



Parameter and Sample Type

Dissolved Oxygen in Bottled Wine

Introduction

The oxygen content of wine must remain low during the bottling process. Higher levels of oxygen can be detrimental to the quality of the wine. Using the Rugged Dissolved Oxygen (RDO) probe with automatic temperature compensation and a portable meter, reliable measurements can be made directly in the bottles.

Result Statistics

See page 2

Recommended Equipment

3-Star Plus Portable RDO meter (Orion 1213300); RDO Probe (Orion 087010MD); Calibration Sleeve (087003); Silicone Tubing (see page 2 for details) Optional: RS232 computer interface cable (1010053)

Required Solutions

Deionized water (DI).

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 correction factor to 0000, barometric pressure to auto, and calibration type to air.

Electrode Setup

See the Probe Users Guide for assembly and preparation of the probe. Cut a piece of the tubing approximately 1/8" thick. Place the piece of silicone tubing on the probe by gently sliding it up the probe to just below the threads. This is required to make a tight seal between the probe and the bottle. Do this slowly and gently so RDO cap does not pop off. The tubing ring does not need to be removed to fit the probe in the calibration sleeve. Place the probe into a calibration sleeve (be sure the sponge in the sleeve is moist) and connect to the meter. Once assembled, probe 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 and following a thorough post-sample rinse (See Comments section). See probe manual if probes do not pass check requirements

Electrode Storage, Soaking, and Rinsing

For short term storage, overnight or between measurements, the RDO 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 wine bottle.

Calibration

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

Analysis

Rinse probe with DI water and blot excess rinse water off with a lint-free wipe. Place probe in the bottle. The silicone ring should make a seal with the bottle. Place the bottle on its side so the neck becomes flooded with wine, covering both the dissolved oxygen and temperature sensors on the probe. Take an auto-reading of the sample. For best results a second reading should be taken as it will take the electrode 1-2 minutes to fully stabilize in the wine sample. Use the second stable value for the oxygen content of the wine. This data will be logged in the meter.

Comments

It is important to thoroughly clean the probe after sample measurement. Rinse with DI water and thoroughly blot all excess water with a lint free cloth *several times* before putting the probe in the calibration sleeve. Rinsing following all sample measurements should take 5-10 minutes. When downloading the logs after measurements are made, be sure that the arrow is pointing to the line of interest in the measurement screen before downloading the calibration and data logs.

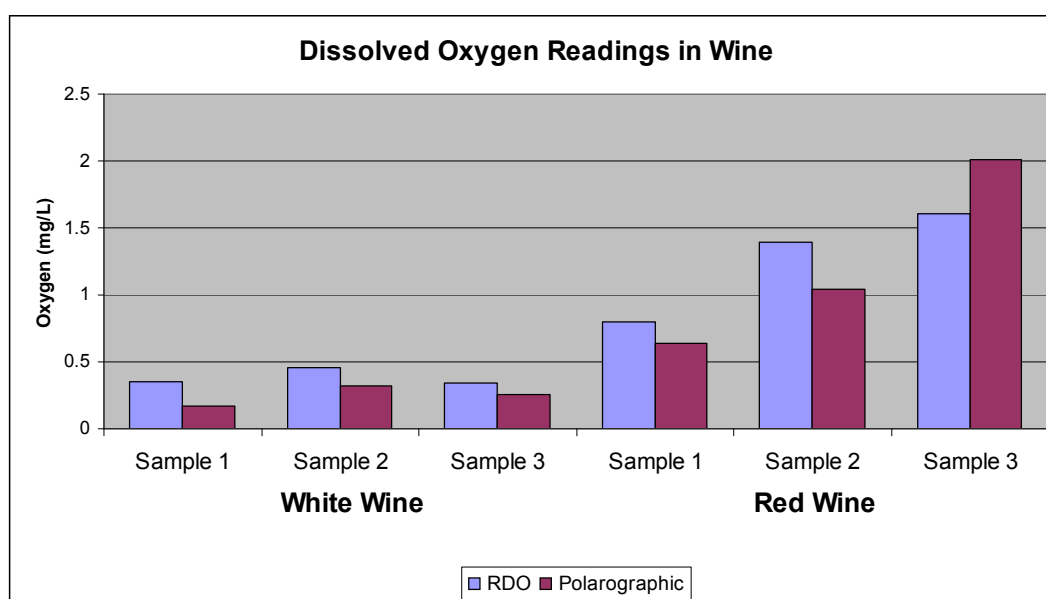
Quality Control (QC)

Recommended QC procedures include: calibration, check of the thermistor response against a calibrated thermometer, and recovery of saturated DI water sample.



Dissolved Oxygen Readings in Wine Bottles

	Oxygen (mg/L)			
	White Wine		Red Wine	
	RDO	Polarographic*	RDO	Polarographic*
Sample 1	0.35	0.17	0.80	0.64
Sample 2	0.46	0.32	1.61	2.01
Sample 3	0.34	0.26	1.39	1.04
Temperature (oC)	21.5	21	21.3	21.1



Notes

*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.

Keeping the calibration sleeve clean and free from water or sample droplets is essential to getting good calibration and read back values in water saturated air. Therefore the probe should be rinsed thoroughly with DI water and all excess water wiped from probe with a lint free cloth prior to putting the probe in the calibration sleeve.

The silicone tubing is necessary to make a seal so the bottle can be laid on its side, immersing the probe in the sample while keeping all of the wine in and ambient oxygen out of the bottle. The probe is not immersed in the sample if the bottle is sitting upright. Fisher part 02-587-2A is suitable as is other silicone tubing with an inner diameter of 0.45" to 0.55" and outer diameter of 0.55" to 0.65". Alternatively, contact your local Thermo Fisher Scientific Orion sales representative to obtain suitable tubing for this application.

The RDO probe does not require constant stirring or a sample stream to give accurate, reproducible results. Polarographic probe can give low readings if it is not constantly being moved up and down in the bottle. The RDO probe does not require any movement in the sample.