

Mercuric Nitrate Method

Method 10073

0 to 100 ppt

Digital Titrator

Scope and application: For seawater and brackish water.



Test preparation

Before starting

As an alternative to stirring by hand, use the TitraStir Titration Stand to hold the Digital Titrator and stir the sample.

The reagents that are used in this test contain mercury. Collect the reacted samples for safe disposal.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

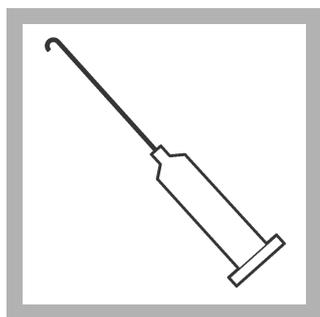
Description	Quantity
Diphenylcarbazone Reagent Powder Pillow	1
Mercuric Nitrate Titration Cartridge, 2.570 N	1
Syringe, 3-cc, Luer lock tip	1
Vial with 2-, 5-, 10-, 15-, 20- and 25-mL marks	1
Digital Titrator	1
Delivery tube for Digital Titrator	1
Water, deionized	varies

Refer to [Consumables and replacement items](#) on page 3 for order information.

Sample collection

- Collect samples in clean glass or plastic bottles.
- If prompt analysis is not possible, keep the sample for a maximum of 7 days before analysis.

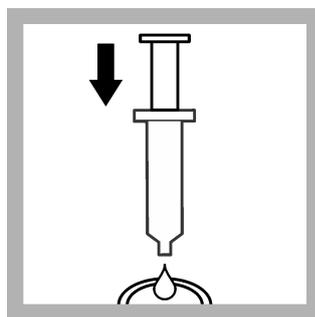
Test procedure



1. Insert a clean delivery tube into the Mercuric Nitrate Titration Cartridge. Attach the cartridge to the Digital Titrator.



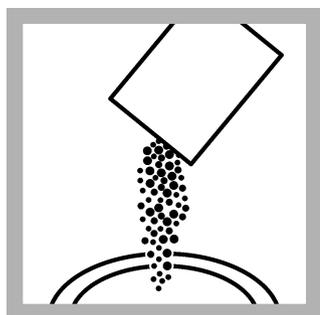
2. Hold the Digital Titrator vertically with the cartridge tip up. Turn the delivery knob to eject air and a few drops of titrant. Reset the counter to zero and clean the tip.



3. Use the 3-mL (3-cc) syringe to collect a 2.0-mL (2-cc) water sample. Add the sample to the plastic vial.

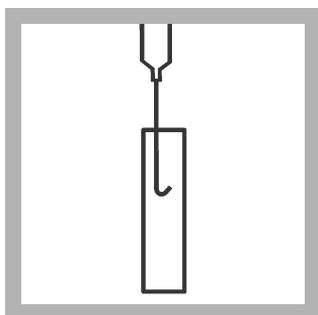


4. Fill the vial to the 10-mL mark with deionized water.

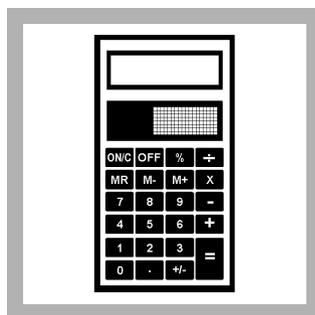


5. Add the contents of one Diphenylcarbazone Reagent Powder Pillow to the vial and mix.

A small amount of undissolved powder will not have an effect on the results.



6. Put the delivery tube point fully into the solution and swirl the flask. Turn the knob on the Digital Titrator to add titrant to the solution. Continue to swirl the flask and add titrant until the color changes from yellow to light pink. Record the number of digits on the counter.



7. Calculate the salinity:
 $\text{Digits} \times 0.1 = \text{ppt salinity}$
Example: The counter showed 250 digits at the endpoint. The concentration is: $250 \text{ digits} \times 0.1 = 25 \text{ ppt salinity}$.
(ppt = parts per thousand)

Conversions

To change the units or chemical form of the test result, multiply the test result by the factor in [Table 1](#).

Table 1 Conversions

ppt salinity to...	multiply by...	Example
mg/L chloride (Cl ⁻)	569	50 ppt salinity x 569 = 28,450 mg/L Cl ⁻
mg/L sodium chloride (NaCl)	940	50 ppt salinity x 940 = 47,000 mg/L NaCl

Pollution prevention and waste management

Reacted samples contain mercury and must be disposed of as a hazardous waste. Dispose of reacted solutions according to local, state and federal regulations.

Summary of method

Mercuric ions in the titrant react with chloride in the sample to form mercuric chloride. After all of the chloride is in the form of mercuric chloride, the mercuric ions react with

diphenylcarbazone indicator to form a pink-purple complex, which shows the endpoint of the titration. The reagent powder contains the indicator and a buffer.

Consumables and replacement items

Required reagents

Description	Quantity/Test	Unit	Item no.
Diphenylcarbazone Reagent Powder Pillows	1	100/pkg	96799
Mercuric Nitrate Titration Cartridge, 2.570 N	1	each	2393701
Water, deionized	varies	4 L	27256

Required apparatus

Description	Quantity/test	Unit	Item no.
Digital Titrator	1	each	1690001
Delivery tube for Digital Titrator, J-hook tip	1	5/pkg	1720500
Syringe, 3-cc, Luer lock tip	1	each	4321300
Vial with 2-, 5-, 10-, 15-, 20- and 25-mL marks	1	each	219300

Recommended standards and apparatus

Description	Unit	Item no.
Chloride Standard Solution, 12,500 mg/L as Cl ⁻ (22 ppt salinity), 10-mL Voluette ampules	16/pkg	1425010
Chloride Standard Solution, 10,246 mg/L as NaCl (10.9 ppt salinity)	100 mL	2307442
Ampule Breaker, 10-mL Voluette [®] Ampules	each	2196800



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