

Method 8206

Mercuric Nitrate Method
(10 to 8000 mg/L as Cl⁻)

Digital Titrator

Scope and Application: For water, wastewater, and seawater



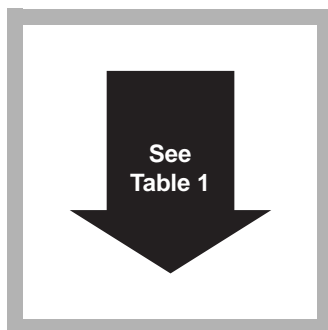
Tips and Techniques

- For added convenience when stirring, use the TitraStir® apparatus (Cat. No. 19400-00, -10).
- mg/L sodium chloride = mg/L chloride x 1.65
- meq/L chloride = mg/L chloride ÷ 35.45

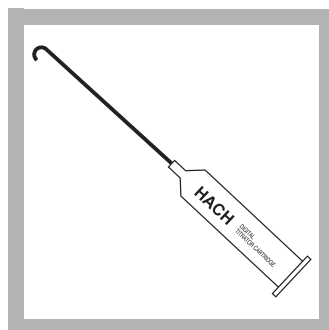


Digital Titration

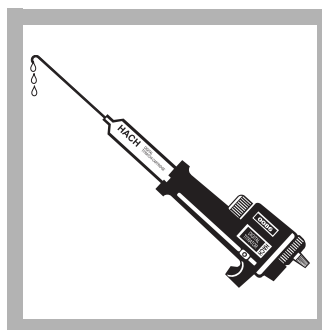
Method 8206



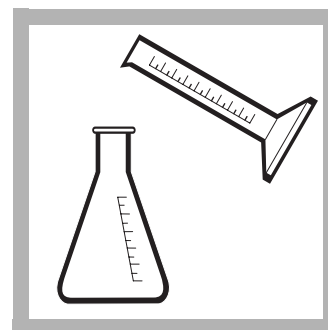
1. Select the sample volume and Mercuric Nitrate Titration Cartridge that corresponds to the expected chloride concentration from *Table 1*.



2. Insert a clean delivery tube into the titration cartridge. Attach the cartridge to the titrator body.

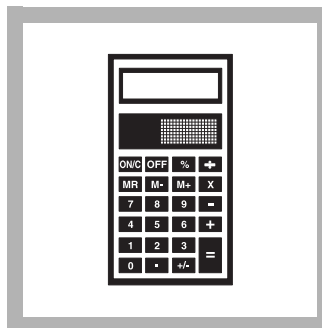
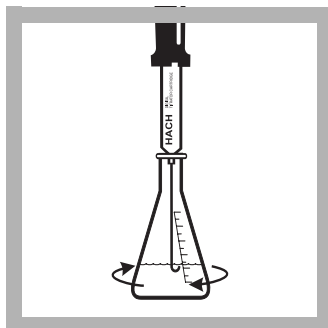
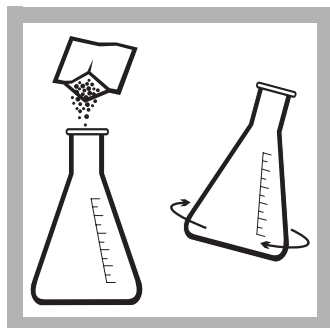


3. Hold the Digital Titrator with the cartridge tip pointing up. Turn the delivery knob until a few drops of titrant are expelled. Reset the counter to zero and wipe the tip.



4. Use a graduated cylinder or pipet to measure the sample volume from *Table 1*. Transfer the sample into a clean 250-mL Erlenmeyer flask. Dilute to about the 100-mL mark, if necessary.

Chloride



5. Add the contents of one Diphenylcarbazone Powder Pillow and swirl to mix.

Results will still be accurate if a small amount of powder does not dissolve.

6. Place the delivery tube tip into the solution and swirl the flask while titrating with mercuric nitrate from a yellow to light pink color. Record the number of digits required.

