Oxygen, Dissolved

DOC316.53.01243

Direct Measurement Method[1]

Method 10360

0.1 to 20.0 mg/L (or 1 to 200% saturation) O_2

LDO probe

Scope and application: For water, wastewater and process water applications.

[1] Luminescent dissolved oxygen is USEPA approved for dissolved oxygen measurements in wastewater treatment process (e.g., aeration and biological nutrient basins, effluent outfalls and receiving water). Refer to USEPA 40CFR Part 136.3.

Test preparation

Instrument-specific information

This procedure is applicable to the meters and probes that are shown in Table 1. Procedures for other meters and probes can be different.

Table 1 Instrument-specific information

Meter	Probe
HQ1130 portable one input, dissolved oxygen HQ4100, HQ2100 and HQ30d portable one input, multi-parameter HQ4200, HQ2200 and HQ40d portable two input, multi-parameter HQ4300 portable three input, multi-parameter HQ430d benchtop one input, multi-parameter HQ440d benchtop two input, multi-parameter	Intellical LDO101 LDO

Before starting

Refer to the meter documentation for meter settings and operation. Refer to probe documentation for probe preparation, maintenance and storage information.
Prepare the probe before initial use. Refer to probe documentation.
When an Intellical probe is connected to an HQ meter or an HQd meter, the meter automatically identifies the measurement parameter and is prepared for use.
The Intellical LDO101 probes automatically adjust for barometric pressure, elevation and temperature.
Do not touch the probe cap with a hand, fingers or any surface that can scratch the cap.
Prepare the probe before initial use. Refer to probe documentation.
Condition the probe before use. To condition the probe, put the probe in 100 mL of tap water for 30 minutes before use.
For probes that are continuously in aqueous solutions, condition the sensor cap for 72 hours.
Calibrate the probe before initial use. Refer to Calibration on page 2.
Salinity affects the concentration of dissolved oxygen in the sample. To correct for salinity effects, refer to the probe documentation.
Analyze the samples immediately. The samples cannot be preserved for later analysis.
Stir the samples at a slow and constant rate to prevent the formation of a vortex.
Air bubbles under the sensor tip can cause slow response or measurement errors. To remove the bubbles, carefully shake the probe.
For rugged electrodes, it may be necessary to remove the shroud before measurement and calibration.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

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Items to collect

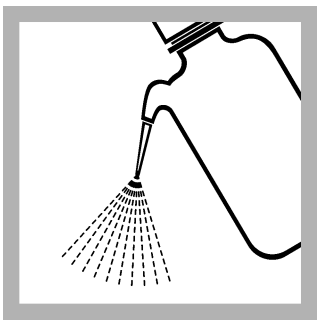
Description	Quantity
BOD bottle, 300 mL or Erlenmeyer flask, 250 mL	1
Beaker (laboratory test)	1

Sample collection

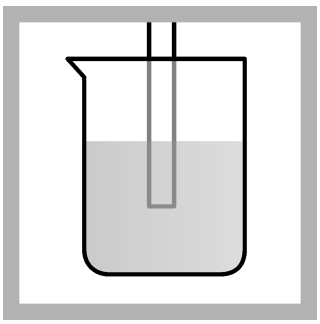
The main consideration with sample collection is to prevent contamination of the sample with atmospheric oxygen.

- Analyze the samples immediately. The samples cannot be preserved for later analysis.
- Analyze the samples at the collection site if possible.
- Do not introduce air into the sample.

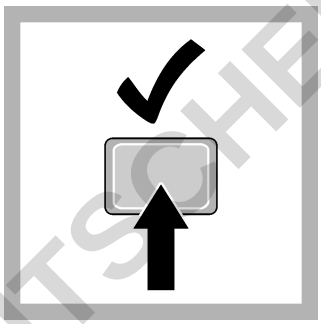
Test procedure



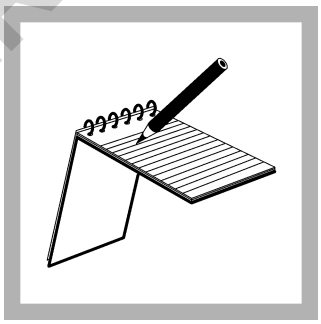
1. Rinse the probe with deionized water. Dry the probe with a lint-free cloth.



2. Laboratory test: Put the probe in a beaker that contains the solution. Do not let the probe touch the stir bar, bottom or sides of the container. Remove the air bubbles from under the probe tip. Stir the sample at a slow to moderate rate.
Field test: Put the probe in the sample. Move the probe up and down to remove bubbles from the probe tip.



