



## 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, 1<sup>st</sup> ed. p. 169 (1984). ASTM D 5543-09, 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 as ppb (ug/L) or ppm (mg/L) O<sub>2</sub>.

**Sampling Information:** 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. To prevent introduction of atmospheric oxygen into the test ampoule at the time of analysis, the sample should be cooled to ambient temperature, and CHEMetrics and ULR CHEMetrics should be gently lowered into the comparator.

#### 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<sup>+6</sup>), ferric iron (Fe<sup>+3</sup>), and cupric copper (Cu<sup>+2</sup>), 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.

High sample pHs are well tolerated. Sample pHs at or below 2 may cause erroneous results.

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.

Morpholine, hydrazine, sulfite, hydrogen sulfide, and ammonia do not interfere.

Methanol present at up to 50% does not interfere. At higher concentrations, methanol causes false positive results.

Ethylene glycol at concentrations up to 20% can be tolerated with this test.

Ethanolamine at concentrations up to at least 3.5 ppm does not interfere.

Sample color and turbidity may interfere.

Sample temperatures below 20 °C may result in a low bias.

With the exception of boron at low pHs, no sample constituents are known to cause a false negative result.

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

**Available Analysis Systems:** Visual colorimetric: CHEMetrics® and ULR CHEMetrics®. 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 CHEMetrics and ULR CHEMetrics refills have shelf lives of 1 or 2 years. Color comparators have 2-year shelf lives. Instrumental colorimetric: The Vacu-vials kit has a shelf life of 4 years.

**Accuracy:** CHEMetrics and ULR CHEMetrics kits: ± 1 color standard increment; Vacu-vials kit: ± 10% error at 0.750 ppm, ± 20% error at 0.250 ppm, and ±30% error at 0.100 ppm.