Our customer is a large global chemical corporation. In one of their European facilities they produce sodium silicate, but the excessive time involved in keeping pH sensors clean and calibrated was causing frustration. Switching to METTLER TOLEDO’s Intelligent Sensor Management (ISM®) has reduced sensor maintenance time by 90%.

**Process**
Sodium silicate is a group of compounds with the formula $\text{Na}_2(\text{SiO}_2)_n\text{O}$ of which sodium metasilicate, also known as water glass, is the most well-known. Uses for the compounds are wide and include detergent manufacture, water treatment, and paper production. Sodium silicate can be produced in different ways. In the particular process our customer uses, silicon dioxide ($\text{SiO}_2$) is dissolved in a caustic soda solution under slight pressure. This produces sodium silicate, which can be in solution, gel, or crystalline form. Whatever the type, its final characteristics depend to a great extent on the pH level during production.

**Glass on glass**
Measuring pH in the process can be very challenging and requires continuous care of the pH sensors if reliable measurements are to be maintained. The biggest issue is the fact that silicon dioxide is the main component of glass and it tends to build-up on and bind itself to the glass membrane of pH sensors. As the layer becomes thicker and the glass impedance increases, the sensor’s response slows and it becomes less accurate.

Besides very frequent calibration, sensors also need extensive cleaning with caustic soda to remove the silicon dioxide deposition, which makes maintenance very time consuming. Further, the continuously high pH values in the process, as well as the frequent cleaning, reduces sensor lifetime.

**Intelligent Sensor Management**
When METTLER TOLEDO’s Intelligent Sensor Management (ISM®) sensors were introduced in our customer’s plant, time spent on sensor maintenance dropped dramatically. This is be-
cause digital ISM sensors can be calibrated away from the process in the comfort of a workshop. Now the maintenance staff has changed its routine from cleaning and calibrating sensors at the measurement points, to simply swapping sensors on a daily basis. Sensors needing attention are removed from the process and replaced with clean, pre-calibrated probes that, due to ISM’s Plug and Measure feature, immediately start measuring. The maintenance engineer does not need to do any configuration/calibration routine at the measurement point itself.

Back in the workshop, the sensors from the process are put in a caustic soda solution and are given sufficient time for proper cleaning. After this, the sensors are calibrated in just a couple of minutes with the aid of a PC equipped with METTLER TOLEDO’s iSense software tool. iSense also provides important glass impedance data that shows how much thicker the glass membrane has become. This information allows the customer to decide if stronger cleaning measures are required. In such cases the sensors are treated with hydrofluoric acid to remove excessive SiO$_2$ and bring back fast response and high accuracy.

The pH sensors used are the InPro 2000 i type. This probe allows refilling of electrolyte and can be pressurized to maintain high accuracy in tough processes. The installed transmitters are the M400 2-wire; a loop-powered instrument with HART capability. The M400 supports all ISM features and provides continuous access to sensor diagnostics through both the display and the HART protocol.

**Huge reduction in maintenance time**
Thanks to ISM, time spent on pH sensor maintenance at the plant has been reduced by around 90 percent, and sensor performance has been improved thanks to more thorough cleaning.

Find out more at:

[www.mt.com/ISM-chem](http://www.mt.com/ISM-chem)