

View of  
Dow's  
Terneuzen  
site

# Salty solution

A Rosemount chlorine analyzer proves just the job for seawater duty at Dow's Terneuzen site

The Dow Benelux site in Terneuzen, the Netherlands, uses seawater for process cooling. Environmental regulations require careful control of the concentration of chlorine added to control microbial fouling. The existing chlorine measurement system had become outdated, so after stringent tests Dow decided to replace it with a Rosemount Analytical Model TCL analyzer from Emerson Process Management. This has proved more accurate and reliable than the instrument it replaced, with significantly lower maintenance costs.

The Terneuzen site on the southern shore of the Westerschelde estuary is Dow's second-largest production facility, with 23 plastics and chemicals plants plus the largest Dow R&D operation in Europe. Because used cooling water returns to the estuary, Dow must use only the minimum necessary concentration of chlorine, says Eric Engelen of the site's analytical department. "Previously we used an analyzer based on diethyl-p-phenylenediamine (DPD) to monitor chlorine, but this had become outdated and was quite expensive to run," Engelen explains. "The DPD analyzer wasn't suited to seawater. It's a colorimetric method, which works well when you are measuring chlorine in a swimming pool, but water from the Westerschelde is completely different. The water is salty and contains algae, mussels, seaweed and sand. This reduces the accuracy and reliability of the measurement, and means that the sensor has to be cleaned almost daily."

## A better operating principle

Emerson has two chlorine measuring devices: the Model TCL for total chlorine and Model FCL for free chlorine, explains Jos Baart from contractor Cegelec. Both are based on amperometric measurements: as chlorine diffuses into the sensor through a membrane, an electrochemical reaction

generates a current proportional to the diffusion rate, which itself is proportional to the chlorine concentration. "Not only is this principle better suited for the application at Dow, but the Model TCL also appeared to be perfect for measuring dirty seawater," says Baart.

"For the initial test we used the Emerson Model TCL in combination with Emerson's Rosemount Analytical Model 1056 dual-input analyzer. The analyzer was very easy to install and start up, with extensive diagnostic functions," Engelen says. "Water pollution and temperature changes don't influence the reliability of the Model TCL."

"Thanks to faster and more accurate measurements we are now able to spot much earlier if there is something wrong with the chlorine content. This makes it easier to comply with environmental legislation, which in turn is better for the environment and prevents us incurring extra levies. Faster, more accurate and, most of all, more reliable measurements from the Model TCL also enable us to optimize both the chlorine content and the microbiological activity."

## Stringent testing

Dow uses stringent criteria when testing new technology. Only equipment that has demonstrated improvements in maintenance, ease of use, fouling, reproducibility,

reliability and costs is adopted. "We noticed immediately that the Model TCL's reagents lasted for more than three months. That's a long time," Baart says. Making up and replacing the reagents is quick and easy. Because air is dosed in the Model TCL, there is a kind of self-cleaning effect, so the measuring cell seldom or never needs cleaning. What also stood out was that the initial membrane lasted for the whole four-month test. Unlike with the previous analyzer, it is not necessary for someone to visit the analyzer every day to clean it or to reset anything, so the operating costs of the Model TCL are significantly lower.

"Although Emerson's Model FCL was not suitable for this application, because of the presence of bromine in seawater, we did test that system and found that it offered the same reliable performance and low maintenance as the Model TCL. Because of this we have started to implement the FCL on other applications at the site, and we expect to see similar increases in the reliability of the measurements and lower operational costs," Baart feels confident. *kem*

Water pollution and temperature changes don't influence the reliability of the Model TCL.



Pictures: Emerson Process Management