Oxygen, Dissolved

DOC316.53.01096

HRDO Method **Method 8166**

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

Scope and application: For water and wastewater

Test preparation

Instrument-specific information

Table 1 shows all of the instruments that have the program for this test. The table also shows sample cell and adapter requirements for AccuVac Ampul tests.

To use the table, select an instrument, then read across to find the applicable information for this test.

Table 1 Instrument-specific information for AccuVac Ampuls

Instrument	Adapter	Sample cell
DR 6000 DR 5000 DR 900	—	2427606 
DR 3900	LZV846 (A)	
DR 1900	9609900 or 9609800 (C)	
DR 3800 DR 2800 DR 2700	LZV584 (C)	2122800 

Before starting

Samples must be analyzed immediately after collection and cannot be preserved for later analysis.
Install the instrument cap on the DR 900 cell holder before ZERO or READ is pushed.
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.

Items to collect

Description	Quantity
High Range Dissolved Oxygen AccuVac® Ampuls	1
Polypropylene beaker, 50-mL	1
Stoppers, for 18-mm tubes and AccuVac Ampuls	1
Sample cells (For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.)	1

Refer to Consumables and replacement items on page 4 for order information.

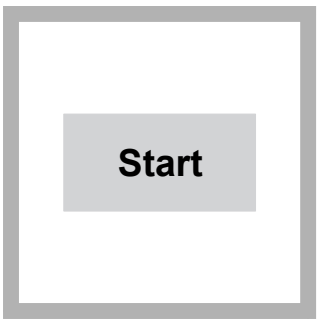
Sample collection

Good sample collection and handling techniques are important to get correct results. The dissolved oxygen content of the sample can 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.

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

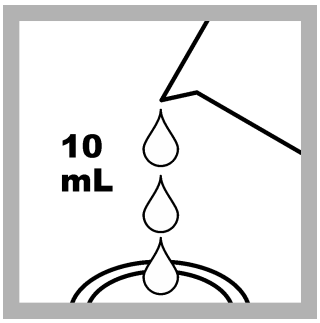
- Samples must be analyzed immediately after collection, although only a small error results if the reading on a capped ampule is taken several hours later. The absorbance will decrease by approximately 3% during the first hour and will not change significantly afterward.
- Make sure to put the cap on the ampule before the ampule is removed from the sample.

AccuVac® Ampul procedure

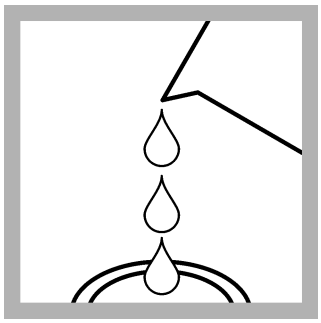


1. Start program **445 Oxygen, Dis HR AV**. For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.

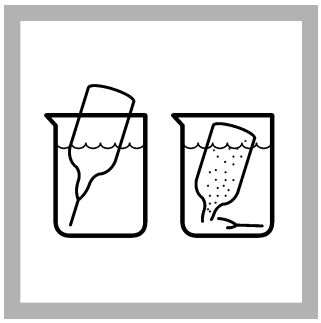
Note: *Although the program name can be different between instruments, the program number does not change.*



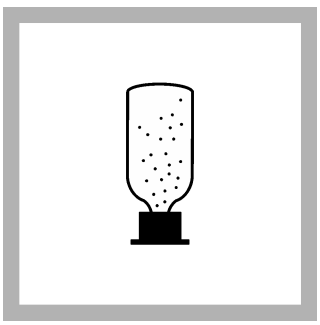
2. Prepare the blank: Fill the sample cell with 10 mL of sample.



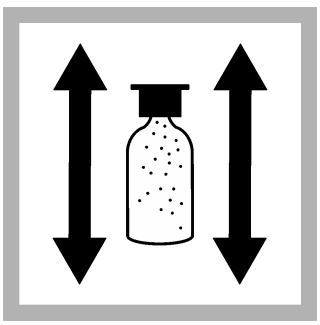
3. Fill a blue Ampul cap with sample.



4. Prepare the sample: Collect at least 40 mL of sample in a 50-mL beaker. Fill the AccuVac Ampul with sample. Keep the tip immersed while the AccuVac Ampul fills completely.

