LumaTreat® fluorescent tagged polymers

For commercial, industrial, and municipal water treatment systems

Nouryon

Peace of mind with constant verification

System disruptions, high-stress conditions, and changing water conditions can lead to downtime if not proactively addressed. Imagine the peace of mind that comes with constant verification that your system is protected, or early indication of a system upset that could result in costly repairs or lost production time if not promptly addressed.

LumaTreat® fluorescent tagged polymers give operators greater control, operational confidence, and timely information while simplifying formulations – without interfering with scale inhibitor performance.

By enabling continuous, online measurement of available deposit-control polymers in the water treatment system, our LumaTreat® tagged polymers offer a unique advantage over inert tracers, PTSA, or untagged polymers alone. Real-time visibility of available and active polymer levels down to 1 ppm permits water treaters to react more quickly, giving the necessary time to address any system stressors.

High-purity fluorescent tagged monomers are chemically bound to the polymer, lowering blending costs, and enabling our LumaTreat® tagged polymers to provide accurate measurement of the available deposit-control polymer and any amount of stress on the water treatment system. This allows the optimization of both polymer and water usage under everyday conditions without diminishing scale inhibitor performance.

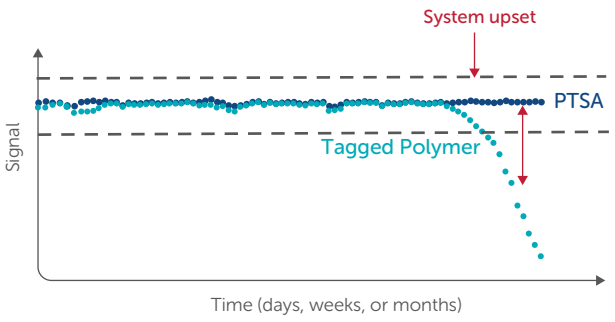
LumaTreat® fluorescent tagged polymers let you:

- Monitor systems remotely and continuously
- Quickly respond to changing conditions through early detection
- Decrease polymer dosage
- Reduce water consumption

Clearer insights

Unique active polymer measurement

Unlike PTSA that must be blended into the formulation, the fluorescent monomer of our LumaTreat® tagged polymers is chemically bound to the polymer structure, eliminating the blending step and associated calibration of the PTSA to the polymer actives.



Continuous verification

Our tagged polymers provide formulators with continuous verification and clear insight to system upsets. As depicted in the chart here, such visibility is not present with untagged polymers or PTSA.

Ask us which LumaTreat® polymer fits your need:

- LumaTreat® FA 140
- LumaTreat® FA 210
- LumaTreat® FB 187
- LumaTreat® FB 242

Continuous reassurance

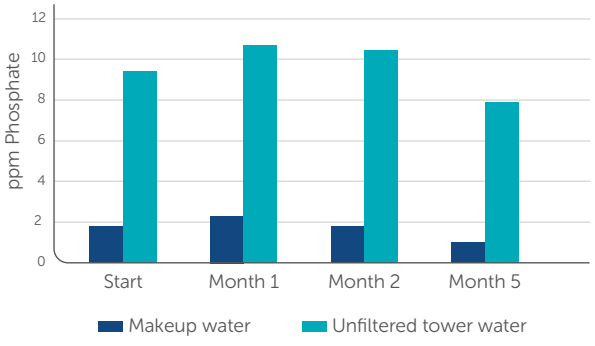
Case Studies

Neutral pH system with varying levels of phosphate

A mid-sized cooling tower using PTSA had been experiencing calcium phosphate scaling issues. The formulation contained an untagged polymer and an inert tracer for phosphate scale control plus phosphate for corrosion control.

In addition to the phosphate in the formulation, the makeup water contained phosphate at levels varying between 1 and 2.5 ppm, resulting in fluctuating phosphate concentrations in the tower during the field trial, depicted in Figure 1. The system pH also drifted between neutral and alkaline, increasing the scale potential.

Fig. 1: Varying levels of phosphate in makeup water and tower system



Working with the water treatment service provider, a new formulation with the LumaTreat® FA 140 tagged polymer was introduced to replace the untagged inhibitor. Because there was sufficient phosphate in the makeup water, formulation phosphate was also eliminated.

