

## Direct Reading Method

**Method 8138**
**5 to 1000 mg/L ClO<sub>2</sub> (HR)**
**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 orientation requirements for specific instruments.

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

**Table 1 Instrument-specific information**

Instrument	Sample cell orientation	Sample cell
DR 6000 DR 3800 DR 2800 DR 2700 DR 1900	The fill line is to the right.	2495402 
DR 5000 DR 3900	The fill line is toward the user.	

### Before starting

Samples must be analyzed immediately after collection and cannot be preserved for later analysis.

Gloves and goggles are recommended.

### Items to collect

Description	Quantity
Deionized water	10 mL
Sample cells (For information about sample cells, adapters or light shields, refer to <a href="#">Instrument-specific information</a> on page 1.)	2

Refer to [Consumables and replacement items](#) on page 3 for order information.

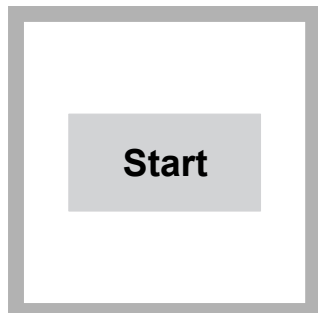
### Sample collection

- Analyze the samples immediately. The samples cannot be preserved for later analysis.
- Chlorine dioxide is a strong oxidizing agent and is unstable in natural waters. Chlorine dioxide reacts quickly with various inorganic compounds and more slowly with organic compounds. Many factors, including reactant concentrations, sunlight, pH, temperature and salinity influence the decomposition of chlorine dioxide in water.
- Collect samples in clean glass bottles. Do not use plastic containers because these can have a large chlorine dioxide demand.
- Pretreat glass sample containers to remove chlorine dioxide demand. Soak the containers in a weak bleach solution (1 mL commercial bleach to 1 liter of deionized

water) for at least 1 hour. Rinse fully with deionized or distilled water. If sample containers are rinsed fully with deionized or distilled water after use, only occasional pretreatment is necessary.

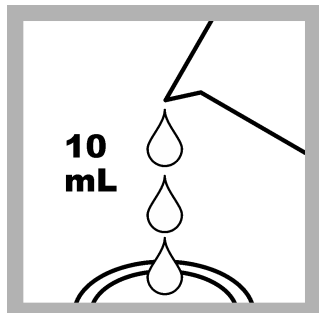
- Make sure to get a representative sample. If the sample is taken from a spigot or faucet, let the water flow for at least 5 minutes. Let the container overflow with the sample several times and then put the cap on the sample container so that there is no headspace (air) above the sample.

## Direct reading method

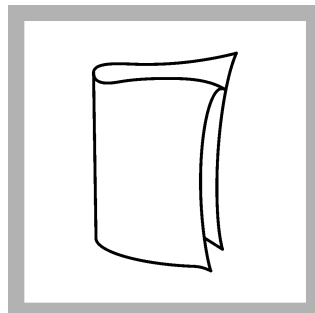


1. Start program **75 Chlor Diox HR**. For information about sample cells, adapters or light shields, refer to [Instrument-specific information](#) on page 1.

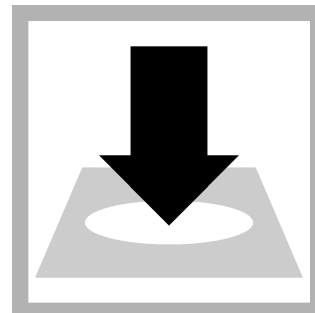
**Note:** Although the program name can be different between instruments, the program number does not change.



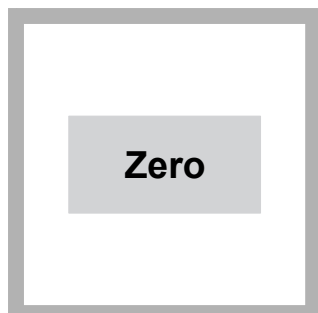
2. **Prepare the blank:** Fill the sample cell with 10 mL of deionized water.



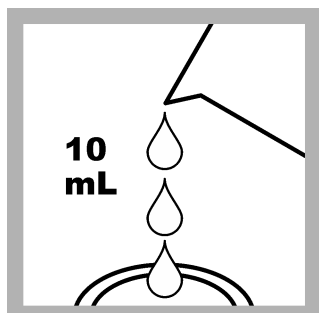
3. Clean the blank sample cell.



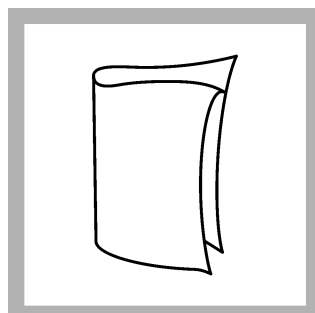
4. Insert the blank into the cell holder.



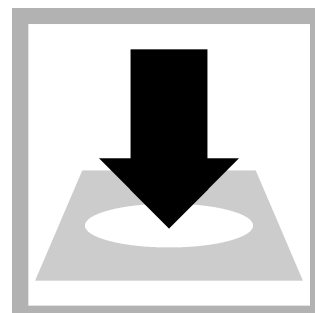
5. Push **ZERO**. The display shows 0 mg/L  $\text{ClO}_2$ .



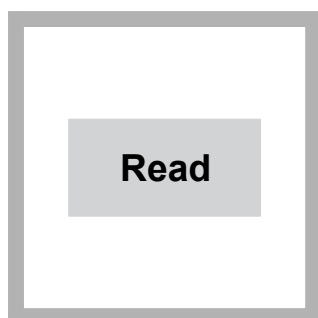
6. **Prepare the sample:** Fill a second sample cell with 10 mL of sample.



7. Clean the prepared sample cell.



8. Insert the prepared sample into the cell holder.



9. Push **READ**. Results show in mg/L  $\text{ClO}_2$ .

## Interferences

Because this is a direct read test, substances that absorb light at the measurement wavelength will interfere.

## Accuracy check

### Standard solution method

The preparation of chlorine dioxide standards is difficult and hazardous. These standards are explosive and volatile! Only a trained chemist should prepare the standards with applicable safety equipment and precautions. The manufacturer does not recommend preparation of chlorine dioxide standards. If an independent standard preparation is required, refer to the instructions in *Standard Methods for the Examination of Water and Wastewater*, Part 4500-ClO<sub>2</sub> Chlorine Dioxide, under the headings "Stock chlorine dioxide solution" and "Standard chlorine dioxide solution". Prepare a 500-mg/L chlorine dioxide standard.

## 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
75	469 mg/L ClO <sub>2</sub>	459–479 mg/L ClO <sub>2</sub>	5 mg/L ClO <sub>2</sub>

## Summary of Method

Chlorine dioxide, a yellow gas, can be measured directly in a water solution. The measurement wavelength is 445 nm.

## Consumables and replacement items

### Required reagents and apparatus

Description	Quantity/test	Unit	Item no.
Water, deionized	varies	4 L	27256
Sample cells, 10-mL square, matched pair	2	2/pkg	2495402

### Optional apparatus

Description	Unit	Item no.
Gloves, chemical resistant, size 9–9.5	pair	2410104 <sup>1</sup>
Safety goggles, vented	each	2550700
Standard Methods Book, most current edition	each	2270800

<sup>1</sup> Other sizes available



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