



# CoagSense

## Coagulation Controller

CoagSense is an integrated controller that accepts multiple inputs from appropriate parameters including flow, pH, temperature, UV254, turbidity and streaming current. From these measured parameters the CoagSense outputs a flow proportional control signal that can go to a site SCADA or direct to control a coagulant dosing pump.

- **Configured and optimised for each site**
- **Stable and reliable - excellent process control**
- **Can integrate UV254, streaming current, pH, turbidity and flow**
- **Help and consulting available for individual applications**



*"If you want to control something reliably and robustly then you need to measure and allow for all the key affecting variables."*

**Dr. Craig Stracey, Pi**

Previous versions of multi-parameter coagulation control systems from other suppliers have been PLC based, complex, extremely expensive, and have rarely been described as 'robust' or 'reliable'. Pi's CoagSense is instrument based (stand-alone) and fully configurable to manage variations between sites or variations within sites, providing full coagulation control directly or via a SCADA. This instrument approach makes CoagSense affordable for all sites not just the larger ones.

### CRIUS<sup>®</sup>4.0 CoagSense



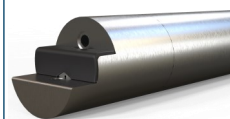
- High Quality - Lowest Cost
- Multilingual
- High resolution colour display
- Intuitive user interface
- Downloadable data logs
- Customisable home pages
- All CRONOS<sup>®</sup> options plus:
  - **Up to 4 sensors**
  - **Remote access via LAN**
  - **Remote access via 3G/4G**
  - **Expandable to 16 sensors**

***For more information please see the individual brochures for CRIUS<sup>®</sup>4.0***

### Sensors for Coagulation Control



**pH** - available from Pi or from existing site sensor



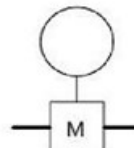
**Turbidity** - available from Pi or from existing site sensor



**UV254 Sensor** - available from Pi or from existing site sensor



**Streaming Current** available from Pi or from existing sensor



**Flow** - available from existing plant flow meter

## Philosophy

For many years water companies have been looking to control coagulant dose on a single parameter. That parameter has been pH, turbidity, streaming current and UV254. All of the parameters have been used to control coagulation with varying degrees of success. The CoagSense allows for the control of coagulation on a water treatment plant using one or more or all of these parameters.

Coagulation is affected by multiple variables associated with, and individual to, any one water treatment site. These include but are not limited to:

- **raw water pH, alkalinity, turbidity, organic loading, temperature**
- **coagulant**
- **post coagulant pH, temperature**
- **physical aspects including dosing point, mixing etc.**

These variables are typically different from site to site, water source to water source, season to season and even day to day.

Pi believes that one size doesn't fit all. One method of coagulation control cannot be trialled at one site and rolled out across many. Each coagulation control system needs to be designed and specified for each water treatment plant and that is a service offered by Pi.

## Consultancy and Expertise

Through training and expertise, Pi is well placed to offer support and guidance on selecting the most appropriate coagulation system, ensuring its correct installation and commissioning, training for operators and ongoing remote supervision to ensure optimal coagulation into the future.

## References

1. Edzwald, J. K. & Kaminski, G. S. A simple method for plant water optimization and operation of coagulation. (American Water Works Association, 2007).

## Solution

CoagSense uses a range of sensors from Pi or existing plant sensors that can be added to a central controller (analyser).

The controller then takes those signals, manipulates them and produces a signal that controls the dosing of a coagulant.

### Flow

Used to increase or decrease the coagulant dose proportionally to flow.

### Raw Water pH

Perhaps the single most important parameter in coagulant control, Pi uses an extremely fast responding, reliable, solid, polymeric junction pH sensor to alarm if pH moves outside a predetermined range or preferably to control the pH of raw water on a separate PID loop, with the addition of an acid or alkali or occasionally both.

### Coagulated Water pH

Used to alarm if the pH goes outside a predetermined range, or is used as a de-coupled PID loop to control alkali or acid addition.

### UV254

During periods of low turbidity and high SUVA<sup>1</sup>, optimal organics and therefore THM removal can be achieved using feed forward control from a UVA signal.

### Raw Water Turbidity

When turbidity is high, or when SUVA is low<sup>1</sup>, turbidity can become the primary contaminant determining the coagulant dose and feed forward turbidity control is required.

### Streaming Current

With the right water conditions or coagulant, streaming current feedback control can offer the simplest and most reliable coagulation control. Installed in over 5000 plants worldwide, streaming current monitors can offer a robust and cost effective solution. Understanding the relationship between pH and streaming current is essential to a successful implementation of a streaming current based coagulation control.