Over the five months of the trial, the water treater referred to two sets of data for reassurance that the system was under control and protected from scaling events – the polymer output signal and sample measurements of filtered and unfiltered phosphate.

Figure 2 captures the controller output over a twelve-day period from the trial. Note that the inline fluorometer signal (polymer signal) remained well within the upper and lower setpoints.

Fig. 2: Conductivity and polymer signal control chart output from the trial

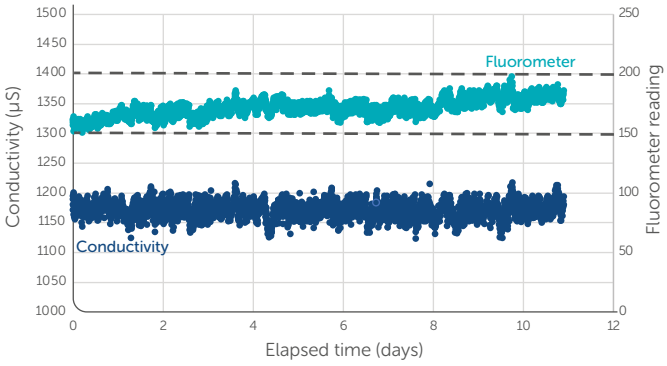
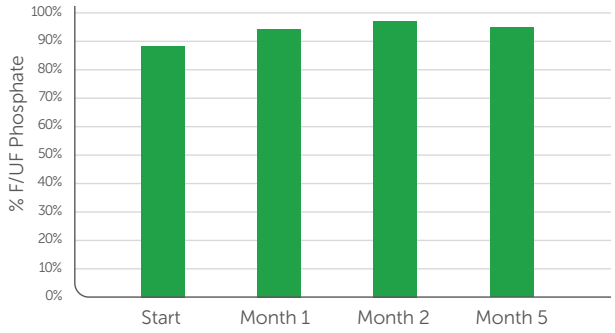


Figure 3 captures the polymer scale inhibition performance over the course of the five-month trial where the filtered/unfiltered phosphate level was maintained above 90%, confirming polymer performance despite fluctuating phosphate levels. If the polymer signal had dropped below the lower setpoint, it would have provided early indication of a system upset.

Fig. 3: Percent filtered/unfiltered system phosphate



Stressed pH system with calcium carbonate precipitation

During a pilot cooling tower study, the pH of the system was intentionally increased to cause calcium carbonate precipitation. In typical field conditions, such an event would not be discovered until a field sample was taken. This study showed that with the LumaTreat® tagged polymer, a drop in polymer signal will automatically trigger an increase in polymer feed until the system stressors are resolved.

Fig. 4: Pilot study monitoring increase in system pH

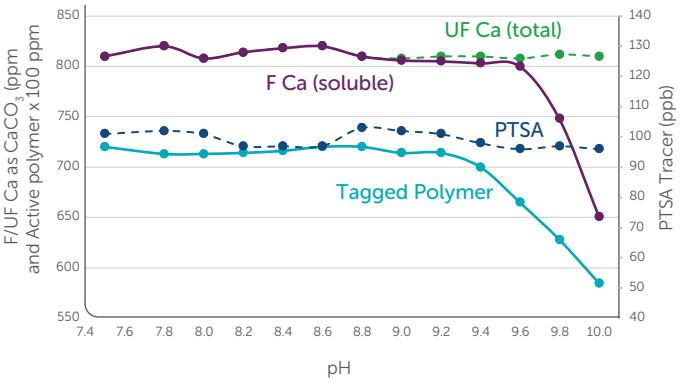


Fig 4. Reference: CTI, Paper No: TP20-14, Advances in monitoring and control of cooling systems chemistry

Alkaline pH system with zero-phosphate formulation

A large cooling tower using an untagged PMA polymer and an inert tracer for scale inhibition was identified by a customer for a field trial. The formulation was phosphonate and phosphate free ("P-free") and operated at alkaline pH.

