Ozone - DPD Method

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Applications and Industries

Potable water, pools and spas, seawater*, wastewater
Food & beverage and pharmaceutical industries

References

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

Chemistry

Sample is treated with an excess of potassium iodide. Ozone oxidizes the iodide to iodine, and the iodine then oxidizes DPD (N,N-diethyl-p-phenylenediamine) to form a pink colored species in direct proportion to the ozone concentration. Results are expressed as ppm (mg/L) O_3.

*The DPD chemistry can be used to determine the concentration of Total Residual Oxidizers (TRO) in seawater.

Analyte-Specific Information

Because ozone decays rapidly in water, analysis should be performed immediately upon sample collection. Similarly, manipulation of the sample during collection should be minimized to avoid dissipation of ozone from the sample. Residual ozone is most stable in clean waters with pHs of less than 6.

Available Analysis Systems

Visual colorimetric: CHEMets®
Instrumental colorimetric: Vacu-vials®

Storage Requirements

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

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:
CHEMets refill, color comparators, Activator Solution: at least 1 year

Instrumental colorimetric:
Vacu-vials kit: at least 1 year

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.

Interference Information

- The following oxidizers are measured quantitatively in addition to ozone: total chlorine, total bromine, total iodine, peracetic acid, performic acid, chlorine dioxide, and permanganate.
- A procedure for the determination of ozone concentration in the presence of up to 2 ppm chlorine is available. Contact technical@chemetrics.com for details.
- Oxidizers at concentrations significantly above the test range may prevent proper color development, causing a false low result.
- At 1 minute of color development, persulfate up to approximately 1.5 ppm can be tolerated. Beyond 1 minute or at higher concentrations, persulfate may interfere positively.
- Sample pHs between 2.5 and 10 are tolerated with this chemistry. However, the rate of ozone decomposition in solution increases with increasing pH. Ozone is most stable when the sample pH is below 6.
- 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 at least 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 with the DPD chemistry. However, nitrite and ozone co-react, depleting the ozone in solution.
- 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.

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 kit: ± 1 color standard increment

Vacu-vials kit:
≤0.05 ppm at 0 ppm
±0.06 ppm at 0.20 ppm
±0.25 ppm at 1.25 ppm
±0.38 ppm at 3.75 ppm