

Chemical additive flow detection



Water and Wastewater Case Study 304-2

Application

The water treatment industry uses a variety of methods to treat potable water in order to bring it into compliance with taste, odor, appearance and health standards. A fundamental part of the treatment process is the use of chemical additives such as alum, polymer, caustic soda, and ferric chloride. Chemicals are added at different points in the treatment process to help purify and clarify the water.

To dispense and meter the chemical additives, positive displacement pumps are commonly used. The quantities of chemicals added to the water are very small and flow rates of 1 to 2 gallons per hour (gph) are typical. Because the chemical content of the water is critical to its quality and safety, treatment plant operators must assure that the chemical additives are flowing.

Challenge

It is common industry practice to assume

the chemical additives are flowing as long as the actuators in the displacement pumps are moving. However, plant operators soon find out that monitoring the actuator movement does not guarantee chemical flow. Chemical reservoirs run dry, blocking valves are accidentally closed, lines leak and injectors clog, yet, the pump's actuator continues its cyclic motion.

Monitoring the flow of the chemical additives is a more dependable way to assure chemical flow. Unfortunately, flow monitors typically are not sensitive enough to detect extremely low flow rates nor robust enough to withstand corrosive chemicals.

Project parameters

User	Wastewater treatment plant
Location	Fairfield, CA USA
Media	Alum, sodium hydroxide, hydrofluosilicic acid

Flow Range	1.27 to 1.59 gph [0.08 to 0.10 lpm]
Pressure Range	0 to 10 psig [0 to 7 bar(g)]
Temperature Range	-50° to +100°F [-46° to +38°C]
Alarm Setpoint	0.48 to 0.65 gph [0.03 to 0.04 lpm]

Solution

FCI created the VelociTee® flow conditioner in response to the water treatment industry's need for a reliable, chemical additive flow monitor. The VelociTee is a special PVC tee designed to boost the velocity and dampen the flow pulsation of the chemical additives. Its unique construction also maintains a flooded measurement cavity.

The VelociTee is used with FCI's FLT93S FlexSwitch® that has been an industry thermal flow switch standard of reliability since 1964. Pairing the all-welded FLT93S with the VelociTee creates a chemical additive flow monitoring system that exceeds the water treatment industry's dependability, sensitivity and ruggedness requirements.

FCI flow switch specifications

Model	FLT93S FlexSwitch®
Media	Water
Flow Range	0.3 to 420 gph [0.019 to 26.5 lpm]
Pressure Range	0 to 3500 psig [0 to 241 bar(g)]
Temperature Range	-100° to +850°F [-73° to 454°C]

FCI flow conditioner specifications

Model	VelociTee
Process Connection	Compatible with 1/2, 3/4 and 1 inch piping

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FCI is ISO 9001 certified/conformance to AS9000