

DPD (Colorimetric) vs. Amperometric (Electrode) Method

	DPD Reagent-based method	Amperometric Electrode-based method
Technique	Colorimetric, Reagent-based	Electrochemical, 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.
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 $\pm 20\%$.
Maintenance	<ul style="list-style-type: none"> • Replace reagent monthly • Replace tubing every 6 months • Cleaning requirement dependent on application 	<ul style="list-style-type: none"> • Reference measurement every week. If not within accuracy limits one or all of the below tasks are to be performed: <ul style="list-style-type: none"> • Calibration required every 1 to 2 months • Electrolyte refill every 6 months • Cap Exchange every 12 months
Calibration	<ul style="list-style-type: none"> • No calibration required. Factory calibrated (only needs calibrated if required by a regulatory agency). • 1-point calibration adjustment based on a grab sample. 	Required every 1 to 2 months if reference measurement shows electrode drift
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 & Disadvantages:

The DPD method and amperometric method of measuring chlorine in aqueous samples each have their own advantages and disadvantages. The amperometric method does not require reagents like the DPD method but the maintenance schedule is 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 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%. 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.

The Chlorine 3017M is factory calibrated and does not require regular calibrations unless required by the regulatory agency. This saves time over the amperometric method, which requires weekly calibrations. In addition, unlike the amperometric analyzer the Chlorine 3017M is not affected by sample variation. The Chlorine 3017M operates independent of changes in pH, temperature, pressure, flow and chlorine.

Advantages

Disadvantages

DPD Method

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| <ul style="list-style-type: none"> • Easier to install and use • User calibration not required • Minimal sample conditioning • Not affected by changes in <ul style="list-style-type: none"> · pH, · chlorine concentration, · temperature, · pressure or · flow • Predictable maintenance schedule | <ul style="list-style-type: none"> • Uses reagents • Higher maintenance cost |
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WTW Chlorine 3017M DPD analyzer

Amperometric Method

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| <ul style="list-style-type: none"> • Reagentless • Higher measuring range | <ul style="list-style-type: none"> • Frequent reference measurements required • Prone to fouling from <ul style="list-style-type: none"> · iron, · manganese and · high turbidity • Chlorine concentration must not fluctuate by more than 20% and must not be equal to 0. |
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WTW FCML 412 N amperometric chlorine electrode

Do you have further questions?
Please contact our
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