Working with the water treater, the untagged polymer was replaced with LumaTreat® FB 242, maintaining use of the inert tracer. Additional operating conditions were as outlined below:

- Alkaline pH system: 8.5-9
- Chlorine oxidizing agent as a biocide
- Prefiltered well water for makeup water
  - Typical conductivity: 120–135 µmho/cm
  - Iron level: <0.25 ppm (due to filters)
  - pH: 6.6–7.4
- Continuous measurement of conductivity, pH, ORP, inert tracer, and LumaTreat® FB 242 tagged polymer
- Weekly measurements of iron, total and free chlorine, and micro counts
- Cycles of concentration controlled by conductivity: 650-800 µmho/cm
- Typical cycles of concentration: 5-6
- Formulation feed controlled by signal from inert tracer

During the first four weeks of the trial, denoted as Weeks 1–4 in Figure 5, the polymer signal was lower than expected with regards to the signal of the inert tracer. This indicated consumption of the LumaTreat® FB 242 tagged polymer. It can be inferred that the scale inhibitor was addressing residual fouling in the system and the data conveyed the powerful insight that LumaTreat® tagged polymers provide to the water treater and system owner.

Later in the trial, the iron prefilter failed, and the iron in the system increased to 2.8 ppm. The tagged polymer signal dropped, indicating an increase in polymer consumption. This alerted the water treater of a system upset, allowing the problem to be rectified quickly while avoiding costs associated with increased scaling.

Fig. 5: Inert tracer and LumaTreat® FB 242 control chart output data from trial

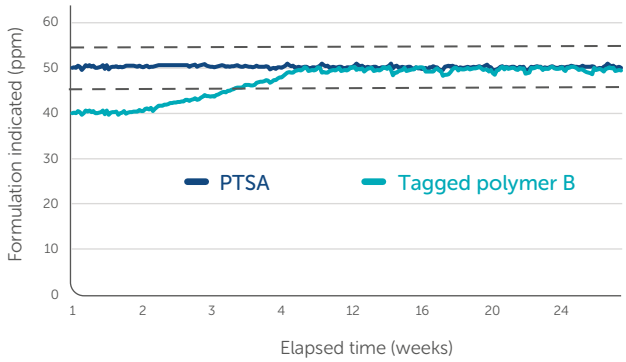
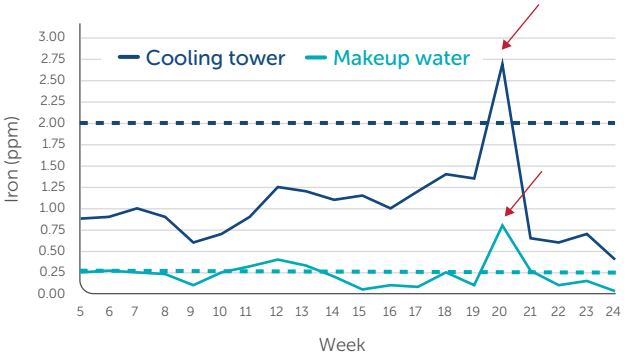


Fig. 6: Iron levels in makeup water and cooling tower system during trial



Monitor and control scale with our tagged polymers

Which tagged polymer is right for you?

Water treatment systems currently using PTSA as an inert tracer along with an untagged scale inhibition polymer can replace both components with our LumaTreat® FA tagged polymers and continue using the same fluorometer. If there is interest in using PTSA in conjunction with our tagged polymers, LumaTreat® FB tagged polymers are the best option.

Polymer	Phosphate scale	Carbonate scale	Dispersancy	Neutral pH or stabilized phosphate systems	Alkaline pH systems	Application
LumaTreat® FA 140	●●●	●●●	●●●	Yes	Yes	Phosphate scale control, dispersancy, and carbonate scale control in neutral or alkaline pH systems
LumaTreat® FA 210	●	●●●	●●●		Yes	Carbonate scale control and dispersancy in alkaline pH systems
LumaTreat® FB 187	●●●●	●●	●●●	Yes		Phosphate scale control and dispersancy, particularly for neutral pH or stabilized phosphate systems
LumaTreat® FB 242	●●	●●●●	●●●		Yes	Calcium carbonate scale control and dispersancy in alkaline pH systems

Contact us for more details
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