An automated system for pH measurements at AVR

AVR.

AVR specializes in processing various types of waste: wastewater, paper pulp residue, consumer and commercial waste, waste wood and dangerous waste substances.

AVR supplies (sustainable) steam, heat and electricity to the local area (district heating and local industries), helping reduce the dependency on fossil fuels.

The company has two locations where waste is used to generate energy and raw materials, as well as four transfer stations. Waste is transported via water where possible, and when that isn't feasible, via road.

www.avr.nl

Richard Kooijmans and Hadji Cifci

AVR Waste in Botlek, Rotterdam, processes up to 1.7 million tons of residual waste per year. The waste is converted into raw materials and energy using a wide range of processes, which involve a lot of monitoring and regulation.

Process Engineer Richard Kooijmans worked together with Project Leader Hadji Cifci and First Operator Ivan de Craen on a solution for lowering the consumption of pH sensors and further automating the waste processing. Together with the specialists from Endress+Hauser, they have successfully established a fully automated calibration and cleaning system for pH measurement, the Liquiline Control CDC90. This reduces costs and improves process quality.

Customer challenge

Kooijmans says "With our processes –particularly water treatment – you get lots of scaling, a big build-up of scale that causes the sensors to get stuck in the fixtures. In practice, 99% of our consumption is purely due to breakages when changing (sensors). They break off or fall while being handled. Some 18,000 man hours are involved in total!"

Memosens

"We've always used the Memosens sensors; we're now on the fourth generation. The data for the calibration, as well as the process and the sensor itself are stored in the sensor head." Kooijmans also notices that temperature has a big influence on several fronts. "A cold buffer in combination with warm liquid in the sensors can lead to errors. With Memosens, you avoid this because of

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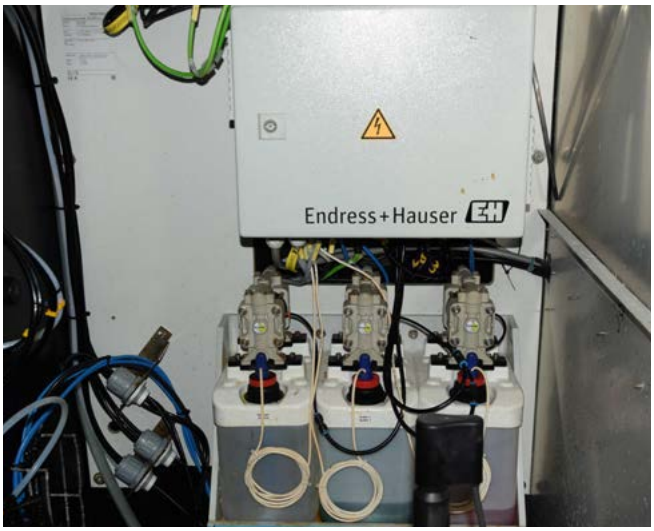

Liquiline Control CDC90 (photo left) and the pneumatic unit for automated supply of cleaning and calibration fluids (photo right).

the conditioned calibration in the laboratory before deployment in the process."

The solution

In order to reduce the consumption of pH sensors and automate the calibration and cleaning processes, a fully automated auto-clean system was installed—Liquiline Control CDC90. "When we decided we wanted to get this part of the processes under control, I talked a lot with the product specialist from Endress+Hauser. Together, we thought about the appropriate hardware for a solution for automatic cleaning. We then did half a year's testing with the Liquiline Control. And that went really well!" The Liquiline CDC90 calibration and cleaning system is a plug-and-play system for Memosens pH measuring points. It cleans, validates, calibrates and adjusts automatically, up to two sensors at a time. This significantly reduces the effort required for maintenance and improves work security too. What's more, the yield and quality of the process are optimized. The system can be easily integrated into the existing installations, allowing remote operation of the measuring points from any process control system or a remote control.

Liquiline Control CDC90 in the background in a case, with two pneumatically controllable retracting fittings for pH sensors on the front.

Admixtures

Water treatment uses specific admixtures to tackle the contamination. Kooijmans uses vortex-mixers for this. These consist of different pots into which the admixtures are tangentially injected. "We're increasingly building skids, like a sort of a toy building brick. In the buffer tank we have a skid with flow measuring and further up in the process we have a skid with the vortex mixers and the auto-clean system."

AVR has seven furnaces which are in continual operation, processing four thousand tons of waste per day. Downtime is not an option, so the company has a reserve line too. With the new system, AVR can adapt an even smarter redundancy.
It's also great for maintenance, because there's no need to stop the whole line, you simply stop one component. And this can be scheduled, too.

Savings

Kooijmans says "It's really important that the processes is repeatable and reproducible. We monitor this by randomly blind-measuring beakers with various pH values using a tripod and an agitator. Now, alternating pH sensors are cleaned every four hours. Before, we had to replace a sensor every two days, now it's only once every eight months. Endress+Hauser takes care of the service and maintenance of the Liquiline Control CDC90. So, we save a lot of man hours and are saved from what is just a messy job. The quality of the water treatment has improved too, which is an unbelievably big win."

The system calibration works really well. AVR always has to have emissions under control for inspection, so calibration is essential. The following step is reading out the relevant data from the pH sensors, as well as the calibration data. The waste processing company only uses the analog pH signal at the moment, but they are working with the DCS to make more data available and to control the Liquiline Control remotely.

Proud

Richard Kooijmans thinks this will be of great use in other factories. The Liquiline Control CDC90 is the first automatic cleaning and calibration system in use here. "Number two is coming soon," he says. "To give you an idea, we had an inspection from the Rijkswaterstaat (executive agency of the Dutch Ministry of Infrastructure and Water Management). They were

seriously impressed with the robustness of the system."
AVR is an innovative company, making changes other companies haven't even considered. There are also no NEN norms or similar norms or standards for their processes, they need to work out for themselves how to make their processes measurable. A robust process when circumstances are challenging and variable. The success of this specific project is a combination of the effort of our own team and the collaboration with Endress+Hauser. Kooijmans says "The optimalization provides new insight which will guide us in further improvements. It's like being given a new, better pair of glasses – suddenly you see more. Now we can continue optimizing. And that's not a simple task – we need real expertise for this."

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