7. Calculate:

Digits Required x
Digit Multiplier = mg/L Chloride

Table 1

Range (mg/L as Cl ⁻)	Sample Volume (mL)	Titration Cartridge (N Hg(NO ₃) ₂)	Catalog Number	Digit Multiplier
10–40	100	0.2256	14393-01	0.1
40–160	25	0.2256	14393-01	0.4
100–400	100	2.256	921-01	1.0
200–800	50	2.256	921-01	2.0
500–2000	20	2.256	921-01	5.0
1000–4000	10	2.256	921-01	10.0
2000–8000	5	2.256	921-01	20.0

Sampling and Storage

Collect at least 100 to 200 mL of sample in a clean glass or polyethylene container. Samples may be stored up to 7 days before analysis.

Accuracy Check

Standard Additions Method (Sample Spike)

This accuracy check should be performed when interferences are suspected or to verify analytical technique.

1. Snap the neck off a Chloride Voluette[®] Ampule Standard, 12,500-mg/L Cl⁻.
2. Use a TenSette[®] Pipet to add 0.1 mL of standard to the sample after titration in step 6. Resume titration back to the same end point. Record the number of digits required.
3. Repeat, using additions of 0.2 and 0.3 mL. Titrate to the end point after each addition.
4. Each 0.1 mL addition of standard should require 12.5 additional digits of 2.256 N titrant, 25 digits of 1.128 N titrant and 125 digits of 0.2256 N titrant. If these uniform increases do not occur, see *Section 3.2.2 Standard Additions* on page 46.

Interferences

- Chromate, ferric iron and sulfite in excess of 10 mg/L interfere with this method.
- Eliminate sulfite interference by adding three drops of Hydrogen Peroxide, 30% (Cat. No. 144-45), in *step 4*.
- Remove sulfide interference by adding the contents of one Sulfide Inhibitor Reagent Powder Pillow (Cat. No. 2418-99) to about 125 mL of sample, mixing for one minute, and filtering through a folded Filter Paper (Cat. No. 1894-57).
- Iodide and bromide interfere directly and titrate as chloride.
- Neutralize strongly alkaline or acidic samples to a pH of 2 to 7 with 5.25 N Sulfuric Acid Standard Solution (Cat. No. 2449-32) or 5.0 N Sodium Hydroxide Standard Solution (Cat. No. 2450-32). Determine the amount of acid or base necessary in a separate sample because pH electrodes will introduce chloride into the sample.

Summary of Method

When using Mercuric Nitrate Standard Solution, the sample is titrated under acidic conditions in the presence of diphenylcarbazone indicator. Upon addition of a slight excess of mercuric ion, a pink-purple complex is formed with the indicator, signaling the end point.

Required Reagents

Description	Unit	Cat. No.
Mercuric Nitrate Chloride Reagent Set (about 100 tests).....		22726-00
Includes:		
(2) Diphenylcarbazone Reagent Powder Pillows.....	100/pkg.....	836-99
(1) Mercuric Nitrate Titration Cartridge, 0.2256 N.....	each.....	14393-01
(1) Mercuric Nitrate Titration Cartridge, 2.256 N.....	each.....	921-01
Water, deionized	4 L	272-56

Required Apparatus

Digital Titrator.....	each.....	16900-01
Select one or more based on sample concentration		
Cylinder, graduated, 10-mL	each.....	508-38
Cylinder, graduated, 25-mL	each.....	508-40
Cylinder, graduated, 50-mL	each.....	508-41
Cylinder, graduated, 100-mL	each.....	508-42
Flask, Erlenmeyer, 250-mL	each.....	505-46

Required Standards

Chloride Standard Solution, Voluette® Ampule, 12,500-mg/L Cl ⁻ , 10-mL.....	16/pkg.....	14250-10
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FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:

In the U.S.A. – Call toll-free 800-227-4224

Outside the U.S.A. – Contact the HACH office or distributor serving you.

On the Worldwide Web – www.hach.com; E-mail – techhelp@hach.com

HACH COMPANY
WORLD HEADQUARTERS
Telephone: (970) 669-3050
FAX: (970) 669-2932
