



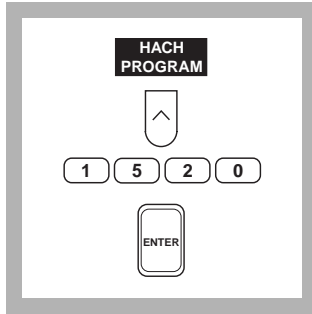
## Method 8138

## Direct Reading Method

HR (0 to 1000 mg/L)

**Scope and Application:** For water and wastewater.

The estimated detection limit for program number 1520 is 2 mg/L ClO<sub>2</sub>.



**1.** Press the soft key under **HACH PROGRAM**.

Select the stored program number for high range chlorine dioxide (ClO<sub>2</sub>) by pressing **1520** with the numeric keys.

Press: **ENTER**

**Note:** Analyze samples immediately. See *Sample Collection, Storage and Preservation* following these steps.

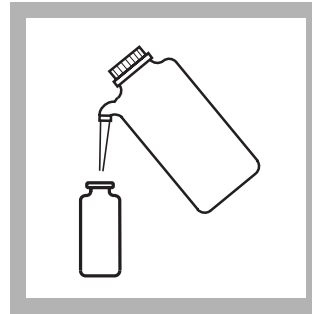
**Note:** The Flow Cell and Sipper Modules can be used with this procedure. Use minimum volumes of 20 and 10 mL, respectively.



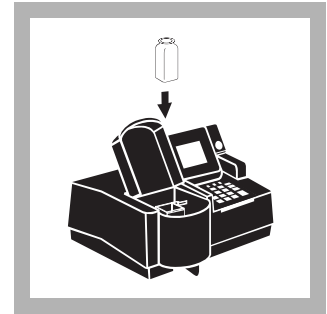
**2.** The display will show:

**HACH PROGRAM:  
1520 Chlor: Dioxide, HR**

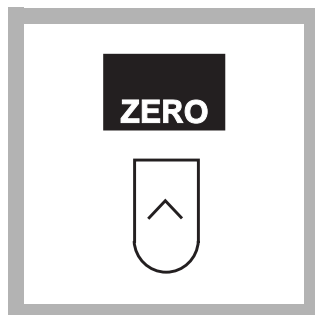
The wavelength ( $\lambda$ ), **445 nm**, is automatically selected.



**3.** Fill a sample cell to the 10-mL mark with deionized water (the blank).



**4.** Place the blank into the cell holder. Close the light shield.

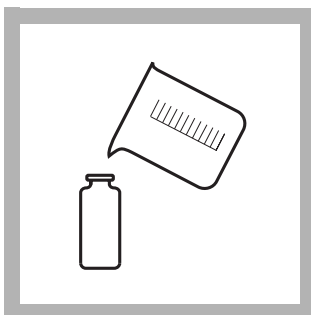


5. Press the soft key under **ZERO**.

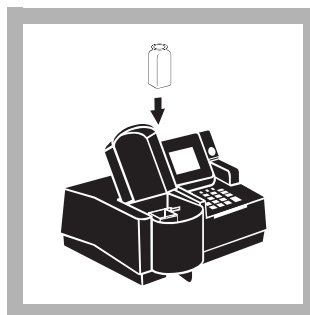
The display will show:

**0 mg/L ClO<sub>2</sub>**

**Note:** For alternate concentration units, press the soft key under **OPTIONS**. Then press the soft key under **UNITS** to scroll through the available options. Press **ENTER** to return to the read screen.



6. Fill another sample cell to the 10-mL mark with sample (the prepared sample).



7. Place the prepared sample into the cell holder. Close the light shield. The results in mg/L ClO<sub>2</sub> (or chosen units) will be displayed.

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## Sample Collection, Storage and Preservation

Collect samples in clean plastic or glass bottles. Samples must be analyzed immediately. Chlorine dioxide is very volatile and unstable.

## Accuracy Check

### Standard Solution Method

Preparing chlorine dioxide standards is difficult and dangerous. In addition, **these standards are both explosive and volatile!** Only a trained chemist should prepare the standards using appropriate safety equipment and precautions. Hach does not recommend preparation of chlorine dioxide standards. If independent standard preparation is required, please see the instructions in *Standard Methods for the Examination of Water and Wastewater*, 18th ed., under the headings “Stock chlorine dioxide solution” and “Standard chlorine dioxide solution” (pg. 4–54). Prepare a 25.0-mg/L chlorine dioxide standard.

## Method Performance

### Precision

Standard: 500 mg/L ClO<sub>2</sub>

Program	95% Confidence Limits
1520	499–501 mg/L ClO <sub>2</sub>

For more information on determining precision data and method detection limits, refer to Section 1.5.

### Estimated Detection Limit

Program	EDL
1520	2 mg/L ClO <sub>2</sub>

For more information on derivation and use of Hach’s estimated detection limit, see Section 1.5.2. To determine a method detection limit (MDL) as defined by the 40 CFR part 136, Appendix B, see Section 1.5.1.

### Sensitivity

Program Number: 1520

Portion of Curve	ΔAbs	ΔConcentration
Entire Range	0.010	4.6 mg/L

See Section 1.5.3 *Sensitivity Explained* for more information.

## Calibration Standard Preparation

Preparing chlorine dioxide standards is difficult and dangerous. In addition, **these standards are both explosive and volatile!** Only a trained chemist should prepare the standards using appropriate safety equipment and precautions. Hach does not recommend preparation of chlorine dioxide standards. If independent standard preparation is required, please see the instructions in *Standard Methods for the Examination of Water and Wastewater*, 18th ed., under the headings “Stock chlorine dioxide solution” and “Standard chlorine dioxide solution” (pg. 4–54). Using the standards prepared above and the analysis procedure, generate a calibration curve.

## Summary of Method

Chlorine dioxide, a yellow gas, can be measured directly in a water solution. This method uses a wavelength of 445 nm to increase the range of the test.

## Safety

Good safety habits and laboratory techniques should be used throughout the procedure. Consult the *Material Safety Data Sheet* for information specific to the reagents used. For additional information, refer to Section 1.

## Pollution Prevention and Waste Management

For information on pollution prevention and waste management, refer to Section 1.

# CHLORINE DIOXIDE, continued

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## REQUIRED REAGENTS AND STANDARDS

Description	Quantity Required		Unit	Cat. No
	Per Test			
Water, deionized .....	10 mL .....	4 liters .....		272-56

## REQUIRED EQUIPMENT AND SUPPLIES

DR/4000 1-Inch Cell Adapter .....	1 .....	each.....	48190-00
Sample Cells, 1-inch, matched pair.....	2 .....	2/pkg.....	26126-02

## OPTIONAL EQUIPMENT AND SUPPLIES

DR/4000 Carousel Module Kit .....		each.....	48070-02
DR/4000 Flow Cell Module Kit, 1-inch.....		each.....	48070-04
DR/4000 Flow Cell Module Kit, 1-cm.....		each.....	48070-05
DR/4000 Sipper Module Kit, 1-inch.....		each.....	48090-03



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