3. Push **Read**. A progress bar is shown. When the measurement is stable, the lock icon is shown.

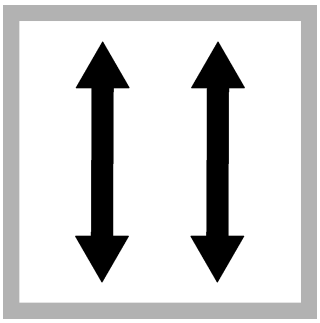


4. When the value is stable, store or record the mV value and the temperature value.

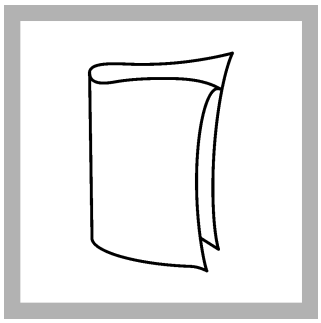
Calibration



1. Add a small amount of water (approximately 1 cm) to the bottom of narrow-neck bottle, such as a BOD bottle.



2. Insert a stopper and shake the bottle vigorously for several minutes.

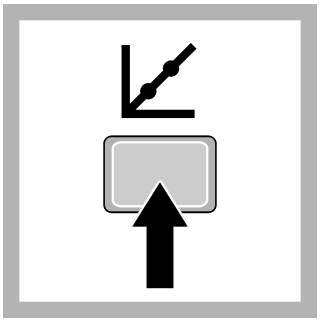


3. If the probe cap is wet, carefully dry the probe cap with a soft cloth.

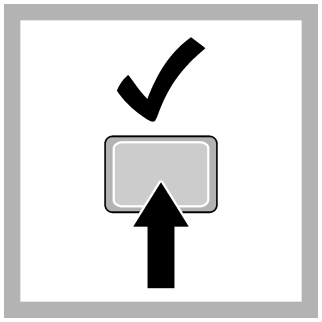


4. Remove the stopper. Put the probe in the bottle.

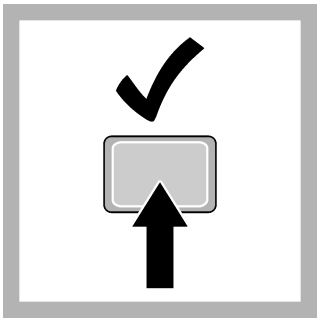
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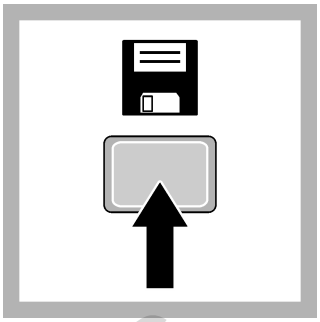
5. Push **Calibrate**.



6. Push **Read**. A progress bar is shown. When the measurement is stable, the lock icon is shown.



7. Push **Done**. The calibration summary shows. The slope value is the comparison between the latest calibration and the factory calibration shown as a percentage.



8. Push **Store** to accept the calibration.

Clean the probe

Clean the probe when:

- Drifting/inaccurate readings occur as a result of contamination on the sensing element or incorrect storage conditions.
- Slow response time occurs as a result of contamination on the sensing element.

For general contamination, complete the steps that follow.

1. Rinse the probe with deionized water. Blot dry with a lint-free cloth.
2. If harsh contaminants are attached to the probe, polish the probe tip with a soft cloth or cotton swab to remove the contaminants.
3. Soak the probe in deionized water for 1 minute.

Summary of method

The oxygen sensor is a clear, oxygen impermeable hard substrate. An oxygen-sensitive luminescent dye and a scattering agent is on the substrate. A final overlay of dark pigment is added to keep stray light out of the measurement cell. The luminescent dye gives a red light when exposed to blue light. The scattering agent distributes the light in the sensor matrix and contributes to the opacity of the sensor. Pulses from a red LED are used as an internal reference. The duration of the luminescence is proportional to the concentration of dissolved oxygen in the sample.

Consumables and replacement items

HQ meters, HQd meters and probes

Description	Unit	Item no.
HQ1130 portable one input, dissolved oxygen meter	each	LEV015.53.1130A
HQ2100 portable one input, multi-parameter meter	each	LEV015.53.2100A
HQ2200 portable two input, multi-parameter meter	each	LEV015.53.2200A
HQ4100 portable one input, multi-parameter meter	each	LEV015.53.4100A
HQ4200 portable two input, multi-parameter meter	each	LEV015.53.4200A
HQ4300 portable three input, multi-parameter meter	each	LEV015.53.4300A
HQ430d benchtop one input, multi-parameter meter	each	HQ430D
HQ440d benchtop two input, multi-parameter meter	each	HQ440D
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 1 m cable	each	LDO10101

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HQ meters, HQd meters and probes (continued)

Description	Unit	Item no.
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 3 m cable	each	LDO10103
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 5 m cable	each	LDO10105
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 10 m cable	each	LDO10110
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 15 m cable	each	LDO10115
Intellical LDO101 luminescent/optical dissolved oxygen (LDO) probe, 30 m cable	each	LDO10130

Accessories

Description	Unit	Item no.
BOD bottle with glass stopper, 300 mL	each	62100
BOD bottle with glass stopper, 300 mL	6/pkg	62106
BOD bottle with glass stopper, 300 mL	24 pkg	62124
Beaker, polypropylene, 50 mL, low form	each	108041
Flask, Erlenmeyer, 250 mL	each	50546
Probe clips, color-coded, for IntelliCAL probes	50/pkg	5818400
Probe, depth markers, rugged LDO probe only	10/pkg	5828610
Probe stand, universal	each	8508850

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