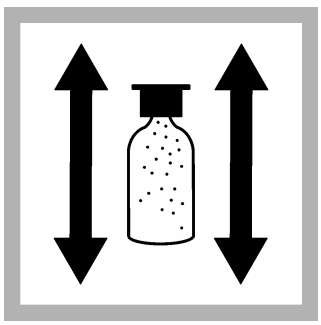


5. Hold the AccuVac Ampul with the tip down. Immediately put the cap on the tip.
The cap prevents contamination from atmospheric oxygen.

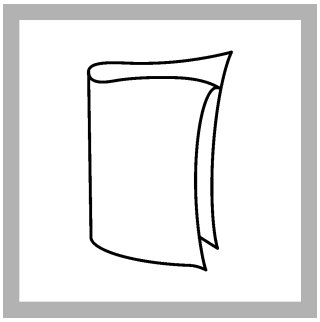


6. Shake the AccuVac Ampul for 30 seconds.
A small quantity of undissolved reagent does not have an effect on the results.

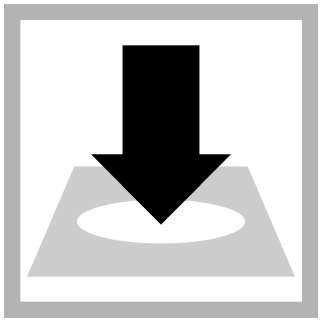
7. Start the instrument timer. A 2-minute reaction time starts.
The oxygen that has degassed during aspiration dissolves again and reacts.



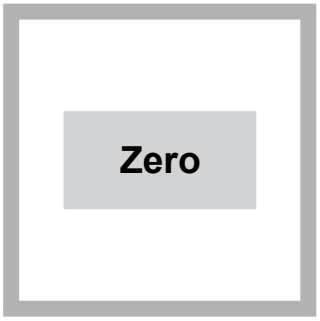
8. When the timer expires, shake the AccuVac Ampul for 30 seconds.
Let all of the bubbles dissipate before the next step.



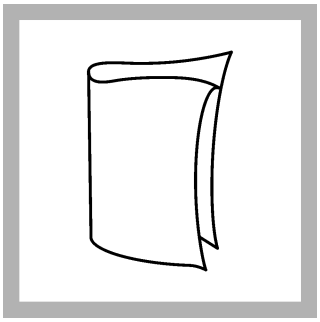
9. Clean the blank sample cell.



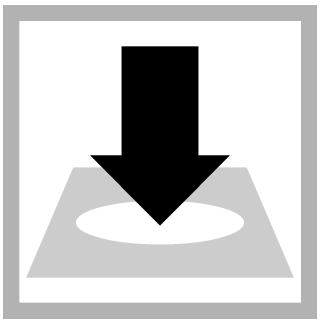
10. Insert the blank into the cell holder.



11. Push **ZERO**. The display shows 0.0 mg/L O_2.



12. Clean the AccuVac Ampul.



13. Insert the prepared sample AccuVac Ampul into the cell holder.

14. Push **READ**. Results show in mg/L O_2.

Interferences

Interfering substance	Interference level
Cr^{3+}	More than 10 mg/L
Cu^{2+}	More than 10 mg/L
Fe^{2+}	More than 10 mg/L
Mg^{2+}	Magnesium in seawater 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+}	More than 10 mg/L
Ni^{2+}	More than 10 mg/L
NO_2^-	More than 10 mg/L

Accuracy check

Comparison method

To validate the test results, measure the concentration of the same sample with a dissolved oxygen meter or with a titrimetric method.

Method performance

The method performance data that follows was derived from laboratory tests that were measured on a spectrophotometer during ideal test conditions. Users can get different results under different test conditions.

Program	Standard	Precision (95% confidence interval)	Sensitivity Concentration change per 0.010 Abs change
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 glass Ampul. When the AccuVac Ampul is opened in a sample that contains dissolved oxygen, the solution forms a yellow color which turns purple. The purple color development is proportional to the concentration of dissolved oxygen. The measurement wavelength is 535 nm for spectrophotometers or 520 nm for colorimeters.

Consumables and replacement items

Required reagents

Description	Quantity/test	Unit	Item no.
High Range Dissolved Oxygen AccuVac® Ampul	1	25/pkg	2515025

Required apparatus

Description	Quantity/test	Unit	Item no.
Beaker, polypropylene, 50-mL, low form	1	each	108041

Optional reagents, apparatus and meters

Description	Unit	Item no.
AccuVac® Ampul Snapper	each	2405200
AccuVac® Sampler	each	2405100
AccuVac® Ampul vials for sample blanks	25/pkg	2677925
Stoppers for 18-mm tubes and AccuVac Ampuls	6/pkg	173106
Stoppers for 18-mm tube	25/pkg	173125

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