Oxygen (dissolved) - Indigo Carmine Method

Version 10 / Jun 2023

Applications and Industries

Industrial wastewater influent and effluent, industrial process waters, surface and ground water, seawater, potable water

References

ASTM D 888-87, Dissolved Oxygen in Water, Test Method A

Gilbert, T.W., Behymer, T.D., Castaneda, H.B., "Determination of Dissolved Oxygen in Natural and Wastewaters," American Laboratory, pp. 119-134, March 1982

Chemistry

In an acidic solution, oxygen oxidizes the yellow-green colored leuco form of indigo carmine to form a highly colored blue dye. The resulting blue color is proportional to the dissolved oxygen concentration in the sample. Test results are expressed as ppm (mg/L) O_2.

Sampling Information

The most critical part of any dissolved oxygen test is sampling. It is difficult to obtain an aliquot that accurately reflects the oxygen content of a sample. Exposure to the high oxygen content of air will cause a sample to approach saturation. Biological activity may cause rapid oxygen depletion. Dipping and pouring operations should be performed with as little agitation as possible, and analysis should be performed immediately after sample collection. At the time of analysis, CHEMets ampoules should be gently lowered into the color comparator to avoid introduction of atmospheric oxygen into the ampoule.

Available Analysis Systems

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

Storage Requirements

Products should be stored in the dark at room temperature.

Note: If the reagent in these ampoules freezes, low test results will be obtained.

Shelf Life

When stored in the dark and at room temperature:
Visual colorimetric:
CHEMets refill, color comparator: 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.

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, K-7513:
± 0.6 ppm at 2.0 ppm
± 0.8 ppm at 4.0 ppm
± 1.7 ppm at 11.0 ppm (± 2.2 ppm with V-3000)

Interference Information

- Ferric iron (Fe^{+3}) and hypochlorite (chlorine) will cause a false positive result if present at or above 10 ppm.
- Chromate at or above 10 ppm will cause a false positive result, and even as low as 1 ppm may interfere positively.
- Other oxidizing agents may interfere positively.
- Hydrogen peroxide at 20 ppm or higher may cause a greenish color development.
- Nitrite at 100 ppm is a strong positive interference, but at 50 ppm does not interfere.
- Cupric copper (Cu^{+2}) does not interfere at 10 ppm, but interferes positively at concentrations at or above 100 ppm.
- Nitrate, thiosulfate, and sulfide up to 100 ppm do not interfere.
- Sample pHs between 2 and 10 are well tolerated. A sample pH below 2 may cause low test results, and above 10 may cause development of green color rather than blue.
- Seawater may occasionally cause the reagent to precipitate.
- 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.