

ChemScan[®]

PROCESS ANALYZERS

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ChemScan[®] Method Summary #41 Free Ammonia in Water and Wastewater

Standard Ammonia Analysis

Selection of analytical methods for ammonia are usually a function of the expected concentration and the expected interferences in the samples. In the laboratory, fresh water or treated wastewater samples are generally analyzed without a prior sample distillation step. Distillation prior to analysis is typically performed in the lab for high concentration water or wastewater samples.

Standard ammonia analysis is generally performed using ion specific electrodes, or using single wavelength colorimetry following addition of phenol (phenate method) or mercury iodide (Nessler method). These reagents are highly toxic and require special handling and sample disposal, making these methods unsuitable for short interval on-line analysis.

ChemScan Analytical Method

On-line analysis of ammonia using the ChemScan Process Analyzer is based on the formation of a chloramine using hypochlorous acid at a controlled pH. Ammonia does not have an absorbance signature in the ultraviolet range, but chloramine does exhibit strong ultraviolet absorbance. pH control is necessary to assure rapid reaction time and to assure that all ammonia present is in the form of NH_3 prior to chlorine addition. See Figure 1.

The ChemScan Process Analyzer must be set up to characterize the background absorbance spectra of the sample prior to introduction of any reagents or pH buffers which compensates for any existing chloramine and other absorbance background in the sample. The analyzer must also be calibrated to compensate for the effects of variable sample turbidity. Reagent concentration is set based on the ammonia range and the presence of other oxidizable matter expected in the sample. The ChemScan multiple wavelength detection and pattern recognition software is used in this analysis.

Monitoring System Requirements

Sample extraction points are a function of the process being monitored. Water treatment applications such as chloramination or wastewater applications such as nutrient removal, nitrification process control, aeration control and chloramination control require careful

sample point selection to assure good results. Consult the factory or the local ChemScan representative for advice and assistance.

The ChemScan Process Analyzer can accommodate samples with up to 150/mg/l of total suspended solids and turbidity of up to 60 NTU. Samples extracted from points in the treatment process ahead of secondary clarification will typically exceed these solids or turbidity specifications. These samples will require filtration or settling prior to analysis to produce a sample meeting ChemScan solids and turbidity requirements. ChemScan has Cross Flow membrane filters and porous plastic Cyclic Filters available for use with on-line analyzer systems. Sample points should be selected to assure that fat, oil and grease (FOG) will be low enough not to foul the sample filtration method selected for the analyzer system. Raw wastewater samples (especially prior to screens, grit removal, FOG removal and primary clarification) are difficult to analyze and are of questionable value for process control. The ideal initial sample point is after RAS and recirculation addition to the primary effluent.

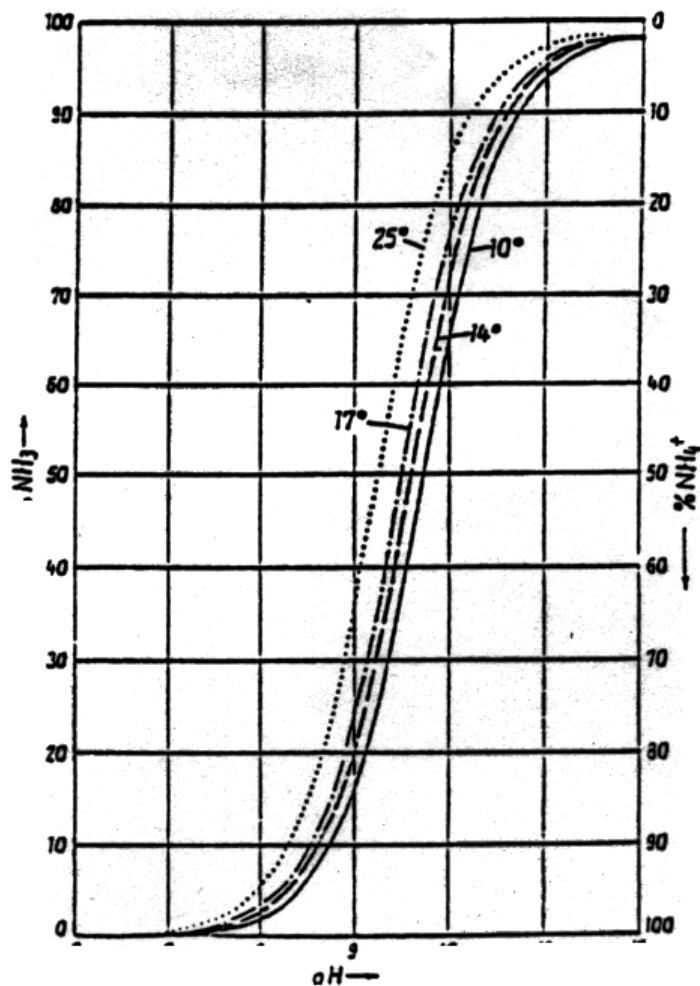


Figure 1
Ammonia distribution with pH