

# Reliable control of nitrification with a wet chemical analyzer

ALYZA IQ NH<sub>4</sub> - REDUCED COSTS AND LESS TIME REQUIRED

The wastewater treatment plant (WWTP) described here is located in the canton of Bern and treats the wastewater of approximately 30,000 population equivalents (PE). About half of the PEs are due to industrial operations such as milk processing plants or a manufacturer of biscuit specialties. The influent wastewater is split between two streets after gravel removal. The nitrification of each street consists of two circulation basins (Figure 1). In each of the first recirculation basins (1.1 and 2.1), the aeration is switched off at low load in order to achieve an aerobic zone and thus biological phosphate elimination. The second circulation basins (1.2 and 2.2) are reserved for nitrification. Individual zones can be switched on during heavier loads.

The retention time of the wastewater is 24 hours from the inlet to the outlet, of which four hours are accounted for by biological treatment. The discharge value for ammonium to be complied with is 1 mg/l for a 24-hour composite sample. Due to this high requirement, the nitrification is controlled using set points between 0.3 and 0.75 mg/l NH<sub>4</sub>-N.

## Requirements for the measurement technology

The control at such low values requires the use of an automatic analyzer, which had to be renewed on this plant. The decisive factors for the purchase were: a significant reduction in maintenance costs and the possibility of being able to carry out maintenance work independently. Xylem meets these requirements with the Alyza IQ NH<sub>4</sub>. A third argument is the partnership-based support from Xylem and the local representative.

## The analyzer at the wastewater treatment plant

Since the water is divided into two streets after the gravel removal, a 2-channel automatic analyzer was purchased (Figure 2). The Alyza IQ NH<sub>4</sub> thus samples from the nitrification basins - alternately from both streets. The measurement interval of ten minutes results in an updated measurement value per street every 20 minutes.

Due to the residence time of the wastewater of at least four hours in the biological treatment the measuring interval is sufficient to reduce even peak loads.



Figure 1: View over the nitrification of the plant

„The excellent and quick response of Xylem and its representative has convinced us. Our requests are heard, passed on and also implemented.“

Plant manager of the wastewater treatment plant



a xylem brand

Figure 3 shows an extract from the control room with an increase of the  $\text{NH}_4\text{-N}$  concentration (green) in street 1 from 0.3 mg/l to over 5 mg/l and its subsequent reduction. The step-like graph is a consequence of the 20-minute measuring interval. The activation of the blower control (gray) and the resulting increase in oxygen concentrations in the recirculation tanks 1.1 (light blue) and 1.2 (dark blue) can be seen clearly.

## “We trust the values”

Plant manager of the wastewater treatment plant

Maintenance of the Alyza IQ  $\text{NH}_4$  is performed every six weeks. Here, the reagents and the two standard solutions for the 2-point calibration are exchanged. The analyzer is operated with a calibration interval of two days, so that the reagents and the standard solutions can be replaced at the same time. Together with this exchange, the two filter plates and the entire sample preparation system are also cleaned with chlorine bleach solution. The cleaning of the other tubes and the photometer happens by the automatic daily cleaning. The exchange of the MultiPort Valve (MPV) takes place as required and is communicated by the device itself.

### Conclusion

The annual consumption costs have been reduced by a factor of about 8 from approx. 20,000 € due to the low consumption of the chemicals and the above-mentioned work without an external service technician (Figure 4).

The purchase has thus paid for itself in less than a year and has absolutely paid off for the plant operator. Reliable measurements, significantly reduced costs of ownership and fast maintenance guided by the operating software lead to a functioning control system, significant savings and a high availability of measured values.

The Alyza IQ  $\text{NH}_4$  has convinced – reliable, saves time and costs:

- **Reliable results due to regular 2-point calibration**
- **Compliance with the specified discharge value**
- **Significant cost savings: 17,000 €/year less**
- **Fast & cost-effective maintenance by own staff**
- **High availability of measured values**
- **Operational reliability**

[xylemanalytics.com/en/landingpages/alyza-iq](https://xylemanalytics.com/en/landingpages/alyza-iq)

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Figure 2: Alyza IQ  $\text{NH}_4$  (2-channel) connected to an IQ SENSOR NET controller DIQ/S 282-CR3

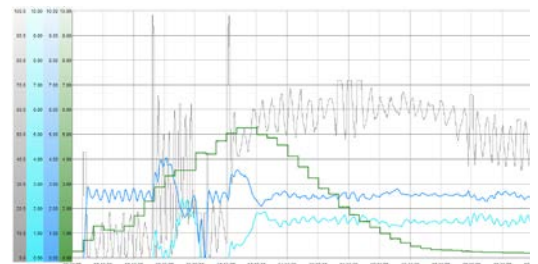


Figure 3:  $\text{NH}_4\text{-N}$  concentration (green) in street 1, blower control (grey), oxygen concentrations (light and dark blue)

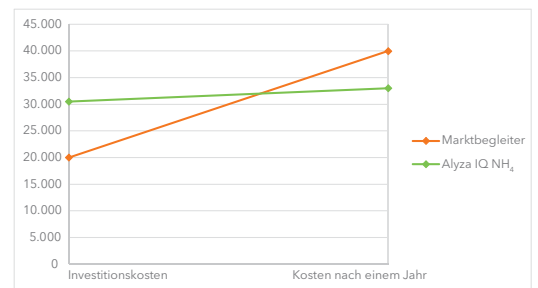


Figure 4: Investment and annual consumption costs including installation of the Alyza IQ  $\text{NH}_4$  (green) and a market competitor (orange)

Do you have further questions?  
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