

Rev. 11/97

ChemScan® Application Summary #82 Wastewater Chloramination Process Control

Statement of the Problem

Chloramination of wastewater is difficult to control because of the variable concentration of ammonia that may be present in wastewater that has not been fully nitrified during the treatment process. The ammonia concentration is rarely proportionate to the flow rate, thus making flow paced control an unreliable strategy.

Process Control Strategy

Under variable ammonia conditions, one strategy is to monitor incoming ammonia (prior to a chlorine addition point) and use this information to feed forward a desired addition value for chlorine which has been stochiometrically calculated to produce a desired monochloramine concentration. A second sample point at or after the point of chlorine addition is used to verify that the desired monochloramine concentration is being achieved and that the set point for free ammonia following chloramine formation is also as desired (zero or at some minimum value). The desired monochloramine concentration is selected based on the concentration and contact time necessary to assure disinfection of the wastewater.

Apparatus

ChemScan Process Analyzers are designed to detect free ammonia, chloramine or both in wastewater from one or more points in the treatment process.

The ChemScan ammonia method detects ammonia in the form of NH_3 by adjusting sample pH using a hydroxide solution and injecting a surplus of hypochlorite in the form of a bleach solution, forming a monochloramine that can be detected directly by the ChemScan analyzer.

Monochloramine is detected directly in wastewater at a standard pH of 6-9, without the need for reagents or pH buffer.

An alternate method of chloramine analysis injects a pH buffer to force monochloramine into the di- or tri-chloramine state, and compares the difference in absorbance spectra before and after the pH change.