TOTAL, CALCIUM & MAGNESIUM HARDNESS KIT

Code 4824-DR-LT-01 | Direct Reading Titrator, Fresh & Salt Water

QUANTITY	CONTENTS	CODE
15 mL	*Sodium Hydroxide Reagent with Metal Inhibitors	*4259-E
50	Calcium Hardness Indicator Tablets	5250A-H
15 mL	*Hardness Reagent #5	*4483-E
50	Hardness Reagent #6 Tablets	4484A-H
60 mL	Hardness Reagent #7	4487DR-H
1	Test Tube, 5-10-12.9-15-20-25 mL, glass, w/cap	0608
1	Direct Reading Titrator, 0-200 Range	0382
1	Pipet, 0.5 mL, plastic	0353

To order individual reagents or test kit components, use the specified code number.

*Reagent is a potential health hazard. **READ SDS:** lamotte.com
Emergency information:
Chem-Tel USA 1-800-255-3924
Int'l, call collect, 813-248-0585

Warning! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

NOTE: Read Direct Reading Titrator Manual before proceeding. The Titrator is calibrated in terms of hardness expressed as parts per million (ppm) Calcium Carbonate as $CaCO_3$. Each minor division on the Titrator scale equals 4 ppm $CaCO_3$.

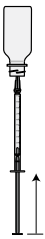
TOTAL HARDNESS TEST PROCEDURE

1. Fill a test tube (0608) to the 12.9 mL line with the sample water.

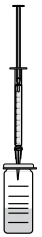
2. Add 5 drops of *Hardness Reagent #5 (4483). Swirl to mix.

3. Add one Hardness Reagent #6 Tablet (4484A). Cap and swirl until tablet disintegrates. Solution will turn red if hardness is present. If solution is blue, there is no measurable amount of hardness.

4. Fill Direct Reading Titrator (0382) with Hardness Reagent #7 (4487DR).



5. Insert the Titrator into the center hole of the test tube cap.



6. While gently swirling the tube, slowly press the plunger to titrate until the red color changes to clear blue.

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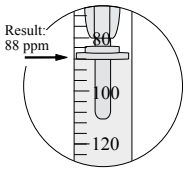
7.

Read the test result directly from the scale where the large ring on the Titrator meets the Titrator barrel. Record as ppm Total Hardness as ($CaCO_3$)



EXAMPLE: Plunger tip is 2 minor divisions below line 80.
Test result is: 80 + (2 divisions x 4) = 88 ppm

NOTE: If the plunger reaches the bottom line on the scale (200 ppm) before the endpoint color change occurs, refill the Titrator and continue the titration. When recording the test result, be sure to include the value of the original amount of reagent dispensed (200 ppm).

Parts per million $CaCO_3$ may be converted to grains per gallon (gpg) $CaCO_3$.

gpg $CaCO_3$ = ppm $CaCO_3$ x 0.058

CALCIUM HARDNESS TEST PROCEDURE

1.

Fill a test tube (0608) to the 12.9 mL line with the sample water.

2.

Add 6 drops of *Sodium Hydroxide with Metal Inhibitor (4259). Cap and swirl to mix.

3.

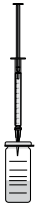
Add one Calcium Hardness Indicator Tablet (5250A). Cap and swirl until tablet disintegrates. Solution will turn red if hardness is present. If solution is blue, there is no measurable amount of hardness.

4.

Fill Direct Reading Titrator (0382) with Hardness Reagent #7 (4487DR).

5.

Immediately insert the Titrator into the center hole of the test tube cap.

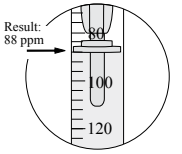


6.

While gently swirling the tube, slowly press the plunger to titrate until the red color changes to clear blue.

7.

Read the test result directly from the scale where the large ring on the Titrator meets the Titrator barrel. Record as ppm Calcium Hardness as ($CaCO_3$).



EXAMPLE: Plunger tip is 2 minor divisions below line 80.
Test result is: 80 + (2 divisions x 4) = 88 ppm

NOTE: If the plunger reaches the bottom line on the scale (200 ppm) before the endpoint color change occurs, refill the Titrator and continue the titration. When recording the test result, be sure to include the value of the original amount of reagent dispensed (200 ppm).

MAGNESIUM HARDNESS TEST PROCEDURE

Subtract Calcium Hardness from Total Hardness. Record as ppm Magnesium Hardness as $CaCO_3$.

Magnesium Hardness (ppm $CaCO_3$) = Total Hardness - Calcium Hardness

ANALYSIS OF HARDNESS IN SALT WATER

When sea and estuarine waters containing very high levels of mineral salts are to be tested, the sample must be diluted to a feasible concentration before titration. This test is supplied with a calibrated pipet for performing the kit dilutions described below.

TOTAL HARDNESS DILUTION (1 TO 25.8)

1. Use the 0.5 mL pipet (0353) to transfer 0.5 mL of the salt water to be tested to the test tube (0608).
2. Dilute to the 12.9 mL line with distilled water.
3. Follow Steps 2 through 7 under the Total Hardness Test Procedure. Multiply Titrator reading by 25.8. Record as ppm Total Hardness as $CaCO_3$.

CALCIUM HARDNESS DILUTION (1 TO 12.9)

1. Use the 0.5 mL pipet (0353) to transfer 1.0 mL (two measures) of the salt water to be tested to the test tube (0608).
2. Dilute to the 12.9 mL line with distilled water.
3. Follow Steps 2 through 7 under Calcium Hardness test procedure. Multiply Titrator reading by 12.9. Record as ppm Calcium Hardness as $CaCO_3$.
4. To convert Calcium Carbonate to Calcium Chloride, multiply by 1.11. Record as ppm Calcium Carbonate.

ppm $CaCl_2$ = ppm $CaCO_3$ x 1.11

5. To convert Calcium Carbonate to Calcium, multiply by 0.4. Record as ppm Calcium.

ppm Ca = ppm $CaCO_3$ x 0.4

MAGNESIUM HARDNESS OF SALT WATER

Subtract Calcium Hardness from Total Hardness. Record as ppm Magnesium Hardness as $CaCO_3$.

Magnesium Hardness (ppm $CaCO_3$) = Total Hardness - Calcium Hardness

To convert Magnesium Hardness as $CaCO_3$ to Magnesium Chloride, multiply by 0.95. Record as ppm Magnesium Chloride.

ppm $MgCl_2$ = ppm $CaCO_3$ x 0.95

To convert Magnesium Hardness to Magnesium, multiply by 0.24. Record as ppm Magnesium.

ppm Mg = ppm $CaCO_3$ x 0.24

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