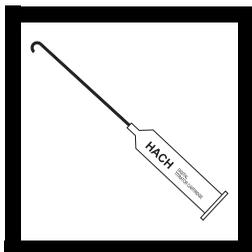


HYPOCHLORITE (Bleach) (50 to 150 g/L [5 to 15%] as Cl₂)

Iodometric Method*

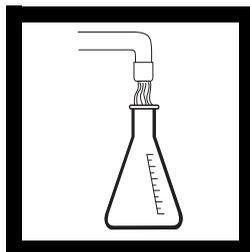
Scope and Application: For testing concentrated liquid bleach (sodium hypochlorite, soda bleach) used as a disinfectant in drinking water or wastewater treatment.



1. Insert a clean delivery tube into the 2.26 N Thiosulfate Titrant Solution cartridge. Attach the cartridge to the titrator body.



2. 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.



3. Fill a 125-mL Erlenmeyer flask to about 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.



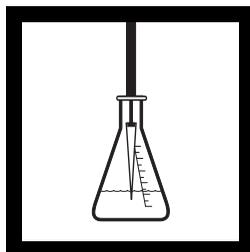
4. Add the contents of one Potassium Iodide Powder Pillow to the flask and swirl to mix.



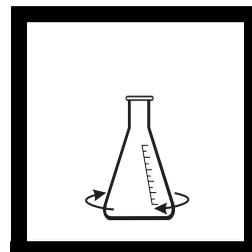
5. Add the contents of one Acid Reagent Powder Pillow to the flask and swirl to mix.



6. Attach a clean tip to the TenSette® Pipet.



7. Use the pipet to dispense 0.2 mL of bleach sample below the solution level in the flask.



8. Swirl to mix. The solution will turn dark brown.

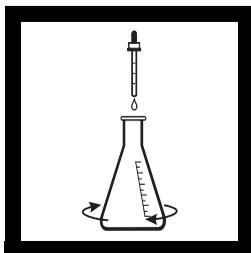
Note: Proceed immediately with Step 9.

* Adapted from ASTM method D2022.

HYPOCHLORITE (Bleach), continued



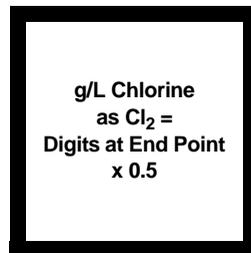
9. Place the delivery tube tip into the solution and swirl the flask while titrating with the thiosulfate titrant until the solution is pale yellow.



10. Add one dropper of Starch Indicator Solution to the flask and swirl to mix. A dark blue or green color will develop.



11. Continue the titration until the solution becomes colorless. Record the number of digits required.



12. Calculate the g/L chlorine:

$\text{g/L chlorine} = \text{Digits Required} \times 0.5$

Note: Divide the g/L chlorine by 10 to obtain the % (by volume) chlorine ("trade percent").

Sample Collection, Preservation and Storage

Soda bleach solutions are relatively unstable. Avoid exposing the sample to heat or light. Collect samples in glass bottles and store in a cool, dark place until analyzed. Analyze as soon as practical.

Accuracy Check

Standard Solution Method

Hach strongly recommends that, for optimum test results, reagent accuracy be checked with each new lot of reagents. The strength of the Thiosulfate Standard Solution can be checked using Potassium Iodide-Iodate Standard Solution:

1. Use a Class A pipet to transfer 50.00 mL of 0.0125 N Potassium Iodide-Iodate Standard Solution to a clean 125-mL Erlenmeyer flask.
2. Add the contents of one Potassium Iodide Powder Pillow to the flask and swirl to mix.

HYPOCHLORITE (Bleach), continued

3. Add the contents of three Acid Reagent Powder Pillows to the flask and swirl to mix. Swirl until all powder is dissolved.
4. Continue the titration starting at *step 9* of the procedure. It should take 217–227 digits of 2.26 N Thiosulfate Standard Solution to reach the end point.

Interferences

The iodometric method is relatively free of interferences. The test will determine chlorite ion (ClO_2^-) in addition to the hypochlorite ion (ClO^-). However, the amount of chlorite in commercial bleach is insignificant (typically less than 0.2%).

A large excess of caustic in the bleach sample may lead to low results. After adding the Acid Reagent Powder Pillow (*step 5*), check the pH of the solution with pH paper. The pH should be less than 3. If not, add additional Acid Reagent, one pillow at a time, until the pH drops below 3.

For most accurate results, the temperature of the dilution water (*step 3*) should be less than 20 °C (68 °F).

Precision

In a single laboratory, using a commercial bleach sample of 91.2 g/L (9.12%) Cl_2 , a single operator obtained a standard deviation of ± 1.5 g/L ($\pm 0.15\%$) Cl_2 .

Summary of Method

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.

HYPOCHLORITE (Bleach), continued

REQUIRED REAGENTS

HR Hypochlorite (Bleach) Reagent Set (about 100 tests)26870-00
Includes: (1) 349-32, (1) 1042-99, (1) 20599-96, (1) 26869-01

Description	Unit	Cat. No.
Acid Reagent Powder Pillows.....	100/pkg.....	1042-99
Potassium Iodide Powder Pillows.....	50/pkg.....	20599-96
Sodium Thiosulfate Standard Titrant Solution, 2.26 N.....	each.....	26869-01
Starch Indicator Solution.....	100 mL MDB*.....	349-32

REQUIRED APPARATUS

Clippers, large.....	each.....	968-00
Delivery Tubes, 180°	5/pkg.....	17205-00
Digital Titrator Assembly.....	each.....	16900-02
Flask, Erlenmeyer, 125-mL.....	each.....	505-43
Pipet, TenSette [®] , 0.1–1.0 mL	each.....	19700-01
Pipet Tips for 19700-01 TenSette [®] Pipet	50/pkg.....	21856-96

OPTIONAL REAGENTS

Potassium Iodide-Iodate Standard Solution, 0.0125 N..... 1 L.....14001-53

OPTIONAL APPARATUS

pH Paper, 1–11	5/pkg.....	391-33
Pipet, volumetric, Class A, 50.00 mL.....	each.....	14515-41

* Marked Dropping Bottle