

Direct Measurement Method

Method 10360

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

LDO Probe

Scope and Application: For water, wastewater and process water applications



Test preparation

How to use instrument-specific information

The [Instrument-specific information](#) table displays requirements that may vary between instruments. To use this table, select an instrument then read across to find the corresponding information required to perform this test.

Table 471 Instrument-specific information

Meter	Probe
HQd meters	LDO101

Before starting the test:

Before attaching probes to the HQd meter for the first time, set the meter time and date.
Refer to the probe instructions for probe preparation.
For probes that are continuously immersed in aqueous solutions, condition the sensor cap for 72 hours.
When an IntelliCAL™ probe is connected to a HQ30d or HQ40d meter, the meter automatically recognizes the measurement parameter and is ready for use.
The IntelliCAL LDO101 probes automatically compensate for barometric pressure, elevation and temperature.
The LDO probe is calibrated at the factory. For more accurate results, manual calibration is recommended. Refer to the Calibration section of this procedure.
Salinity affects the concentration of dissolved oxygen in the sample. To correct for salinity effects, refer to Modifying LDO Measurement Options in the meter manual.

Collect the following items:

Description	Quantity
HQd meter	1
IntelliCAL LDO101 probe	1
Sensor cap for HQd with I-button	1
Shroud	1
BOD bottle, 300-mL or Erlenmeyer flask, 250-mL	1
Beaker, polypropylene (100-, 250-, 400- or 600-mL)	1

See [Consumables and replacement items](#) for reorder information.

Method Name for powder pillows



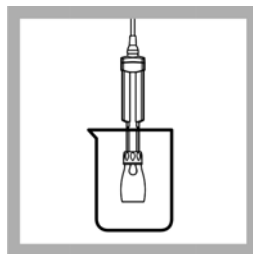
1. Prepare the probe. Refer to the probe instructions.



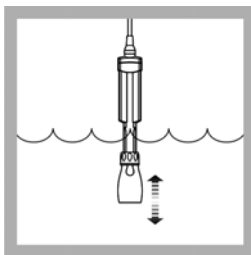
2. Connect the probe to the meter.



3. Calibrate the probe. Refer to the [Calibration](#) section of this procedure. Go to step [4](#) for laboratory tests. Go to step [5](#) for field tests.



4. Laboratory tests: Immerse the probe in the beaker containing the sample solution. Move the probe up and down and tap it on the beaker to remove bubbles from the probe.



5. Field tests: Immerse the probe directly into the sample. Move the probe up and down to remove bubbles from the probe.



6. Press **READ** to store data in the data log.

Calibration

The LDO probe is calibrated at the factory. For more accurate results, manual calibration is recommended.

1. Remove the shroud from the probe body.
2. Add a small amount of water (about 1 cm) to the bottom of narrow-neck bottle, such as a BOD bottle.

Note: Use a wider neck bottle or flask (for example, a 250-mL Erlenmeyer flask) for the rugged probe.

3. Insert a stopper and shake vigorously for several minutes.
4. Remove the stopper. If the sensor cap surface is wet, carefully dry the cap with a nonabrasive cloth, then put the probe in the bottle. Allow several minutes for the probe to reach equilibrium.

5. Make sure the meter is in the measurement screen. Press the **CALIBRATION** key.

***Note:** For HQ40d meters with two probes attached, the display must be in the single screen LDO101 mode.*

6. Press **READ**. When the measurement is stable, the calibrated measurement will show on the display. The standard value will be highlighted on the display.
7. Press **DONE** to view the calibration summary. The slope value is the comparison between the latest calibration and the factory calibration expressed as a percentage.

***Note:** If the calibration slope does not meet the acceptance criteria, the display will show "Slope out of range". Let the probe stand in water-saturated air for several minutes. When the probe reaches equilibrium, press **READ**.*

8. Press **STORE** to accept the calibration and return to the measurement mode. The calibration record is stored in the data log.

***Note:** A successful calibration will show "OK" in the measurement screen.*

Interferences

There are no significant interferences with the LDO technology.

The Intellical LDO101 probes are designed for water and wastewater applications, but can be used for other applications. Some organic solvents may damage the sensor cap and probe body.

Sample collection, preservation and storage

- Analyze samples in-situ, if possible.
- Collect samples in an appropriate container. Fill completely and analyze immediately.
- Do not store samples.

Accuracy check

1. Return the electrode to a water-saturated air environment.
2. Allow at least 10 minutes for stabilization.
3. Read the % saturation on the right side of the measurement mode screen. The meter should display 100% saturation. If not, allow additional time for the air to reach water saturation or calibrate the probe.

Method performance

The following statements are true for dissolved oxygen when the temperature is kept between 10 and 30 degrees C.

Method	Standard	Precision 95% Confidence Limits of Distribution	Accuracy Concentration change per 0.010 Abs change
10360	8.00 mg/L DO	7.95–8.05 mg/L DO	7.90–8.10 mg/L DO
10360	15.00 mg/L DO	14.90–15.10 mg/L DO	14.80–15.20 mg/L DO

Summary of method

The oxygen sensor is made up of a clear, oxygen impermeable hard substrate. An oxygen sensitive luminescent dye, along with a scattering agent, is pad-printed on the substrate. A final overlay of dark pigment is added to prevent stray light from entering the measurement cell. The luminescent dye emits red light when exposed to blue light. The scattering agent distributes the emitted light throughout the sensor matrix and contributes to the opacity of the sensor. Pulses from a red LED serve as an internal reference. The duration of the luminescence is proportional to the concentration of dissolved oxygen in the sample.

Consumables and replacement items

Required apparatus (select one)

Description	Quantity/Test	Unit	Catalog number
HQ40d multi-parameter meter, dual input	1	each	HQ40d53000000
HQ30d multi-parameter meter, single input	1	each	HQ30d53000000

Required probes (select one)

Description	Unit	Catalog number
LDO Probe, standard, with 1 m cable	each	LDO10101
LDO Probe, standard, with 3 m cable	each	LDO10103
LDO Probe, rugged, with 5 m cable	each	LDO10105
LDO Probe, rugged, with 10 m cable	each	LDO10110
LDO Probe, rugged, with 15 m cable	each	LDO10115
LDO Probe, rugged, with 30 m cable	each	LDO10130

Optional apparatus

Description	Unit	Catalog number
AC Power Adapter for HQd meters (included w/ HQ40d)	each	5826300
BOD bottle, 300 mL	each	62100
BOD bottle, 300 mL	6/pkg	62106
Citizen PD-24 USB Handy printer, 115 VAC	each	5835800
Color Coded Probe Clips (5 color coded sets) 5 sets	10/pkg	5818400
Depth Markers for Rugged LDO probe only	10/pkg	5828610
Erlenmeyer flask, 250 mL	each	2089846
Field Kit (Includes glove kit, 2 probe holders and 5 120 mL sample cups) ¹	each	5825800
Glove kit only for HQd meters	each	5828700
Probe Holder for HQd meter, IntelliCAL Standard probes only	each	5829400
Replacement Sensor cap w/ I-button	each	5811200
Replacement Shroud kit Rugged LDO probe	each	5825900
USB Keyboard for HQd meters (must have 5813400 & 5826300)	each	LZV582
USB/DC Adapter for HQd meters (must have 5826300, inc w/HQ40d)	each	5813400

¹ Included with HQ40d



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