Oxygen, Dissolved

DOC316.53.01096

HRDO Method **Method 8166**

HR (0.3 to 15.0 mg/L O_2) **AccuVac® Ampuls**

Scope and Application: For water and wastewater

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 315 Instrument-specific information

Instrument	AccuVac Ampuls	
	Sample cell	Adapter
DR 6000	2427606	—
DR 5000	2427606	—
DR 3900	2427606	LZV846 (A)
DR 3800, DR 2800, DR 2700	2122800	LZV584 (C)

Before starting the test:

Analyze samples on-site. Do not store for later analysis

Collect the following items:

Description	Quantity
High Range Dissolved Oxygen AccuVac® Ampuls with reusable Ampul caps	1
Polypropylene Beaker, 50-mL	1
Sample Cell (see *Instrument-specific information*)	1

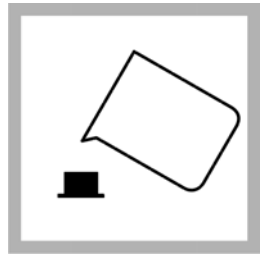
See *Consumables and replacement items* for reorder information.

HRDO Method

1. Select the test.

Insert an adapter if required (see *Instrument-specific information*).

2. Blank Preparation: Fill a sample cell with 10 mL of sample.

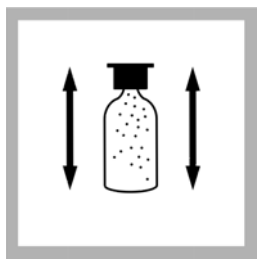


3. Fill a blue Ampul cap with sample.

4. Prepared Sample: Fill a High Range Dissolved Oxygen AccuVac Ampul with sample. Keep the tip immersed while the Ampul fills completely.

5. Hold the Ampul with the tip pointing down and immediately insert the Ampul into the Ampul cap.

The cap prevents contamination from atmospheric oxygen.

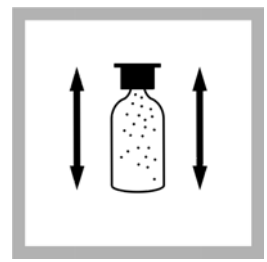


6. Shake the Ampul for 30 seconds.

A small amount of undissolved reagent will not affect results.

7. Start the instrument timer.

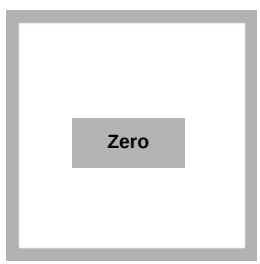
A two-minute reaction period will begin. This enables the oxygen that was degassed during aspiration to redissolve and react.



8. When the timer expires, shake the Ampul for 30 seconds.

Allow any bubbles to dissipate before proceeding.

9. Insert the blank in the cell holder.

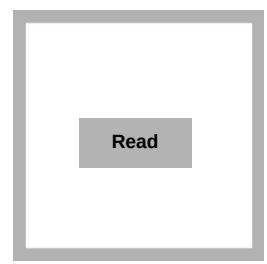


10. ZERO the instrument.

The display will show:

0.0 mg/L O_2

11. Insert the prepared sample into the cell holder.



12. READ the results in mg/L O_2.

Interferences

Table 316 Interfering substances

Interfering substance	Interference level
Cr^{3+}	Greater than 10 mg/L
Cu^{2+}	Greater than 10 mg/L
Fe^{2+}	Greater than 10 mg/L
Mg^{2+}	Magnesium is commonly present in seawater and causes a negative interference. If the sample contains more than 50% seawater, the oxygen concentration obtained by this method will be 25% less than the true oxygen concentration. If the sample contains less than 50% seawater, the interference will be less than 5%.
Mn^{2+}	Greater than 10 mg/L
Ni^{2+}	Greater than 10 mg/L
NO_2^-	Greater than 10 mg/L

Sample collection, preservation and storage

The main consideration in sampling with the High Range Dissolved Oxygen Ampul is to prevent the sample from becoming contaminated with atmospheric oxygen between breaking open the Ampul and reading the absorbance. This is accomplished by capping the Ampul with an Ampul cap. If the Ampul is securely capped, the Ampul should be safe from contamination for several hours. The absorbance will decrease by approximately 3% during the first hour and will not change significantly afterwards.

Sampling and sample handling are important considerations in obtaining meaningful results. The dissolved oxygen content of the water being tested may change with depth, turbulence, temperature, sludge deposits, light, microbial action, mixing, travel time and other factors. A single dissolved oxygen test rarely reflects the accurate overall condition of a body of water. Several samples taken at different times, locations and depths are recommended for most reliable results. Samples must be tested immediately upon collection, although only a small error results if the absorbance reading is taken several hours later.

Accuracy check

The results of this procedure may be compared with the results of a titrimetric procedure or by using a dissolved oxygen meter.*

Method performance

Program	Standard	95% Confidence Limits of Distribution	Sensitivity—ΔConcentration per 0.010 ΔAbs
445	6.7 mg/L O_2	6.2–7.3 mg/L O_2	0.09 mg/L O_2

Summary of method

The High Range Dissolved Oxygen AccuVac Ampul contains reagent vacuum-sealed in a 14-mL Ampul. When the AccuVac Ampul is opened in a sample containing dissolved oxygen, it forms a yellow color which turns purple. The purple color development is proportional to the concentration of dissolved oxygen. Test results are measured at 535 nm.

* See *Optional reagents, apparatus and meters*.

Consumables and replacement items

Required reagents

Description	Quantity/Test	Unit	Catalog number
High Range Dissolved Oxygen AccuVac® Ampuls	1	25/pkg	2515025

Required apparatus

Description	Quantity	Unit	Catalog number
Polypropylene Beaker, 50-mL	1	each	108041
Sample cell, 10 mL round, 25 x 54 mm	1	each	2122800
Sample cell, 10 mL round, 25 x 60 mm	1	6/pkg	2427606
Sample cell, 10 mL square, matched pair	2	2/pkg	2495402

Optional reagents, apparatus and meters

Description	Unit	Catalog number
AccuVac® snapper	each	2405200
AccuVac sampler	each	2405100
AccuVac, vials for sample blanks	25/pkg	2677925
AccuVac stoppers	6/pkg	173106
HQ30d Meter with Standard LDO Dissolved Oxygen Probe[1] (1 meter cable)	each	HQ30d53301000
HQ40d Meter with Standard LDO Probe[1] (1 meter cable)	each	HQ40d53301000

[1] Additional probes and cable lengths are available.

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