

## HORIBA Ammonia Nitrogen Sensor – Full-Scale Evaluation by Sanitation District of Los Angeles (LACSD)

Ammonia nitrogen monitoring promotes energy saving at aeration tanks.

### 1 Overview of LACSD

Water recycling is very important in arid Southern California environment where water must be imported from other parts of the state. The goal of the Sanitation Districts is to recycle as much water as possible from its Water Reclamation Plants (WRPs), therefore, the WRPs play a major role in meeting its water needs. Water recycling significantly reduces the Los Angeles Basin's dependence on costly imported water, and helps to replenish a large percentage of the groundwater used in region.

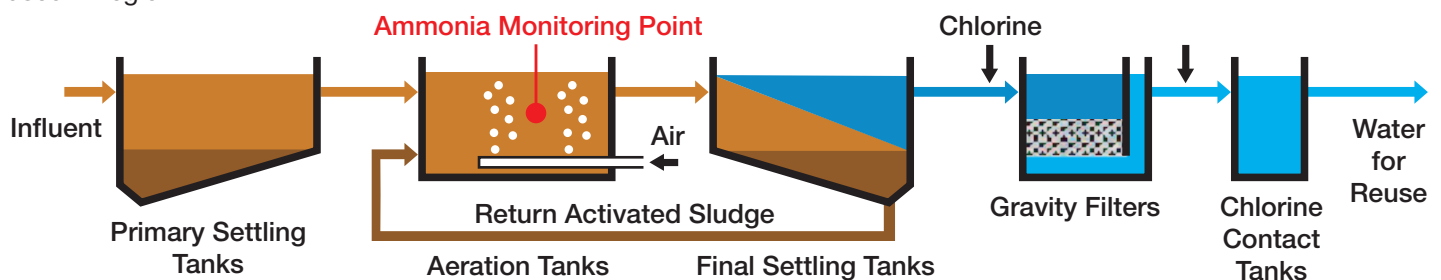


Fig. 1 Wastewater treatment and water reclamation

### 2 Ammonia monitoring

Ammonia monitoring in aeration tanks allows the production of high quality water while saving energy. Especially for biological water treatment where large amount of energy is required. LACSD has tested several ammonia sensors over the past several years, and concluded that it was difficult to find an instrument that is robust and accurate enough to be used in mixed liquor sample conditions. In most cases, the number of maintenance and value drift made it impractical for operational use. However, HORIBA ammonia nitrogen sensors, which are evaluated by LACSD, are able to fulfil the requirements.

### 3 Full-scale evaluation

Full-scale evaluation was performed by Sanitation District of Los Angeles County. The sensor was installed at aerobic zone in the nitrification-denitrification process of San Jose Creek Water Reclamation Plant (Fig. 2). The sensor was installed with ultrasonic cleaner. Grab sample analysis was conducted by the research team using HACH colorimeter, DR-3900 as reference. Routine cleaning such as rinse and wipe was performed every 6 weeks on average, and deep cleaning using sodium hypochlorite was performed once in summer. Calibration using standard solution was performed in the beginning, and sample adjustment was conducted twice.

Fig. 3 shows the correlation with lab data (HACH colorimeter, DR-3900), while Fig. 4 shows HORIBA's measurement data taken during a two-week time frame in 2017 and in 2018. The data obtained shows a similar pattern even after one year of measurement. No electrode was replaced during the evaluation, and no symptom of drift was observed. Regarding accuracy, correlation efficient R was 0.96. Phil Ackman, Supervising Engineer of Wastewater Research Section, commented that "HORIBA sensor is suitable for full-time use in the treatment plants".



Fig. 2 Installation

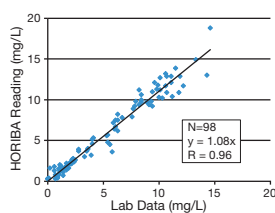


Fig. 3 Correlation with lab data

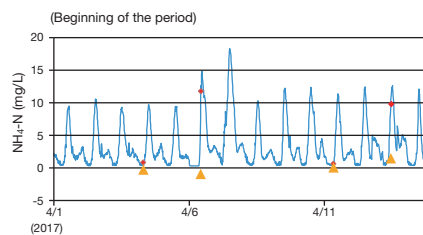
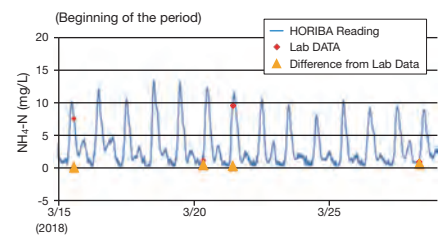
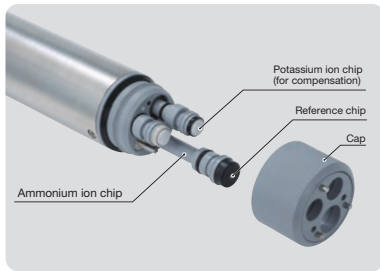


Fig. 4 Measurement data (for 2 weeks, start to end)



## 4 HORIBA ammonia nitrogen meter, HC-200NH

This is an ion-selective electrode-type ammonia nitrogen meter designed to achieve optimal control of the nitrification process. It helps to contribute to the improvement of energy efficiency, and enables proper operation of process control of sewage treatment, and wastewater treatment.



Ammonia nitrogen sensor, AM-2000



Ammonia nitrogen meter, HC-200NH

### ● Ammonia nitrogen meter specifications

Model	HC-200NH
Combination sensor unit model	AM-2000
Measurement range	NH <sub>4</sub> -N: 0~1000mg/L (display range: 0~2000mg/L) Temperature: 0~40°C (display range: -10~110°C) pH: 4.0~8.5 Sodium ion concentration is not more than 100 times the ammonium ion concentration
Repeatability	NH <sub>4</sub> -N: Larger value between 3%±1 digit of measured value or 0.2mg/L±1 digit (with standard solution) Temperature: ±0.3°C
Potassium ion compensation	Compensation range: Potassium ion concentration is not more than 10 times the ammonium ion concentration and under 1000mg/L Compensation error: ±20% (measured value)



The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001. We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.



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