

SOP TITLE: Free Chlorine Residual Monitoring SOP

SOP #: _____

Effective Date: _____

Revision Date: _____

Operator-in-responsible-charge (ORC) approving this SOP: _____

License #: _____ Class: _____ Subclass: _____ Expiration Date: _____

Email address: _____ Phone: _____

Signature: _____ Date: _____

Has the owner of the system been informed that this SOP is in place at their system?

- ☐ YES
☐ NO

Staff Acknowledgement

NOTE: For treatment processes that are not covered by an SOP, individuals who are not properly certified must contact the ORC to make process control decisions.

I certify that the requirements of this SOP have been communicated to me and that I am trained in its use.

Operators/staff approved by the ORC to use this SOP for process control decisions:

Name (Print)	Title	Signature	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

FREE CHLORINE RESIDUAL MONITORING SOP

I. SCOPE

PURPOSE: This is a residual colorimetric DPD method that uses a colorimeter for determination of residual chlorine concentration in the water.

LOCATION: Monitoring the free chlorine level at EP 101 (EP tap after contact tanks) and distribution sampling locations 701 (55 Old Court Road, kitchen sink) & 702 (2230 Lincoln Hwy, restroom sink)

NORMAL OPERATING RANGE & ACTION LEVELS for Free Chlorine (mg/L):

Monitoring locations:	Goal	Alert Level	Action Level *contact ORC
EP 101	0.50 mg/L-1.5 mg/L	0.45 mg/L - 0.49 mg/L or 3.00 mg/L - 3.49 mg/L	< 0.45 mg/L* or > 3.50 mg/L*
Distribution 701 & 702	0.25 mg/L- 1.5 mg/L	0.15 mg/L - 0.24 mg/L or 3.00 mg/L - 3.49 mg/L	< 0.15 mg/L* or > 3.50 mg/L*

II. APPLICABILITY

- Personnel identified on page 1.
- Personnel who have successfully completed the Analyst Initial Demonstration of Capability for method 334.0 (DEP form 3900-FM-BSDW0544) and are assigned to take chlorine residuals at the system.

III. SUMMARY

- Each day the water treatment plant is in operation there needs to be a daily EP chlorine residual taken at the hour of peak flow (0800). EP free chlorine levels must always be at or above 0.40 mg/L. Additional samples may be required to ensure proper treatment of the water supply.
- Once a week the chlorine residuals will be taken at the distribution monitoring locations sites 701 or 702, alternating one site each week. The results of distribution samples must be at least a 0.2 mg/L.
- All results and actions recorded in the daily log.

IV. DEFINITIONS & ACRONYMS

DPD- Indicator that reacts with available chlorine, stands for N,N diethyl-p-phenylenediamine.

EP- Entry point is the point acceptable to the Department at which finished water representative of each source enters the distribution system.

Method blank- level of interference that the DPD reagent has on the sample (sample filled with DI water and then powder pillow added and analyzed to account for the presence of DPD)

mg/L- milligrams per liter

PPE- personal protective equipment

SDS- Safety Data Sheet

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V. TRIGGERING MECHANISMS

If results are outside of the action levels listed above, record the results and retake the sample:

- If an EP chlorine residual is less than 0.45 mg/L or greater than 3.50 mg/L, contact the (operator in responsible charge) immediately at 717-XXX-XXXX.
- If the chlorine residual is flashing 2.2 mg/L and a high range/dilution has been done according to the Hach Pocket II instructions and the value is higher than 3.50 mg/L, contact the (operator in responsible charge) immediately at 717-XXX-XXXX.
- If the distribution sample result is less than 0.15 mg/L or greater than 3.5 mg/L contact the (operator in responsible charge) at 717-XXX-XXXX.

If results are in the alert level ranges listed above, make sure that the ORC is contacted and made aware of changing conditions.

VI. CAUTIONS

Analyze sample immediately upon collection.

VII. INTERFERENCES

Color, turbidity, manganese, copper, permanganate and ozone interfere with chlorine measurements.

