Comparing Chlorine Measurement Methods

Colorimetric DPD Analyzer vs. Amperometric Electrode

	DPD	Amperometric
Technique	(N,N-diethyl-p-phenylenediamine) Colorimetric, Reagent and Analyzer-based	Electrode-based
Description	The standard measurement method of chlorine. This technique uses reagents and a photometer to measure the amount of free or total chlorine in a sample.	Designed for process control using two dissimilar electrodes (anode and cathode) to measure the change in current based on a chemical reaction taking place that is proportional to the amount of chlorine in the sample.
Measurement Range	• 0 ... 5 mg/l free or total chlorine, depending on reagents • Threshold 0.03 mg/l	Depending on version • 0.005 ... 20.00 mg/l (free chlorine) • 0.01 … 2.00 mg/l (total chlorine)
Interferences	Iron causes negative interference at all levels. Manganese causes positive interference at all levels.	Dependent on consistent pH, sample temperature, flow and pressure. Chlorine concentration cannot fluctuate by more than ±20 % or be at zero.
Maintenance	• Replace reagent monthly • Replace tubing every 6 months • Cleaning requirement dependent on application	• New electrolyte every 6 month • New membrane every 12 month • Electrode polishing, if required
Calibration	• No calibration required. Factory calibrated (only needs calibrated if required by a regulatory agency). • 1-point calibration adjustment based on a grab sample is possible.	• Weekly reference measurement recommended. • Membrane conditioning and sensor calibration required every 1 to 2 months and after a membrane change
Causes of Fouling	Air in sample line, biological growth in measurement cell and sample turbidity >100 NTU.	Iron, manganese and high turbidity can increase calibration and maintenance requirements.

Advantages and Disadvantages:

The measurement of chlorine in aqueous samples with the DPD analyzer WTW Chlorine 3017M and the amperometric WTW chlorine electrodes each have their own advantages and disadvantages.

The amperometric method does not require reagents like the DPD method , and therefore produces less waste. But the maintenance schedule is usually more extensive and less predictable. The life of electrodes and electrode membranes will depend on process conditions. The overall maintenance is less when using a DPD analyzer as it can operate unattended for over 30 days.

The amperometric method is more sensitive and can cover a larger measurement range than a DPD analyzer. However, an amperometric electrode cannot measure chlorine accurately if the sample's pH, temperature, sample flow, sample pressure and chlorine levels fluctuate more than 20 %. In addition, the chlorine level must not be 0. The DPD method's accuracy on the other hand, is not constrained to these conditions. Furthermore, the DPD method wastes less water than the amperometric method.

WTW Chlorine 3017M DPD analyzer

WTW FCML 412 N amperometric chlorine electrode

Do you have further questions?
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