

Chlorine (free & total) - DDPD Method

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Applications and Industries

Drinking water, wastewater, surface and ground water,
industrial process water, pools and spas
Food and Beverage industry

References

Method developed by CHEMetrics

Chemistry

Free chlorine oxidizes DDPD, a methyl substituted form of DPD (N,N-diethyl-p-phenylenediamine), to form a purple colored species in direct proportion to the chlorine concentration. Total chlorine, the sum of free chlorine and combined chlorine (chloramines), is determined by adding potassium iodide (A-2500 solution) to the sample. Chlorine oxidizes the iodide to iodine, and the iodine then oxidizes DDPD to the purple colored species. Results are expressed in ppm (mg/L) Cl₂. The combined chlorine concentration of a sample can be determined by difference between the total and free results.

Sampling Information

Chlorine is not stable in aqueous solution. Sample agitation and exposure of samples to light should be minimized. Chlorine analysis should be performed immediately after sample collection.

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:

CHEMets and ULR CHEMets refills, color comparators,
Activator Solution: at least 1 year

Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

CHEMets and ULR CHEMets kits:
± 1 color standard increment

Available Analysis Systems

Visual colorimetric: CHEMets®, ULR CHEMets®

Interference Information

- Various oxidizing agents, including other halogens (bromine, iodine), ozone and peracetic acid, and various halogenating agents will react with the chemistry to cause false high test results.
- Chlorine itself and other halogens at concentrations significantly above the test kit range may prevent proper color development, causing a false low result.
- Chloramines present at concentrations within the test range do not interfere significantly during free chlorine analysis at 1 minute of color development but are an increasing positive interference beyond 1 minute.
- Nitrite interferes positively, particularly during total chlorine analysis.
- Oxidized manganese (permanganate, Mn⁷⁺) interferes positively; however, it is not appropriate to use permanganate standards to validate this test method.
- Cupric copper may interfere positively.
- Chromate at levels up to 15 ppm should not interfere.
- Ferric iron and hydrogen peroxide at concentrations comparable to the test range do not interfere with this chemistry.
- Sample pHs between 2 and 8 can be tolerated. Samples with extreme pHs should be adjusted to approximately 6-7 prior to analysis.
- The DDPD chemistry is UV-light sensitive. When performing the test outdoors, care must be taken to prevent exposure of the ampoules to sunlight, both before use and after the ampoules have filled with sample.
- Sample color and turbidity may make a visual color match difficult.

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.