

## Indigo Method

## Method 8311

0.01 to 0.25 mg/L O<sub>3</sub> (LR), 0.01 to 0.75 mg/L O<sub>3</sub> (MR),AccuVac<sup>®</sup> Ampuls0.01 to 1.50 mg/L O<sub>3</sub> (HR)

Scope and application: For water.

**Test preparation****Instrument-specific information**

The table in this section shows all of the instruments that have the program for this test. [Table 1](#) shows the adapter requirement for AccuVac Ampul tests.

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

**Table 1 Instrument-specific information for AccuVac Ampuls**

Instrument	Adapter
DR 6000 DR 5000 DR 900	—
DR 3900	LZV846 (A)
DR 3800 DR 2800 DR 2700	LZV584 (C)

**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.

Use tap water or deionized water for the blank (ozone-free water).

In this method, the instrument is intentionally zeroed on the sample, not the blank.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used and use any recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Use the Safety Data Sheets for disposal information for unused reagents. Consult the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

**Items to collect****AccuVac Ampuls**

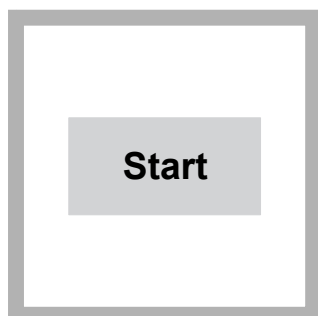
Description	Quantity
Ozone AccuVac <sup>®</sup> Ampules, 0-0.25 mg/L	2
Ozone AccuVac <sup>®</sup> Ampules, 0-0.75 mg/L	2
Ozone AccuVac <sup>®</sup> Ampules, 0-1.5 mg/L	2
Beaker, 50 mL	1
Stoppers, for 18-mm tubes and AccuVac Ampuls	2
Water, ozone-free	varies

## Sample collection

- Samples must be analyzed immediately after collection and cannot be preserved for later analysis.
- The most important consideration during sample collection is to prevent the escape of ozone from the sample.
- Collect the sample gently and analyze immediately. Do not shake or stir the sample or allow the sample temperature to increase.
- Do not transfer the sample from one container to another unless absolutely necessary.

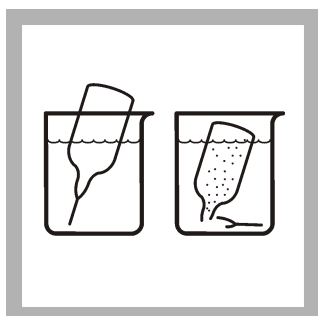
## AccuVac Ampul procedure

**Note:** For this procedure, the zero step is done on the prepared sample, and the read step on the blank.

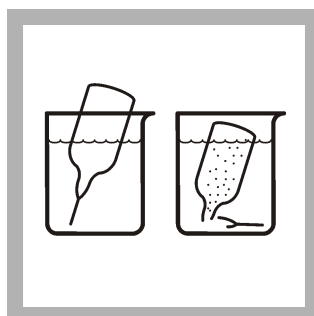


1. Start program  
**454 Ozone LR AV**,  
**455 Ozone MR AV** or  
**456 Ozone HR AV**. For  
information about sample  
cells, adapters or light  
shields, refer to [Instrument-  
specific information](#)  
on page 1.

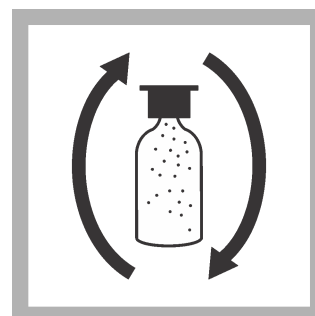
**Note:** Although the program  
name may vary between  
instruments, the program  
number does not change.



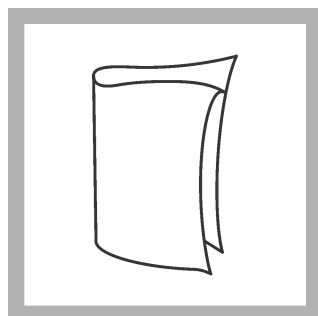
2. **Prepare the blank:** Pour  
at least 40 mL of ozone-free  
water in a 50-mL beaker. Fill  
an Indigo Ozone Reagent  
AccuVac Ampul with the  
ozone-free water. Keep the  
tip immersed while the  
Ampul fills fully.



