

## Tagged Polymer + PTSA sensor

There are many methods for feeding inhibitor into cooling tower systems. Which one gets selected is a matter of economics and preference of the water treater.

Direct measurement of the inhibitor concentration is both difficult and very expensive. In small, non-critical systems, it is fed by a timer, or in proportion to the amount of time the bleed valve is open. The next step up is a timed feed in proportion to the volume of makeup water added. By adding flowmeter to the metering pump discharge, the algorithm is refined by feeding a known volume of inhibitor in proportion to the volume of makeup water added.

In any of these cases, the only way to know the cooling tower is being treated correctly is to manually measure the inhibitor concentration during a monthly service call. Overfeeding over that time period wastes chemicals and money. Underfeeding results in a scaled up or corroded tower. Either way, the risk of losing the account is real.

PTSA has been used as an additive to inhibitor for decades, as a moderately expensive and reliable way to confirm that inhibitor has been fed in the amount desired. The fluorescent molecule is blended in with the inhibitor, and measurement of the concentration of PTSA can be converted to the ppm of inhibitor fed. The inhibitor can be fed using any of the traditional algorithms and PTSA monitored, or a control algorithm maintaining a PTSA set point can be used.

The downside of this method is that the inhibitor is consumed by doing its job, while the PTSA is not. Upset conditions can quickly deplete the inhibitor while the PTSA concentration remains normal.

The current state of the art involves using an inhibitor (polymer based) that has a fluorescent functional group incorporated into the polymer itself, in addition to having PTSA blended in as well. This solution was proprietary but now the patent has expired, and it is available for everyone.

In the case of an upset condition, the new combination PTSA and Polymer sensor will detect that the PTSA is normal, and therefore inhibitor was fed at the correct rate, yet the polymer concentration is low, indicating that something occurred to stress the system.

In combination with the Walchem WCT900 series controllers, corrective action can occur automatically using its unique control algorithms. These innovative controllers have the ability to control the inhibitor concentration based upon the PTSA reading (via On/Off Control) and then use the polymer reading as the input to a Disturbance type of virtual input. The Disturbance Input is used as a multiplier on the set point of the control algorithm, to increase the PTSA set point to feed more inhibitor if the polymer reading is too low.

Based on the disturbance input channel selection, minimum and maximum disturbance input readings, and defined multiplier values at the minimum and maximum disturbance readings, this Virtual Input generates a value that is used to multiply to a primary control value. Disturbance input channel values that result in a multiplier output of 1.0 have no impact on the final control output.

The output value is restricted between low and high limits to allow more complete control over the impact of disturbance inputs. The value of the multiplier at minimum disturbance can be either higher or

lower than its value at maximum disturbance, depending upon what effect is desired on the control setpoint. In this case, the settings should be adjusted such that the lowest polymer value results in the highest multiplier value.

The remote communication capability of the controller, along with the advanced alarm notification capability of Walchem Fluent, allows the service representative to be immediately notified of the upset condition and respond appropriately. They can monitor the controller's response, change settings, contact local personnel to ensure the pumps and controllers are functioning correctly, and potentially solve any problem without having to go onsite. This is a huge advantage in these times of restricted travel and site access.

The combination of the PTSA + Polymer sensor and the powerful WCT900 controller puts any water treatment chemical company on a level playing field with the large global companies.