

Ammonium measurement with a VARiON® sensor

IN THE PROCESS WATER OF AN SB REACTOR

At the Hanau waste water treatment plant (Germany), an SB reactor is used to pretreat the highly loaded process water (ammonium concentrations of up to 800 ppm) coming from the filter chamber presses of the digestion tower. There, the separate nitrification and denitrification of the process water takes place with the goal of relieving the standard biological treatment tanks.

To achieve better degradation results, methanol is added to the waste water as a carbon source in order to adjust an optimum C/N ratio. To do so the N concentration must be known, i.e. continuously measured. The process water is discharged into the inlet of the aeration tanks only after the $\text{NH}_4\text{-N}$ contents have been reduced to approx. 60 ppm.

In former times, a measurement buoy was used for $\text{NH}_4\text{-N}$ measurement where ammonium was measured according to the indophenol blue method. The upper measurement limit of this measuring system (100 ppm) was not sufficient for application in the SB reactor, for the plant is often run with a clearly higher $\text{NH}_4\text{-N}$ load of up to 150 ppm and more (fig. 2 and fig. 4). Depending on the feed of the SB reactor the daily load may considerably change. Changes of the ammonium and nitrate load of the reactor feed occur within a very large range of up to 800 ppm.

To monitor this complex process in the SB reactor, a VARiON® sensor from Xylem with an ion selective electrodes for ammonium and nitrate is used at the Hanau waste water treatment plant. The sensor is part of the IQ SENSOR NET network and its measuring range easily covers the 0-1000 ppm ammonium range required by the operator. Due to the extremely loaded process water the compressed air cleaning of the VARiON® sensor is essential (fig. 1). This cleaning is controlled via the IQ SENSOR NET and automatically sets the sensor to the maintenance state during cleaning.

The results of measuring with the VARiON® sensor are shown in fig. 3 and fig. 4. The temporal course of the process can be seen in the lower curve of the Nitrate concentrations. It is also clearly visible that the sensor covers the measured $\text{NH}_4\text{-N}$ values very easily and precisely within the required measuring range (up to 800 ppm – ISE measuring principle). The values measured by the sensor very well correlate to the ammonium values of the sample that were photometrically determined in the lab.



Fig. 1: Use of the VARiON® sensor in the SB reactor of the Hanau waste water treatment plant (Germany)



Fig. 2: Mr. Faust from the Hanau waste water treatment plant (Germany) working with an IQ SENSOR NET system and the described VARiON® sensor

Summary:

The VARiON® sensor is easy to handle and maintain, and the measured value is better available to the user. Moreover, the very large measuring range is completely covered by the VARiON® sensor.



Fig. 4: NH₄-N value measured with the VARiON® sensor

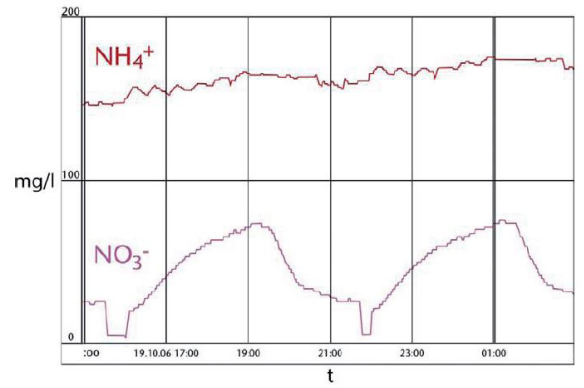


Fig. 3: Daily load diagram of ammonium and nitrate in the process water of the SB reactor.

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Do you have further questions?
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