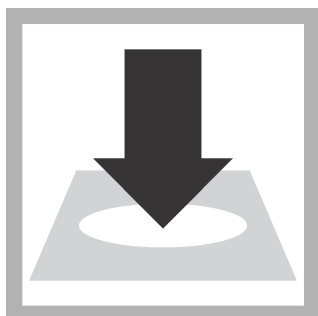
3. **Prepare the sample:**  
Pour at least 40 mL of  
sample in a 50-mL beaker.  
Fill an Indigo Ozone  
Reagent AccuVac Ampul  
with the sample. Keep the  
tip immersed while the  
Ampul fills fully.



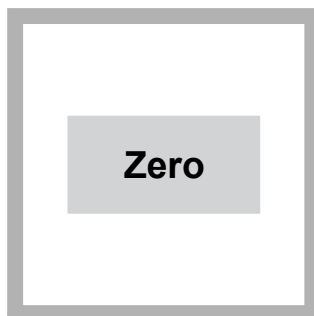
4. Quickly invert the Ampuls  
several times to mix.  
Some of the blue color will  
be bleached if ozone is  
present.



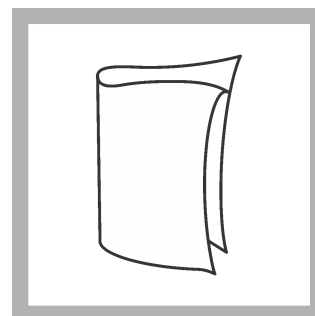
5. Clean the prepared  
sample AccuVac Ampul.



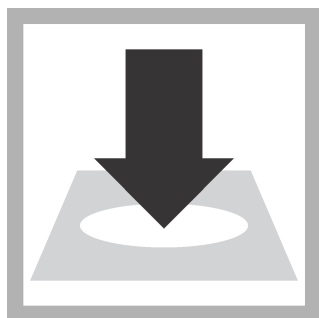
6. Insert the prepared  
sample AccuVac Ampul into  
the cell holder.



7. Push **ZERO**. The display  
shows 0.00 mg/L O<sub>3</sub>.



8. Clean the blank AccuVac  
Ampul.



**9.** Insert the blank AccuVac Ampul into the cell holder.



**10.** Push **READ**. Results show in mg/L O<sub>3</sub>.

## Reagent stability

The indigo reagent is light-sensitive. Keep the unused AccuVac Ampuls in the dark. The indigo solution decomposes slowly under room light after the AccuVac Ampul is filled. The filled blank Ampul can be used for multiple measurements during the same day.

## Method performance

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

Program	Standard	Precision (95% Confidence Interval)	Sensitivity Concentration change per 0.010 Abs change
454	0.15 mg/L O <sub>3</sub>	0.14–0.16 mg/L O <sub>3</sub>	0.01 mg/L O <sub>3</sub>
455	0.45 mg/L O <sub>3</sub>	0.43–0.47 mg/L O <sub>3</sub>	0.01 mg/L O <sub>3</sub>
456	1.00 mg/L O <sub>3</sub>	0.97–1.03 mg/L O <sub>3</sub>	0.01 mg/L O <sub>3</sub>

## Summary of method

The reagent formulation adjusts the sample pH to 2.5 after the Ampule has filled. The indigo reagent reacts immediately and quantitatively with ozone. The blue color of indigo is bleached in proportion to the amount of ozone present in the sample. Other reagents in the formulation prevent chlorine interference. No transfer of sample is needed in the procedure, therefore ozone loss due to sampling is eliminated. The measurement wavelength is 600 nm for spectrophotometers or 610 nm for colorimeters.

## Consumables and replacement items

### Required reagents

Description	Quantity/test	Unit	Item no.
Ozone AccuVac <sup>®</sup> Ampules, 0-0.25 mg/L	2	25/pkg	2516025
Ozone AccuVac <sup>®</sup> Ampules, 0-0.75 mg/L	2	25/pkg	2517025
Ozone AccuVac <sup>®</sup> Ampules, 0-1.5 mg/L	2	25/pkg	2518025

### Required apparatus

Description	Quantity/test	Unit	Item no.
AccuVac Snapper	1	each	2405200
Beaker, 50-mL	1	each	50041H
Stoppers for 18-mm tubes and AccuVac Ampuls	2	6/pkg	173106
Beaker, polypropylene, 50-mL, low form	1	each	108041

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## Optional reagents and apparatus

Description	Unit	Item no.
Water, deionized	4 L	27256
SpecCheck™ Gel Secondary Standard Kit, Ozone, 0–0.75 mg/L set	each	2708000



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