

# Ammonium & nitrate measurement using IQ SENSOR NET

IN THE OUTLET OF A FERTILIZER MANUFACTURER IN NORWAY

## **situation/conditions/background/problems**

Due to legal regulation in the outlet of a fertilizer manufacturer  $\text{NO}_3\text{-N}$  and  $\text{NH}_4\text{-N}$  have to be monitored and controlled. Concentrations are within a range of 20 and 150 mg/l, in case of an incident the values of  $\text{NO}_3\text{-N}$  as well as  $\text{NH}_4\text{-N}$  are significant greater than 200mg/l.

Known influences are:

- Strong potassium and chloride fluctuations
- pH values move in a range of pH 4 and pH 9
  - » There is an influence to the ion-selective measurement from potassium and chloride (An online compensation is possible).
  - » Ammonium depends on pH and Salinity of the sample.

## **Solution**

The following installation figured out to overcome the existing interferences:

- VARiON® PLUS 700 IQ, for the ammonium and nitrate measurement
- SensoLyt 700® IQ, for the pH measurement
- TetraCon 700® IQ, for the Salinity measurement
  - » Nitrate value of the VARiON® PLUS 700 IQ could be used directly
  - » To use the ammonium value of the VARiON® PLUS 700 IQ measurement of pH and Salinity are necessary to calculate the relative portion of ammonia (ammonia affects very strongly the photometric laboratory measurement of ammonium). The calculation of the portion of ammonia is done in the central control system.

## **Ammonium dissociation:**

Beside the directly measured ammonium also ammonia must be proven. Ammonium and ammonia are present solved in water always at the same time. The quantitative proportion of the two substances is dependent on pH value, Salinity and temperature of the solution and can be recorded by calculation using a formula empirically developed by Clegg and Withfield in 1995. The calculation of the ammonia portion is based on the measured ammonium quantity, the pH value, the Salinity and the temperature in the central control system.

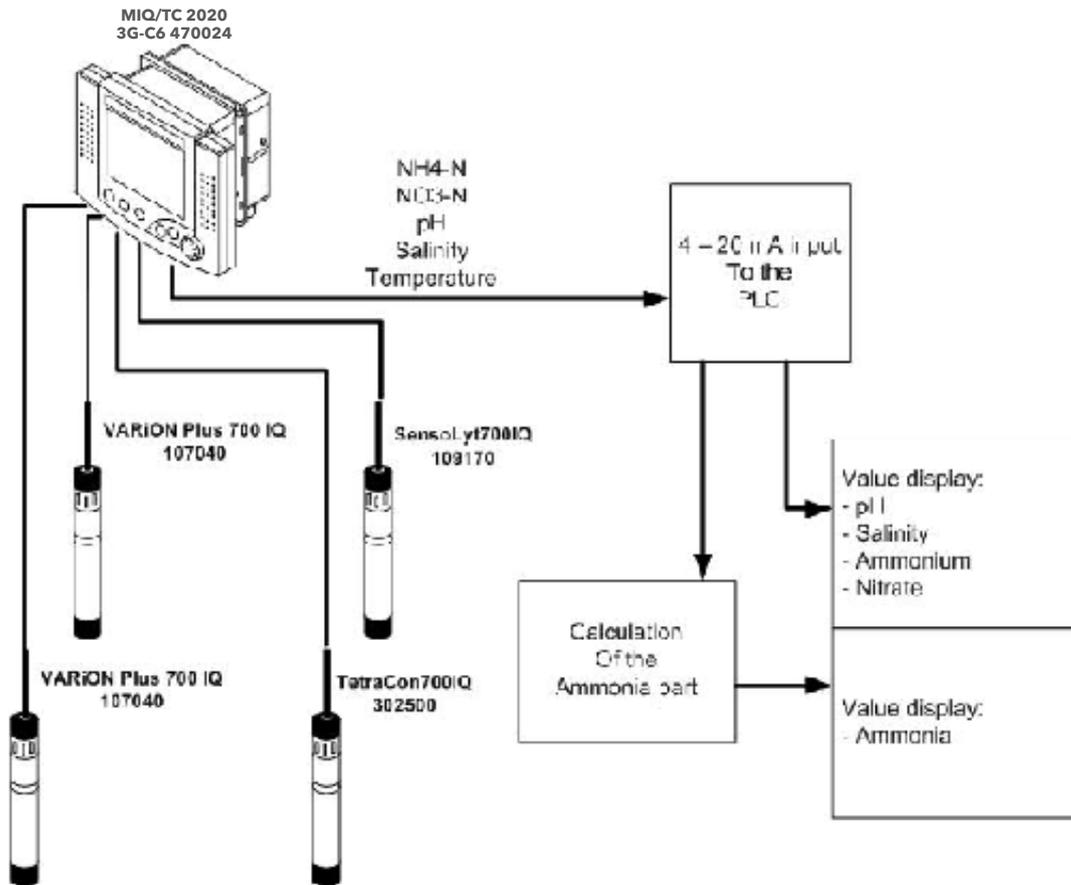
## **Measuring method**

- Ion-selective electrodes for ammonium and nitrate
- pH and conductivity for the calculation of the ammonia part.

## **Equipment/accessories**

- IQ SENSOR NET with VARiON® PLUS 700 IQ (ammonium with potassium compensation)
- VARiON® PLUS 700 IQ (nitrate with chloride compensation)
- TetraCon® 700 IQ
- SensoLyt® 700 IQ (with SensoLyt® SEA)
- Central control system to display all values and calculate the relative portion of ammonia.





**Result**

The above described installation was done in November 2006 and is working without any problems up to now.

Taking all well-known influences to ion-selective measurement into consideration, the above mentioned measurement system of ammonium and nitrate is very well suitable for this application.

Do you have further questions?  
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