAK meas-*

urement, the UV system would only have been dimensioned to the normal rate of flow. In spring, at the latest, this plant would then have failed to carry out the desired disinfection performance, as it would have been dimensioned too small for the load on the raw water caused by melt water. However, since these seasonal parameters were included in our considerations, the Stadtwerke Deggendorf can rely on the fact that the UV system is adequately dimensioned. Equipped with four lamps, it provides disinfection tailored to the Deggendorf raw water at a flow rate of up to 100 m<sup>3</sup>/h”

“Another advantage,” Maximilian Franke adds, “is the linear connection between the SAK value and the DOC value (DOC = **D**issolved **O**rganic **C**arbon). The UV absorption measurement further provides a continual on-line measurement which makes it possible to describe a trend of the DOC values without extensive laboratory measurements.”

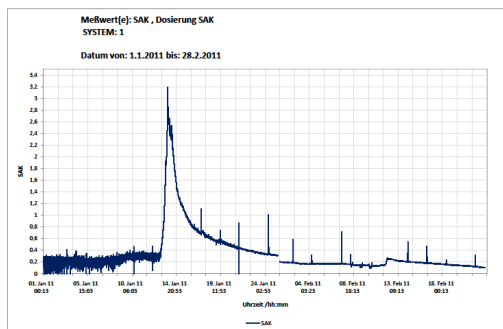
Michael Ertl, water technician at the Stadtwerke Deggendorf, explains, “It was important for us, that the planned UV system does justice to the qualities of our raw water.” Christian Grabolle, also a water technician of the Stadtwerke Deggendorf, adds: “We are absolutely on the safe side with the performed UV absorption – even after seasonal strains on the quality of the water. As a result of the conclusive measuring values, our consumers will now receive hygienic and best quality water at any time. In consequence of the tailor-made UV system designed via the SAK value and in addition to the improved quality, we expect a lowering of the operational costs and thus improved cost effectiveness.”



Measurement using a photometer “ColorPlus” from Sigrist-Photometer



Display and documentation with a “Disinfection Controller” from ProMaqua



SAK measured values in the period January to February 2011. After the warm spell with the melting of snow, heavy rain and flooding, highly elevated SAK values can be determined on 13<sup>th</sup> and 14<sup>th</sup> January, 2011. The backwashing of the de-acidification plant caused the other peaks.

## Certified UV systems

Dulcodes Z plants are UV systems certified according to the DVGW criteria and biosimetrically validated; they guarantee performance of the highest standards of potable water disinfection at all installation options. The biosimetric test determines, under specified conditions corresponding to the actual operation, the disinfection performance of the UV system for a specific rate of flow. That means that the disinfection performance is guaranteed within the limits thus specified. The biosimetric validation is carried out in accordance with the latest edition (Dec. 2003) of the DVGW test regulation W 294.

By means of the UV-C sensor, which can be calibrated, lamp ageing, the contamination on the lamp protection tube as well as changes in the quality of the water are monitored. The plant is provided with a freely programmable control with and extensive controlling, signaling and monitoring functions as well as with a large graphical display for indicating the sensor signal as a trend indication.