



## Parameter

Correcting DO measurements for salinity

## Sample Type

Sample with salinity equal to and above 1 ppt (~0.5 mS/cm)

## Introduction

Sample salinity value is used to correct for the change in oxygen solubility due to salt concentration in sample. The Orion 5 Star Plus RDO Meter and 5 Star Plus Multimeter have capability of correcting dissolved oxygen (DO) measurements for salinity of the sample. This note describes two available options to apply the appropriate salinity correction factor: manual (separate measurement) and automatic (simultaneous measurement).

## Reference

- 1) 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](http://www.standardmethods.org).
- 2) Method 2520-B Salinity. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. APHA, AWWA, & WEF, Washington, D.C. [www.standardmethods.org](http://www.standardmethods.org).

## Recommended Equipment

Conductivity Probe (013010MD or 013610MD).  
For DO measurement with the RDO probe (Orion 087010MD):  
5-Star Plus Portable RDO meter (Orion 1213320).  
For DO measurement with the Polarographic Probe (Orion 083010MD): 5-Star Plus Portable or Benchtop Multimeter (Orion 1219000 or 1119000).

## Required Solutions

Deionized water (DI); 12.9 mS/cm conductivity standard (011006 or 01100610).

## Meter Setup

Turn meter on. Move pointer arrow to the conductivity reading line and set units to ppt. 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 conductivity settings: temperature compensation to linear, temperature coefficient to 2.0, cell constant to nominal value, and temperature reference to 25.

### 1) Setting up an automatic salinity correction factor

In DO Setup mode, set resolution to 0.01 mg/L, salinity correction type to AUTO, barometric pressure compensation to AUTO and calibration type to Air.

### 2) Setting up a manual salinity correction factor

In DO Setup mode, set DO resolution to 0.01 mg/L, salinity correction type to manual, salinity correction factor to 0000, barometric pressure compensation to AUTO and calibration type to Air.

## Electrode Setup

Connect the conductivity probe to the meter. Assemble and prepare the dissolved oxygen probe (RDO or polarographic DO) according to the Probe Users Guide.

## Electrode Storage, Soaking, and Rinsing

The conductivity probe should be cleaned with DI water and stored dry. The dissolved oxygen probe should be stored, soaked, and rinsed according to the dissolve oxygen measurement application note.

## Calibration

Move pointer arrow to the conductivity line in the Measure mode. Calibrate the conductivity probe using 12.9 mS/cm conductivity standard. Rinse electrode with a portion of 12.9 mS/cm conductivity standard, shake off excess drops, and then insert the probe into fresh portion of 12.9 mS/cm standard. Press Calibrate. After the reading stabilizes, press the Measure key to accept calibration. The cell constant will be displayed briefly. Ideally the cell constant will be within 10% of the nominal value. The meter will go to Measure mode and display salinity of the standard. Expect a value of ~8 ppt for 12.9 mS/cm standard.

Calibrate the dissolved oxygen probe as described in the specific application note for your sample DO measurement application.

## Analysis

**1) For an automatic salinity correction**, rinse dissolved oxygen and conductivity probes with DI water and blot with a lint-free wipe. Place both probes in the sample and perform DO measurement as it is described in the DO measurement application specific for your sample. The conductivity probe will measure salinity of the sample and a compensation for salinity will be made automatically in the DO readings.

**2) For a manual salinity correction**, measure salinity of a sample. In the DO Setup mode, enter this result as the value for salinity correction factor (previously set to 0000). Rinse the conductivity probe with DI water and unplug probe from the meter. Perform measurement with the DO probe as it is described in the application specific for your sample. The salinity factor entered will be used to compensate all DO measurements.

**Note: If an RDO or a DO meter without a conductivity mode is used, enter a manual salinity correction factor obtained from another source. Salinity can be calculated from conductivity readings in mS/cm. See table 1 on page 2.**

## Quality Control (QC)

Recommended QC procedures for conductivity include: conductivity calibration, verification of cell constant, and verification of temperature accuracy.



**Table1. Salinity correction factors for dissolved oxygen in water based on conductivity**

Conductivity at 20 °C (mS/cm)	Salinity Correction Value (ppt)	Conductivity at 20 °C (mS/cm)	Salinity Correction Value (ppt)	Conductivity at 20 °C (mS/cm)	Salinity Correction Value (ppt)
5	3	20	13	35	25
6	4	21	14	36	25
7	4	22	15	37	26
8	5	23	15	38	27
9	6	24	16	39	28
10	6	25	17	40	29
11	7	26	18	42	30
12	8	27	18	44	32
13	8	28	19	46	33
14	9	29	20	48	35
15	10	30	21	50	37
16	10	31	22	52	38
17	11	32	22	54	40
18	12	33	23	56	42
19	13	34	24		