

Chlorine Dioxide - DPD Method

Version 9 / May 2023

Applications and Industries

Industrial cooling water, municipal water treatment systems
Food and beverage, pulp and paper, poultry industries
Not recommended for seawater analysis

References

APHA Standard Methods, 20th ed., Method 4500-ClO₂ D – 1993 and 23rd ed., Method 4500-Cl G – 2000
USEPA Methods for Chemical Analysis of Water and Wastes, Method 330.5 (1983)

Chemistry

Chlorine dioxide oxidizes DPD (N,N-diethyl-p-phenylenediamine) to form a pink colored species in direct proportion to the chlorine dioxide concentration. Results are expressed as ppm (mg/L) ClO₂.

Available Analysis Systems

Visual colorimetric: CHEMetrics®

Instrumental colorimetric: Vacu-vials®

Storage Requirements

Products should be stored in the dark at room temperature.

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

CHEMetrics refill, color comparators: at least 1 year

Neutralizer Solution: at least 8 months

Instrumental colorimetric:

Vacu-vials kit: at least 8 months

Accuracy Statement

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

CHEMetrics kit: ± 1 color standard increment

Vacu-vials kit:

With Spectrophotometer, V-2000 and V-3000:

≤0.2 ppm at 0 ppm

±0.2 ppm at 0.8 ppm

±0.6 ppm at 2.8 ppm

±0.8 ppm at 8.3 ppm

With I-2005 SAM:

≤0.5 ppm at 0 ppm

±0.3 ppm at 1.0 ppm

±0.6 ppm at 2.8 ppm

±0.8 ppm at 8.3 ppm

Sampling Information

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

Interference Information

- Interference from up to 6 ppm free chlorine is prevented by the addition of glycine to the sample.
- Bromine, iodine and permanganate will interfere positively.
- Ozone may interfere positively.
- Chlorine dioxide itself and other oxidizers at concentrations significantly above the test range may prevent proper color development, causing a false low result.
- Chloramines (combined chlorine) present at concentrations up to approximately 5 ppm do not interfere significantly at 1 minute of color development but are an increasing positive interference beyond 1 minute.
- Persulfate up to 10 ppm is not expected to interfere at 1 minute of color development. Beyond 1 minute or at higher concentrations, persulfate may interfere positively.
- Sample pHs between 2.5 and 10 are tolerated. Samples with pHs outside this range or that are highly buffered should be adjusted to pHs of approximately 6 - 7 prior to analysis.
- Hydrogen peroxide at concentrations up to approximately 10 ppm does not interfere with the test at 1 minute of color development.
- Ferric iron can be tolerated at concentrations up to 10 ppm.
- Cupric copper up to 10 ppm does not interfere.
- Manganese (II), Mn⁺², at up to at least 100 ppm does not interfere.
- Nitrite at concentrations up to at least 5 ppm does not interfere.
- Chromate may interfere.
- Sample color or turbidity may make a color match difficult during visual colorimetric testing and may cause a false positive result with instrumental colorimetric tests. CHEMetrics' Sample Zeroing Accessory Pack can be used to correct for potential errors during instrumental analysis.

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.