

Optimized pH Measurement Improves Sulfide Control in Scrubber

A Japanese customer improved the sulfide scrubbing process by using the pH electrode InPro 3250 together with a retractable housing for automatic cleaning and calibration. Longer electrode life and lower chemicals consumption also brought cost savings.

Japan, a "Paper Country"

Japan is the third largest paper producer in the world. The number of people employed in this industry is about 230,000. Per capita consumption of paper in 2003 was 243 kg. Japan's paper industry is mainly directed towards domestic needs.

Current situation

Paper production can be critical for the environment. Controlling sulfides and other odor emissions from boiler exhaust gas is a major issue for most mills. Sulfide odors can be reduced to very low levels by wet scrubbers using caustic and chlorine or sodium hypochlorite. However, chemical storage, metering, and control equipment all add to the cost of a scrubber. The che-

micals are hazardous, and the volume needed is quite high, putting further pressure on operating costs. The process needs quite delicate control.

Customer's expectation

The customer, a leading Japanese paper company on the island of Hokkaido, faced problems with the pH measurements in the sulfide removal process. The pH electrode needed frequent maintenance involving cleaning and calibration, at least once a week. Despite this regular attention, the pH-electrodes at the measuring point had a lifetime of only 6 months at most. The customer was therefore very much interested in a system that would provide him with more reliability and reduce the current high cleaning effort.



METTLER TOLEDO solution

Due to the large amount of sulfide in the process at the desired sampling point we recommended the InPro 3250 electrode with silver-ion barrier, which is very effective in preventing diaphragm contamination in sulfide enriched processes.

After reviewing the application and listening to the customer needs, METTLER TOLEDO suggested a demonstration system consisting of the following products:

- Pneumatic retractable housing InTrac 777 e-P
- pH electrode InPro 3250
- Transmitter pH 2100e



An automatic cleaning system was used by the customer to reduce the significant time and effort needed for frequent electrode maintenance. Duration of the cleaning cycle was 30 sec. per hour at a process temperature of 50 °C/ 122 °F, whereby the temperature of the flushing water was 25 °C / 77 °F. The pH value was approx. 7.0, and the pressure was at 1 bar.

Longer loop maintenance intervals

The process pH value was compared in the laboratory with a reference measurement taken daily. Since the difference between these two measurement values was invariably less than 0.2 pH units, electrode maintenance then became necessary only once every four months. The lifetime of the installed electrode is still not yet known because even twelve months after termination of the scheduled test-period, the electrode is still working properly.



Significant cost savings

The customer was very pleased with the outcome of the test phase, and an order was placed for a measuring system. Saving in manpower for maintenance work was estimated to be in the region of 50 working hours per year, equivalent to approximately 200'000 Yen (US\$ 1700). Moreover, HCl consumption for the neutralization was reduced by around 2m³ in a full year. These savings were realized due to the lower electrode maintenance effort required as well as to accurate, uninterrupted pH measurement by our heavy-duty electrode in conjunction with the customer's automatic cleaning / calibration device.

Key-features overview of InPro 3250

- Highly alkali-resistant membrane glass
- Pressurized electrolyte reduces maintenance requirement
- Design suitable for harsh chemical processes

Key-features overview of InTrac 777 e-P

- Flushing chamber for sensor cleaning and calibration
- TRI-LOCK™ safety system
- Multiple choice of process connections