



Parameter and Sample Type

Optical Dissolved Oxygen in Wastewater aeration basin

Introduction

During wastewater treatment, maintaining the optimum dissolved oxygen (DO) concentration in an aeration basin is necessary to keep microorganisms alive for breakdown of the organic waste. The concentration of DO in water is affected by ambient temperature, atmospheric pressure, and salinity of sample. The Orion 5 Star Plus Rugged Dissolved Oxygen (RDO) meter has capability of correcting DO measurement for temperature, pressure, and salinity of the sample. The RDO probe measures both oxygen and temperature in the aeration basin and produces reliable results under extreme conditions. If the salinity of the sample is 1 ppt (~0.5 mS/cm conductivity) or more, use the salinity correction. See Electrode Log 54 Correcting DO Measurement for Salinity for details.

Reference

Method 4500-O-G. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. APHA, AWWA, & WEF, Washington, D.C. www.standardmethods.org

Recommended Equipment

5-Star Plus Portable RDO meter (Orion 1213320); RDO Probe (Orion 087010MD); Calibration Sleeve (087003) Optional: RS232 computer interface cable (1010053).

Required Solutions

Deionized water (DI); pH Electrode Cleaning Solution B, for removal bacterial contaminants (900022).

Meter Setup

Turn meter on. Move pointer arrow to the DO reading line and set units to mg/L. In Setup mode, set read type to auto, log delete to no (to allow overwrite of the oldest data points), log auto to on, and set the following DO settings: resolution to 0.01 mg/L, salinity correction to manual, salinity factor to 0000, barometric pressure to auto, and calibration type to air.

Electrode Setup

See the RDO Probe Users Guide for assembly and preparation of the electrode. Place the electrode into the calibration sleeve (be sure the sponge in the sleeve is moist) and connect to Star Meter. Once assembled, the electrode can be used immediately.

Electrode Performance Check

RDO probe should read between 98 and 102% saturation in the calibration sleeve after calibration. Expect the probe to

calibrate within 2 minutes when working properly. Duplicate samples should read within 0.2mg/L of each other. See probe manual if probes do not pass check requirements.

Electrode Storage, Soaking, and Rinsing

For short term storage, overnight or between measurements, probe should be kept in the calibration sleeve or a BOD bottle with water saturated air. For long-term storage, keep the probe in the calibration sleeve.

Sample Preservation

None required.

Sample Preparation

None required; dissolved oxygen can be measured directly in the aeration basin.

Calibration

Make sure the arrow is pointing to the DO line in the Measure mode. Perform RDO calibration using water-saturated air (calibration sleeve) as the calibration standard. Calibrate the probe; 100.0% sat will be displayed when probe is calibrated.

Analysis

If the sample has salinity of 1 ppt or more, enter the salinity factor (previously set to 0000) of the sample or use automatic salinity correction. See Electrode Log 54 for details. Rinse RDO probe with DI water and blot with a lint-free wipe. Place the probe in the aeration basin. Wastewater level must be above the thermistor of the electrode. Measure the sample and wait for a stable reading to be displayed. This data will be logged in the meter.

Quality Control (QC)

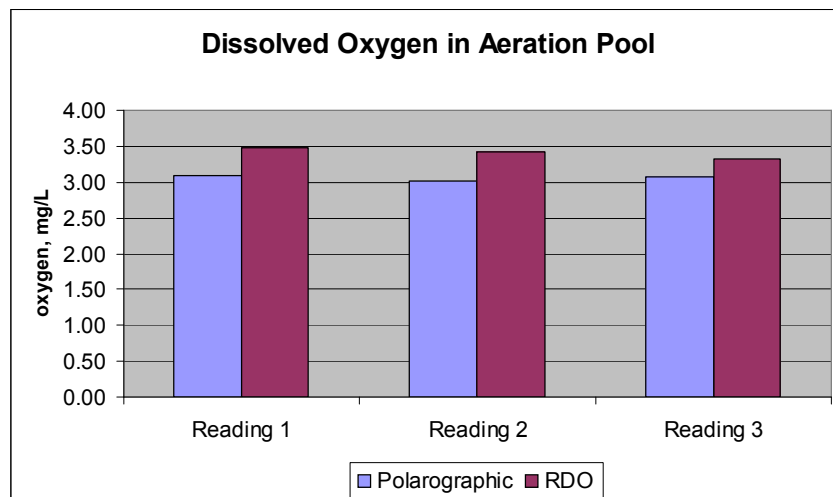
Recommended QC procedures include: calibration, check of the thermistor response against a calibrated thermometer, and duplicate samples.



Dissolved Oxygen measurement in aeration basin

	Polarographic Probe (mg/L)	RDO Probe (mg/L)
Test 1	3.09	3.47
Test 2	3.02	3.42
Test 3	3.08	3.32
Average	3.06	3.4
Standard Deviation	0.04	0.08
%CV	1.20%	2.20%
Temperature (°C)	18.9	19.0

The speed, accuracy and precision of the RDO probe is equivalent or superior to current DO measurement techniques. See Electrode Log 57 DO Comparison of Methods for detailed information.



Comments

1) It is important to thoroughly clean the probe after sample measurement before placing it back in the calibration sleeve. Salt, dirt and any other particles in the sample that get in the calibration sleeve can cause erroneous readings and calibrations. Rinse with DI water and thoroughly wipe all excess water with a lint free cloth before putting the probe in the calibration sleeve. If the electrode failed to read in 98 – 102% range in the calibration sleeve after sample measurement, rinse the electrode with DI water; soak the electrode in cleaning solution for removing bacterial contaminants (900022) for 5 minutes and rinse again with DI water.

2) When downloading the logs after measurements are made, be sure that the arrow is pointing to the line of interest before downloading the calibration and data logs.