



Technical Data Sheet

Oxygen (dissolved)

Rhodazine D Method

Applications and Industries: Boiler water, cooling water, seawater; Power generation, petroleum refining, water treatment

References: Developed by CHEMetrics, Inc. ASTM Power Plant Manual, 1st ed. p. 169 (1984). ASTM D 5543-94 (2005), Low Level Dissolved Oxygen in Water, Test Method A. Department of the Navy, Final Report of NAVSECPHILADIV Project A-1598, Evaluation of CHEMetrics Feedwater Dissolved Oxygen Test Kit (1975).

Chemistry: Dissolved oxygen reacts with the pale yellow colored leuco form of Rhodazine D to produce a deep rose color. The resulting color is proportional to the dissolved oxygen concentration in the sample. Results are expressed in ppb (ug/L) or ppm (mg/L) O₂.

Sampling: The most critical part of any dissolved oxygen test is sampling. The sample stream must be completely leak-free, and new or intermittently used sampling systems must be purged for a minimum of 4 hours prior to sampling. It is necessary to analyze a sample stream that is flowing at a rate of 500-1000 mL/min in order to prevent the introduction of atmospheric oxygen during sampling. At the time of analysis, CHEMets and ULR CHEMets should be gently lowered into the comparator to avoid introduction of atmospheric oxygen into the ampoule.

Interference Information: Sample temperatures that are more than 20 °F hotter than ambient temperature may cause a false positive test result. Oxidizing agents, including chlorine, hexavalent chromium (Cr⁺⁶), ferric iron (Fe⁺³), and cupric copper (Cu⁺²), may cause high test results. Cupric copper and ferric iron concentrations up to 50 ppb do not interfere, while 100 ppb cupric copper may appear as 5 ppb dissolved oxygen, and 100 ppb ferric iron may appear as 7 ppb oxygen. Hydrogen peroxide at levels up to 200 ppb, in the absence of boron, does not interfere; there is a positive interference of 3.3 ppb per 100 ppb of hydrogen peroxide above 200 ppb (e.g., a sample containing 300 ppb hydrogen peroxide will read 3.3 ppb with the oxygen test). In the presence of 2200 ppm boron (present as boric acid), hydrogen peroxide at 100 ppb causes a positive interference of 10 ppb, and at 0.5-650 ppm causes a positive interference of 20-25 ppb. At pH 6 and above, up to 2200 ppm boron does not interfere with the chemistry in the absence of hydrogen peroxide. At sample pHs below 6, 2200 ppm boron can cause a negative bias (up to 20% low). Polysulfides may cause a false positive result. Hydroquinone at >200 ppb is a positive interference, and its oxidation product, benzoquinone, causes a false positive result. Methyl ethyl ketoxime at normal treatment rates and its byproduct, nitrous oxide, do not interfere. DEHA at up to at least 1 ppm does not interfere. Carbohydrazide up to 250 ppm does not interfere. Other oxygen scavengers when present at normal treatment rates have not been shown to interfere. Hydrazine, sulfite, hydrogen sulfide, and ammonia do not interfere. Methanol at up to concentrations of 50% does not interfere. At higher concentrations, methanol causes false positive results. Sample color and turbidity may interfere. With the exception of boron at low pHs, no sample constituents are known to cause a false negative result.

Safety Information: Material Safety Data Sheets (MSDSs) are included with the test kits and are available upon request and on our website. Read MSDS before using these kits. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear eye protection.

Available Analysis Systems: Visual colorimetric: CHEMets® and ULR 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: The CHEMets and ULR CHEMets refills have shelf lives of 1-2 years. Color comparators have 2-year shelf lives. Instrumental colorimetric: The Vacu-vials kit has a shelf life of 12 months.

Accuracy: CHEMets kits: +/- ½ of a color standard increment; ULR CHEMets kit: +/- 1 color standard increment; Vacu-vials kit: +/- 10% error at 75% of full range, +/- 20% error at 25% of full range, and +/- 30% error at CHEMetrics' Practical Detection Limit (PDL).