



SODIUM HYPOCHLORITE TESTING SOP

SOP #133

Rev: 0.0

Date: 01/31/2018

SOP VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Approved by

STAFF ACKNOWLEDGEMENT

I certify that the requirements of this SOP have been communicated to me and that I am trained in its use. A copy of this page will be distributed to the employee training record file.

Name	Date

APPROVAL SIGNATURES

Prepared by: Arcadis U.S., Inc. Date: 01/31/2018

Approved by: _____ Date: _____

1 DEFINITIONS AND ACRONYMS

g/L	grams per liter
PPE	personal protective equipment
mL	milliliter
N	normal (equivalent per liter)

2 KEY PERSONNEL AND RESPONSIBILITIES

- Laboratory Technician:
 - Confirm sodium hypochlorite strength and record to calculate correct dosing.

3 SCOPE/PURPOSE

This SOP uses the iodometric method to determine the percent concentration of sodium hypochlorite (concentrated liquid bleach) used as a disinfectant at the water treatment plant and reservoirs.

Under acidic conditions, hypochlorite reacts with iodide to produce an equivalent amount of triiodide (I_3^-). The released I_3^- is titrated with standard thiosulfate solution to a colorless end point. The number of digits of thiosulfate required is proportional to the hypochlorite concentration in the original bleach sample.

Samples of concentrated sodium hypochlorite solution should be stored in a cool, dark place until analyzed and should be analyzed as soon as practical.

4 HEALTH AND SAFETY

The following personal protective equipment (PPE) is required while inside the building where the bulk sodium hypochlorite is stored:

- Chemical resistant apron
- Chemical resistant gloves
- Face shield

Additionally, the facility is equipped with an emergency eyewash station.

Once the sample is collected and taken to the lab for analysis, the following PPE is required:

- Chemical resistant gloves
- Laboratory coat
- Safety glasses

5 PROCEDURE

Equipment Required:

- Glass sample bottle
- One 125 mL Erlenmeyer flask
- Reagents:
 - Potassium iodide powder pillow (Hach Catalog No. 2059996)
 - Acid reagent powder pillow, 25 mL (Hach Catalog No. 104299)
 - 2.26 N thiosulfate titrant solution cartridge (Hach Catalog No. 2686901)
- Starch indicator solution (Hach Catalog No. 34932)
- Titrator (Hach Catalog No. 1690001)
- Piston pipet, 0.1 – 1.0 mL

Procedure:

1. Collect a sample from the concentrated sodium hypochlorite solution (approximately 5-10 mL) in a clean glass sample bottle. Take the bottle to the lab for analysis.
2. Insert a clean delivery tube into the 2.26 N thiosulfate titrant solution cartridge. Attach the cartridge to the titrator body.
3. Flush the delivery tube by turning the deliver knob to eject a few drops of titrant. Reset the counter to zero and wipe off the tip.
4. Fill the 125-mL Erlenmeyer flask to the 75-mL mark with deionized or tap water.
Note: The level of residual chlorine found in tap water will not interfere in the test.
5. Add the contents of one potassium iodide powder pillow to the flask and swirl to mix.
6. Add the contents of one acid reagent powder pillow to the flask and swirl to mix.
7. Attach a clean tip to a calibrated piston pipet.
8. Use the pipet to dispense 0.2 mL of the sodium hypochlorite sample below the solution level in the flask.
9. Swirl to mix. The solution will turn dark brown.
10. Place the delivery tube tip into the solution and swirl the flask while titrating with the thiosulfate titrant until the solution is pale yellow.
11. Add one dropper of starch indicator solution to the flask and swirl to mix. A dark blue or green color will develop.
12. Continue the titration until the solution becomes colorless. Record the number of digits required.
13. Calculate the g/L chlorine:
 - a. $\text{g/L chlorine} = \text{Digits Required} \times 0.5$
 - b. Divide the g/L chlorine by 10 to obtain the % (by volume) chlorine (trade percent).

6 DATA RECORDING AND MANAGEMENT

Record the results of the test on the daily test log sheet.

7 REFERENCES

Method adapted from ASTM Method D2022.