



Sodium Bisulfite Absorber and Wet well applications



Process Information:

There are four pH assemblies used to monitor the pH value on a Sulfur Dioxide absorber. The chemical composition is approximately 20-30% Sodium Bisulfite, 4% Sodium Sulfite, and the balance of water. Temperature is around 110 deg F at 5 psig and a pH rating near 4.8.

Process Consideration:

In most cases, the pH sensors are operating to catastrophic failure. This is determined when the transmitter indicates a considerable change to the DCS or failure. The client wants minimal maintenance. Every now and then a physical check with a grab sample is taken as a pH reference.

Product Recommendation:

Utilize an Industrial Duty BAT pH cartridge with a hot tap sheath set for ease of probe replacement. Replace the insertion assembly with a ball valve using Teflon seats and seals, hand tight fitting, Insertion collar stop, possible sample port with stop cock. The 2211xpH Stratos transmitter with sun shield and pipe mount fittings. The BAT pH sensor can be field adjusted via single point calibration. Kube recommends a quality laboratory pH hand held unit. BAT will provide with quotation.

Process Maintenance Consideration:

In order to assist "*the client's*" maintenance concerns, Kube suggests using the BAT sensor and Stratos Transmitters in conjunction with a new mechanical assembly. With the success of the BAT sensors provided over eight months ago without failure, I would suggest a six month sensor replacement procedure. We are confident in the stability of the sensors within the process and along with the transmitter diagnostics and pH grab sample adjustments; this should work well and keep the maintenance low.

pH Sensor

The BAT sensor is a considerable technology upgrade to the Rosemont sensors.

- Rosemont is a second generation design utilizing two junctions with the lower portion being polymerized to keep fluid from leaking out. Pressure and temperature affect the polymer. BAT utilizes a complete wooden core with five junctions and no polymer. In assembly, the BAT probe is completely saturated and assembled submerged with no air enhancing the life. BAT has up to five or six times the potassium chloride volume within the reference junction.
- The BAT electrode is larger with a greater mass of silver/silver chloride wire.
- BAT utilizes a hand blown J-glass. They still use the hand blown process because they limit the impedance to 450 Ohms. The Rosemont glass could have changed to an automatic process with quality ranges between 300 to 600 Ohms.
- Due to mechanical design and modern assembly process, the BAT sensor is more rugged, provides longer stability and greater life.



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Transmitter Features

The transmitter is almost as important as the sensor itself. pH is a difficult measurement with a range of 10 trillion to 1. The translation of the mV reading output from the sensor to a usable and accurate current equivalent affects your process measurement.

In three of the four Sulfur Dioxide Scrubbers, an older style Rosemont 1181 transmitter is being used. These units are nice to get a ballpark pH value as you walk by. Their accuracy is 0.14pH error measurement. In comparison, the Stratos measurement error is less than 0.02 pH value, resulting in over 600% more accurate. In addition, I don't believe the 1181 can be calibrated with a slope correction as the sensor degrades.

The fourth scrubber utilizes a newer technology of the Rosemount 5081 transmitter. This is a better transmitter with only a few differences with the Stratos. They both allow for a single point field adjustment and provide a slope adjustment. The Stratos provides a slightly more detail in data monitoring and provides historical error messages.

We recommend the Stratos 2211(x)pH transmitter. This has the explosion proof C1D1 rating with the intrinsic barrier. In addition it provides comprehensive service function for monitoring both the sensor as well as the transmitter. Data logging allows for accurate service tracking of the sensor. It also provides a single point field adjustment.

Mechanical

In all four applications, the weak point was the ball valve. A considerable amount of material leaked and crystallized on the outside causing a danger as well as difficulty of removing the probe for any calibration or maintenance issues. It is possible the existing valves have Viton seals, which fail at 140deg F, operating temp is near 110 deg F, so over time this could be the problem. I recommend replacing the valve due to packing failure.

One location had a good idea for a pH grab sample location. It is important to obtain a sample as close to the probe as possible. The design initially utilized a 1/8" stainless steel tubing going down to ground level. The problem with this design is contamination of the process material with residual process material in line and fluid cooling. I will recommend a grab sample port without the tubing.

Wet Well Application:

There is a concern about the pH sensors drying out within the wet well. We need further information about the depth of the well, duration of liquid contact verses dry contact. By using the BAT sensors, the increased volume of potassium chloride solution will increase the time before potential drying out of the sensor. We recommend changing the transmitters to the Stratos for diagnostic information indicating sensor failure. Lastly, we may need to discuss a mechanical device to provide liquid submersion in extensive dryness.



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Application probably needs hot tap assembly with removable probe. BAT probe and assembly.



Example of grab sample port, needs to be modified. Replace with BAT probe and assembly.



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Leaking valve assembly through packing, replace with BAT probe and assembly



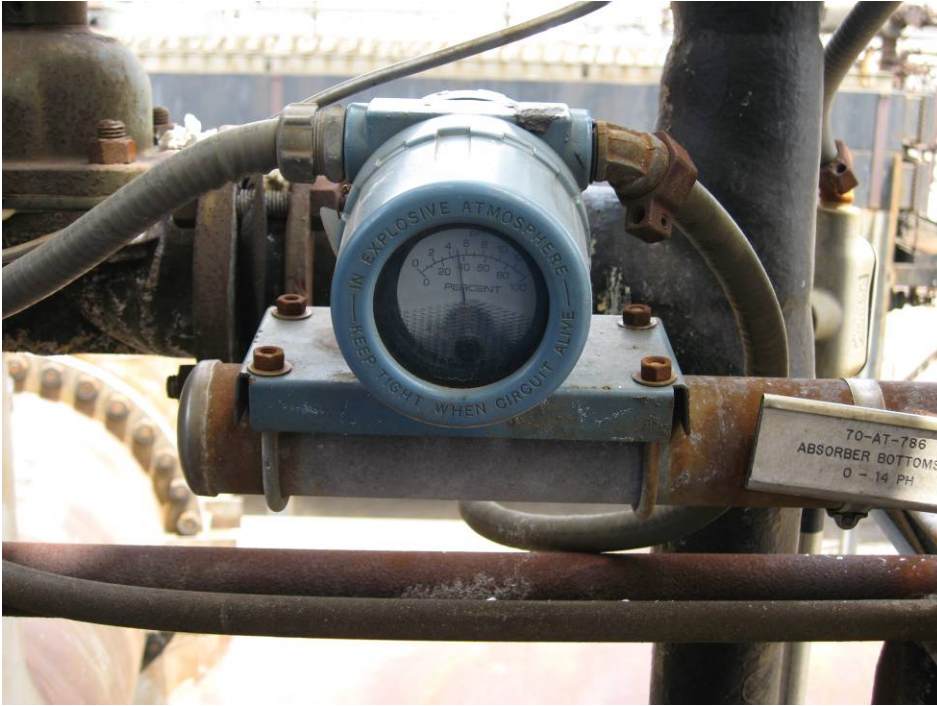
Well Application



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Older Technology transmitter, recommend replacement with Stratos



Failed new technology transmitter, recommend replacement with Stratos