The Solution To Dechlorination Control

Model A15/66

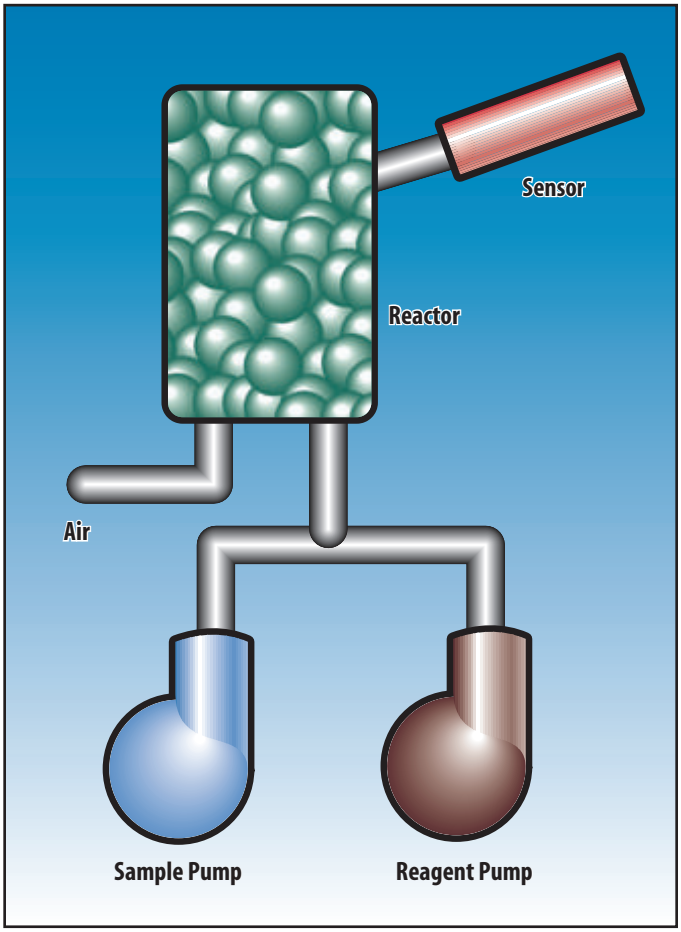
Residual Sulfite Monitor

Keep Chemical Costs Under Control

Dechlorination of wastewater effluent is common practice in many treatment facilities throughout the US. Strongly reducing sulfur compounds are used to eliminate chlorine residuals that might prove toxic to fish in the receiving stream. Because residual chlorine discharge limits are often very close to zero, monitoring residual values to comply with regulations has become very difficult, and controlling residuals at values between zero and a few hundred parts-per-billion is often not achievable.

Residual chlorine is normally removed by injection of either sulfur dioxide gas or a solution of sodium sulfite or sodium bisulfite. Because the resulting sulfite ion is a strong reducing agent, any residual chlorine in solution is destroyed. As long as there is an excess of sulfite ion in solution, residual chlorine is effectively zero. In practice, most plants subject to dechlorination requirements run relatively high sulfite residuals to ensure complete chlorine removal at all times. While this practice is effective from a chlorine removal standpoint, one result is excessive chemical consumption.

ATI's Model A15/66 Sulfite Ion Monitor provides the solution to dechlorination control. The system allows continuous measurement of sulfite residuals over ranges of either 0-2 or 0-20 PPM. An analog output from the monitor can be used for control of the chemical feed system to maintain a safe residual sulfite concentration while reducing chemical expense to a minimum.



Operation

The A15/66 Monitor takes a unique approach to the measurement of sulfite ion concentration. In operation, a small amount of sample is pumped into the system and mixed with acid. In acidic solution, the sulfite ion is converted to sulfur dioxide according to the following reaction:

$$SO_3^{-2} + 2H^+ \rightarrow SO_2 + H_20$$

The mixed sample flows into a special chamber where the sulfur dioxide is stripped from the sample. A sensor located in the gas stream measures the released SO_2 concentration and displays the results in terms of equivalent sulfite ion concentration.

Sulfite measurement in dechlorinated effluent has frequently been plagued by fouling problems. An important feature of the A15/66 system is the fact that the sensor never comes in contact with the wastewater sample. The result is a system that will continue to function, regardless of the quality of the effluent, or the presence of sulfur reducing bacteria that can proliferate in water containing excess sulfite.

System Components

Sulfite Monitors consist of three separate components: a chemistry module where the sample is pH adjusted for measurement, an inlet overflow assembly where raw sample is delivered to the system, and an electronic readout containing the sulfite concentration display, analog output, and alarm contacts. Readout modules are available in either wall mount NEMA 4X or general purpose panel mount versions. A 20 foot interconnecting cable is supplied to connect the monitor to the chemistry module, and this separation can be increased to a maximum of 100 feet if required. An optional stainless steel system panel is available for mounting all components and providing a convenient shelf for reagent bottles.

Sample is connected to the inlet overflow assembly using 1/4" ID flexible tubing. Recommended sample flowrate is 3-30 gallons per hour (.2-2 LPM). While the monitor uses only a small fraction of this sample, higher flow keeps sample delivery times to a minimum. Excess sample simply overflows to a drain chamber. A 1/2" I.D. hose barb is provided for connection of drain tubing.

