

WWTP Facility Name

Location

Standard Operating Procedure

Field Oxygen Dissolved

Hach 10360

Luminescence based sensor (LDO)

Revision 1.2, October 2011

<http://www.azdhs.gov/lab/documents/license/environmental-lab/facilities/ww-hach-method-10360.pdf>

Written by:

Date:

Approved by:

Date:

Next Review Date:

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NOTE: Quality control included in this SOP is for Round 1 Inspections only; For Round 2 in a couple of years, additional QC will be required (CCV and Precision and Accuracy samples). Fixed licensed labs must follow the entire QC outlined in this method by July 01, 2013.

1. Introduction:

- A. Dissolved Oxygen (DO) levels in natural and wastewater streams depend on physical, chemical and biochemical activities in the water body. The analysis for DO is a key test in water pollution and waste treatment process control.
- B. This method is for the measurement of dissolved oxygen (DO) in surface and ground water, municipal and industrial wastewater, and for use in Biochemical Oxygen Demand₅ (BOD₅) and carbonaceous Biochemical Oxygen Demand₅ (cBOD₅) determination.
- C. The method is for use in the United States Environmental Protection Agency's (EPA's) survey and monitoring programs for the measurement of DO and for the determination of BOD₅ and cBOD₅ under the Clean Water Act.
- D. This method is capable of measuring DO in the range of 0.20 to 20 mg/L.
- E. This method is restricted to luminescence probe technologies where calibration is performed by single-point water-saturated air (100% saturation).
- F. This luminescence-based sensor procedure measures the light emission characteristics from a luminescence-based reaction that takes place at the sensor-water interface. A light emitting diode (LED) provides incident light required to excite the luminophore substrate. In the presence of dissolved oxygen the reaction is suppressed. The resulting dynamic lifetime of the excited luminophore is evaluated and equated to DO concentration.

2. Sample analysis time:

Samples must be analyzed within 15 minutes of sampling to gain exempt status. Facility must have adequate written documentation to support that it is performing

compliance testing within 15 minutes of sampling. To remain exempt, facility must follow the approved ADHS exempt method that requires the plant to have records that show the date/time of sampling, the date/time of analysis and that there is not more than 15 minutes between these events.

3. Interferences:

There are no known agents that interfere with luminescence DO detection and quantification with this method.

4. Sample Collection Process:

Enter your plant's protocol

5. Instrumentation:

Meter and LDO Probe (Hach Catalog Number 8505200 or 8506300) for DO measurement in open containers and water bodies. The analyst is advised to follow the recommended operating conditions provided by the manufacturer.

6. Specifications for Reagents and Standards:

Not Applicable

7. Calibration and Standardization:

- A. Water saturated air is prepared and the LDO is placed in the saturated air portion and the reading is saved into the instrument.
- B. Prepare water saturated air as follows:
 - Add approximately 1 inch of reagent water to a clean BOD bottle and stopper.
 - Shake vigorously for ~ 10 seconds

- Allow for the BOD bottle and its contents to equilibrate to room temperature. Room temperature should be approximately $20 \pm 3^{\circ}$ C.
- The stopper may now be removed from the BOD bottle and the LBOD probe inserted into for calibration purposes (the value is input into the probe).

NOTE: This is a suggested procedure for the preparation of water-saturated air. Other procedures for the preparation of water-saturated air may be used that are equally effective.

8. Sample Analysis:

Measurement of DO

For samples in an open vessel, container, or water body, place the LDO probe into the water sample to be measured and stir gently with probe or add a stir bar. Do not put the probe on the bottom or sides of the container. Stir the sample at a moderate rate or put the probe in flowing conditions. Read sample. The display will show "Stabilizing" and a progress bar as the probe stabilizes in the sample. The display will show the lock icon when the reading stabilizes.

9. Quality Control:

- A. Instrument Setup: Follow the instrument manufacturer's instructions for instrument setup.
- B. Calibration of the meter is done on each day of analysis.

10. Analyst training and record keeping:

Maintain a record of each analyst's training that contains:

- A. A review of the ADHS approved methods and SOPs;
- B. A review of the manufacturer's guidelines for instrumentation maintenance and use;
- C. A copy of the proficiency study results. (Only if facility has an AZPDES permit)