



# APPLICATION REPORT

Food & Beverage

## pH measurement of fish silage in tanks

- Monitoring fish silage quality for dosing of acidifiers
- Reliable and cost-effective pH sensor technology without the need for external transmitter
- Sensor exchange and maintenance without process interruption and spillage of fish silage
- High operational safety and flexibility due to manual retractable assembly with ball valve

### 1. Background

Norwegian company Fluctus AS specialises in the development, manufacturing, installation and service of products for the fish farming industry. Their product portfolio ranges from ensilage tanks, feeding systems and spreaders to management software to fully equipped feed barges.

### 2. Measurement requirements

The ensilage tanks manufactured by Fluctus can be placed on feed barges or at fish factories on land. The tanks provide the customer a way to handle dead fish from fish farming or slaughter waste from factories. In the tank, the dead fish are grinded to a thick porridge that is subsequently mixed with acid – primarily formic acid – to prevent the product from rotting. The liquefied silage product can then be stored for up to six months before transporting and further processing to different products such as fish meal and fish oil in factories on land.

A pivotal control variable for the dosing of acidifiers is the pH value. Only if the silage is permanently stabilised at 3.5 to 4 pH can a safe product be guaranteed. As the silage is a sticky, bad-smelling medium, spillage is to be prevented. This can be an issue when it comes to pH measurement as pH sensors need to be removed from the process for cleaning and calibration on a regular basis.

For ensilage tanks of a customer, Fluctus was searching for an accurate and reliable pH sensor to control acid dosage. It was required that the measurement should not be affected by fish skin, bones and other solids in the medium. Safe sensor operation and maintenance without the risk of spillage was paramount for the end-user.

## 3. KROHNE solution

KROHNE recommended a combined solution consisting of the SMARTPAT PH 8320 pH sensor and the SENSOFIT RET 5000 manual retractable assembly. The robust glass sensor with dirt-repellent PTFE diaphragm comes with a double junction for extended lifetime in silage applications. Featuring an integrated transmitter with built-in fieldbus communication (HART® 7), the pH sensor was directly connected to the operator's DCS. The digital 2-wire loop-powered sensor was only connected to a KROHNE control unit for offline calibration on-site.



pH measurement in fish silage for acid dosing

For easy sensor exchange without process interruption, KROHNE also provided the SENSOFIT RET 5000. The manual retractable assembly with ball valve and bayonet coupling is particularly designed for the highest operational safety requirements. The insertion rod including the pH sensor can be separated from the assembly without interrupting the process, e.g. to carry out sensor cleaning or calibration. Product spillage during sensor removal is prevented by a built-in ball valve which must be closed to remove the insertion rod including the sensor. This ball valve seals the process connection during maintenance.

The additional Bayonet locking system features an automatic locking mechanism for elevated pressure conditions. The design prevents the immersion tube from being pushed out of the assembly in case of overpressure since the sensor holder will be blocked by the end stop of the sliding device. The retractable housing of the assembly allows for a flexible selection of the sensor immersion depth. If required by the operator, the integrated cleaning connection of the SENSOFIT RET 5000 can be utilised for automatic sensor cleaning in the process.

## 4. Customer benefits

The SMARTPAT PH 8320 contributes to a safe, economical, and sustainable fish silage production with the best possible yield in mind. The reliable and accurate pH measurement is key to keeping the fish silage at optimum conditions while dosing only those quantities of formic acid that are really needed. Given its integrated transmitter technology, the KROHNE pH sensor operates cost-effectively. There was no need to purchase and install an external transmitter. In this way, the customer benefitted from reduced commissioning effort and capital expenditure for hardware of up to 60%. Calibration can be carried out in a lab or on-site using cost-effective interface cables or control units that KROHNE supplies from one source.

The SENSOFIT RET 5000 manual retractable assembly provides a high degree of work safety and facilitates maintenance procedures without spillage of fish silage. The safety functions of the assembly allow for trouble-free sensor installation and removal during the process. In this way, the KROHNE sensor can be temporarily moved out of the process for cleaning or calibration purposes or whenever there is a high solid content in the ensilage tanks (e.g. fish bones). KROHNE offers a wide selection of assemblies for pH and other sensors. If further automation is required, a retractable assembly with pneumatic drive for automatic control is also available.

## 5. Products used

### SMARTPAT PH 8320

- Potentiometric pH sensor for fish silage applications
- 2-wire loop powered, 4...20 mA/HART® 7, for direct connection to a PCS
- Glass sensor with PTFE diaphragm and Pt1000 temperature sensor

### SENSOFIT RET 5000

- Manual retractable assembly for high operational safety
- Insertion length: adjustable, max. 720 mm / 28.3"



### Contact

Would you like further information about these or other applications?  
Do you require technical advice for your application?  
application@krohne.com

Please visit our website for a current list of all KROHNE contacts and addresses.