Sulfite monitoring systems are extremely easy to operate and maintain. Acid usage for pH adjustment in the chemistry module is inexpensive and consumption is limited to one gallon every 40 days. Peristaltic pumps are used for sample and acid using long life tubing that requires replacement every 6 months. Pump heads are designed for easy tube changes, requiring about 10 minutes to replace both tubes. The sulfite gas sensor requires no maintenance other than an occasional visual inspection to ensure that no deposits have collected on the sensing membrane.

Other methods of monitoring dechlorination, such as "biased" chlorine monitors or ORP monitors, cannot match the sensitivity, selectivity, and overall accuracy of the A15/66 Residual Sulfite Monitor. If better dechlorination process control is your goal, continuous sulfite measurement will provide the key to ensuring complete dechlorination while reducing chemical consumption.

Chemistry module

Panel mount monitor

Features

Direct Sulfite Measurement: Sulfite ion is measured selectively by conversion to sulfur dioxide.

Alphanumeric LCD: Provides $SO_3^=$ display, alarm status indication, and all configuration information.

Two Control Relays: Relays are programmable for setpoint, dead-band, and time delay. Relays offer pulse frequency and pulse width modulation control modes in addition to simple on/off control for direct chemical feed pump modulation.

Isolated Output: Programmable 4-20 mA output span from 0 - 0.2 PPM to 0 - 20.00 PPM full scale. Output may also be inverted if required.

Automatic Cleaning: Monitor provides system for controlling the automatic cleaning of sample inlet line to control fouling.

Gas Phase Sensing: Measurement is made without contact between sample and sensor, eliminating the potentional for sensor fouling.

Model A15/66 SO_3 Monitor Specifications

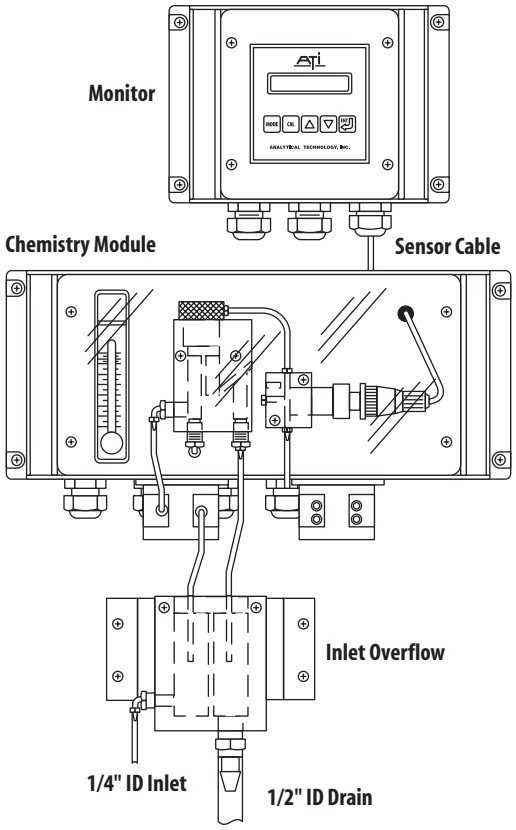
Electronic Monitor

Range:	0-2.000 or 0-20.00 PPM
Accuracy:	±0.03 PPM
Repeatability:	±0.01 PPM
Linearity:	0.1% of FS
Zero Drift:	<0.01 PPM per month
Display:	16 character alphanumeric backlit LCD
Control Relays:	Two SPDT relays, 5A @ 220 VAC resistive Programmable deadband and time delay
Control Mode:	On/Off, pulse width modulation, pulse frequecy modulation
Alarm Relay:	Programmable for actuation on high/low values or system failure.
Analog Output:	Isolated 4-20 mA, 600 ohm maximum load. Programmable output span. Output may be inverted.
Operating Conditions:	0-50°C, 0-95% RH non-condensing
Power:	110/220 VAC ±10%, 50/60 Hz
Enclosure:	Panel mount standard, NEMA 4X (IP-65) wall mount optional

Chemistry Module

Sensor:	Membraned SO_2 gas sensor
Sensor Cable:	25 ft standard, 100 ft maximum
Response Time:	95% in 3 minutes
Sample Pump:	Internal tubing pump, 5 cc/min
Acid Pump:	Internal tubing pump, 0.06 cc/min
Air Supply:	Diaphgram air pump with precision flow control
Air Stripping Chamber:	Cast Acrylic
Temperature Limits:	0-50°C
Sample Flow Rate:	3-30 GPH (.2-2 LPM.) at sample inlet overflow assembly
Sample Inlet:	1/4" ID hose barb
Sample Drain:	1/2" ID hose barb
Power:	120 VAC, 60 Hz. standard, 220 VAC, 50 Hz optional

Typical Installation



Ordering Information: Model A15/66 - C - D Monitor

Suffix C - Enclosure
- 1 - Panel Mount
- 2 - NEMA 4X Wall Mount Suffix D

Suffix D - Power
- 1 - 120 VAC, 60 Hz
- 2 - 220 VAC, 50 Hz

Options:

00-1261	Stainless steel system mounting plate
31-0037	Sensor interconnect cable (max. 100 ft.)

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PDS-A15/66 (08/10)