Advanced Sensor Technologies, Inc.

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Pulp & Paper Bleaching Case Study - Valve Retractable pH & ORP Sensor Installation

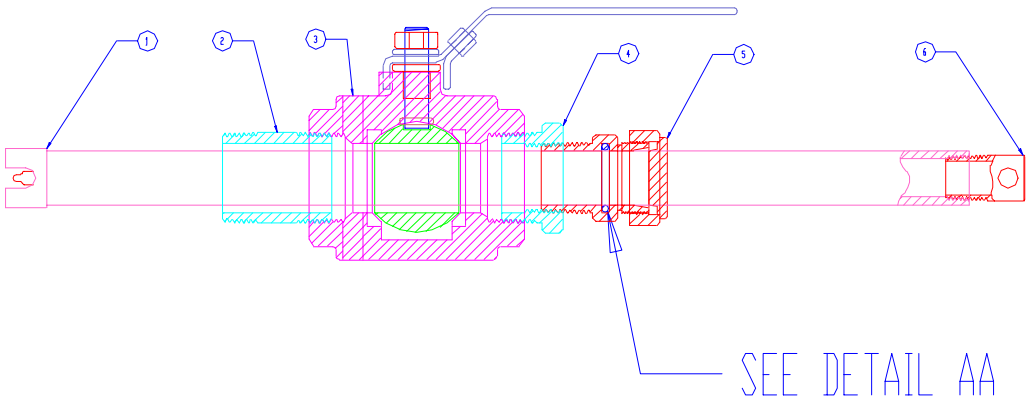
The Company:

A pulp and paper producer wanted to improve their control and reduce their maintenance time and costs for their ClO_2 bleaching process lines. They wanted to better control the brightness of the resultant pulp and reduce down time due to failure and/or cleaning required of the pH and ORP sensors. This meant that they were replacing their sensor every 1-2 months and cleaning and calibrating bi-weekly.

The Problem:

Conventional pH/ORP sensors experienced fast intrusion into the reference element due to the high temperature (from 100 to 150 °C, 212 to 302 °F) and pressure (50 to 100 psi) with the presence of high concentrations of chlorine dioxide gas. Both the pH and ORP sensors required frequent calibrations due thee drift of the reference element. The strong bleaching agent attacked the O-Ring seals inside the probe and the seals of the probe to the titanium sheath. This permitted the dangerous solution and gas to escape intermittently during removal and insertion of the multi-component valve retractable sensor assembly. The sealing agent agents for the junction and pH elements were dissolved and eroded allowing the gas intruded all the way through the reference element to the back of sensor.

The Solution:



A dissolved gas resistant (chlorine dioxide), high temperature, acid/fluoride (low pH) and slurry/viscous resistant pH and ORP Valve Retractable Sensor. This sensor was sealed from the front and back end with agents that were selected based upon the chemicals and process conditions present. The non-porous cross-linked high-density conductive polymer double reference system did not allow for the chlorine dioxide to diffuse in the junction thus **elongating the lifetime of the sensor five fold (5X)** and significantly reduced the frequency of calibration by reducing drift of the reference signal. **The lifetime now improved to servicing 5-6 months for the most problematic lines and cutting the cleaning and calibrating frequency in half**. The single unit, completely sealed, O-Ring free design allowed the high grade thermoplastic (Ultem and PEEK) housed valve retractable sensors to be installed directly into the Ball Valve Assembly. This significantly reduced maintenance time required for disassembly and re-assembly of other manufacturer's multi-component valve retractable designs. This allows greatly **increased the safety of operating the ball valves by removing the possibility of O-Ring seal failure through the novel O-Ring Free Design**. The required temperature element was embedded directly into the sensor, permitting the cable to be connected directly from the back of the sensor in the original equipment manufacturer's (OEM) transmitter. In this way, the company was able to leave the process control loop in place, yet greatly improve the quality of their process through superior pH & ORP sensor performance and lifetime.

The Sensor Part Numbers:

pH Sensor: PNC 9141/9341/9441-3000-20

ORP Sensor: PNC 9841/9141/9341-0000-20

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