The instrument will be zeroed out with a sample (minus the DPD reagent) in order to account for these interferences.

VIII. HEALTH & SAFETY

DPD is toxic and flammable. Open powder pillows with scissors and handle with gloves. Analyst should always utilize all appropriate PPE during analysis. All chemicals should be handled and stored in accordance with the SDS.

IX. EQUIPMENT & SUPPLIES

Hach Pocket II Colorimeter (Initial/Quarterly verified) & routinely meets SpecCheck Gel standards	Safety glasses/goggles
Hach DPD 10 mL free chlorine powder pillows – PN # 2105569	Protective gloves
Sample cell, 10 mL	SpecCheck Gel Secondary Standard Kit, Chlorine DPD, LR -PN# 2635300
Kimwipes	Squirt bottle w/ deionized water

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X.

PROCEDURES

1. Turn cold water on at the sample tap and let run for at least 2 minutes.
2. On the meter press the black “on” button. (Note: Most recent reading will show in the display)

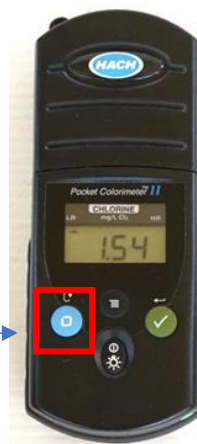


“ON” Button

3. Using the sample cell, rinse the sample cell and cap. Collect a 10 mL sample of water from the sample tap. Be sure to read the bottom of meniscus. Replace sample cell cap and wipe off all fingerprints and condensation with a kimwipe.
4. Pull the black instrument cap off of the meter.
5. Properly place the sample into the sample holder oriented with the diamond facing you. Replace the instrument cap upright completely over the sample cell.



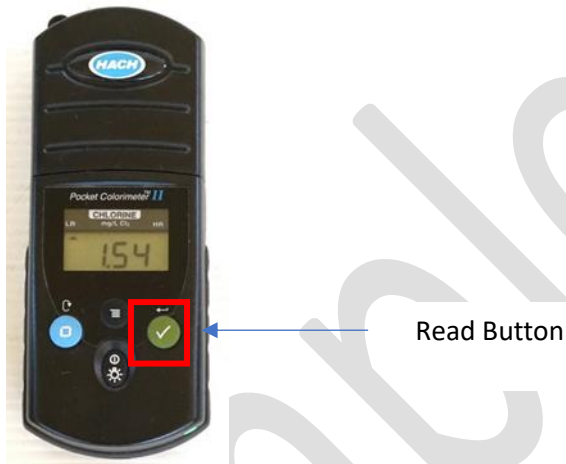
6. Press the blue “zero button”. Zeros will be displayed.



“Zero O” Button

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7. Remove the instrument cap and sample cell from the meter. Place one 10 mL free chlorine DPD powder pillow into the sample cell and swirl for 20 seconds. If chlorine is present, you should see a pink color develop. Again, wipe the outside of the sample cell with a kimwipe and return it to the sample cell holder in the instrument. Replace the instrument cap completely over the sample cell. This must be read within a minute of adding the powder pillow.
8. Press the green “✓” read button on the instrument. Result should display.



9. Subtract the method blank result (0.00 mg/L, 0.01 mg/L or 0.02mg/L- see Method 334.0 information) from the reading on the display. Each lot of powder pillows may vary.
10. Record the result on the Daily Sheet and make note of anything unusual in the daily treatment logbook. Please be sure to specify the date, time, and location of each sample, and initial each entry.
11. Empty and rinse the sample cell and cap at least 3 times with deionized water. Turn meter off and put it away.

XI. QUALITY CONTROL

Hach Pocket II Low range mode detection: 0.02 mg/L to 2.00 mg/L

Hach Pocket II High range mode detection: 0.1 mg/L to 8.0 mg/L

XII. REFERENCES

Hach Pocket II instrument manual

Operations permit special conditions

Comprehensive Monitoring Plan

SDS Sodium Hypochlorite

SDS DPD Powder Free Chlorine Powder Pillows

Method 334.0 documentation instrument/analyst