Hardness Calcium 4

Range(s): 0-4.00 ppm $CaCO_3$, 0-1.60 ppm Ca

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Procedure

Note: Glassware that has not been properly cleaned may contaminate the sample and affect test results. Clean glassware thoroughly before use with phosphate-free detergent (available in local stores); then rinse with Hydrochloric Acid 3N (R-0737) followed by DI Water (R-0833) or sample water.

1. Turn on the Colorimeter.
2. Select a test menu (ALL TESTS, RECENT TESTS, or FAVORITES) containing Hardness Calcium 4 using ◀▶.
3. Select Hardness Calcium 4 using ▲▼; then press ENTER ⊙.
4. Select a chemical form ($CaCO_3$ or Ca) for expression of test results using ▲▼.
5. Rinse and fill 25 mm sample cell to 20 mL mark with sample.
6. Add 0.5 mL Hardness Calcium 4 - Reagent A.
7. Add 0.5 mL Hardness Calcium 4 - Reagent B; cap and swirl to mix.
8. Insert sample cell into sample cell compartment. Align marks per User's Manual.
9. Select ZERO using ◀▶; then press ENTER ⊙. Zero will be displayed.
10. Remove sample cell from sample cell compartment; then remove cap.
11. Add 2 drops Hardness Calcium 4 - Reagent C; then cap and swirl to mix thoroughly.
12. Insert sample cell into sample cell compartment. Align marks.
13. Wait approximately 10 seconds.
14. Select READ using ◀▶; then press ENTER ⊙. The instrument will read the sample and the result will be displayed.

Interferences

Copper > 0.75 ppm – negative interference

EDTA or EGTA, all levels – negative interference

To remove interference: Rinse sample cells thoroughly before each test.

Hardness, Magnesium ($CaCO_3$) > 0.25 ppm or Hardness, Total ($CaCO_3$) > 2.0 ppm

To remove interference: Dilute sample with DI Water (R-0833). Take a 10 mL portion and follow test procedure above.

Iron, Ferric > 1.4 ppm – negative interference

Iron, Ferrous > 1.4 ppm – negative interference

Manganese > 0.4 ppm – positive interference

Zinc > 0.15 ppm – negative interference

The following analytes were tested to the levels listed and found not to cause any interference up to the specified values:

Alkalinity, Total ($CaCO_3$) – 50 ppm

Chlorine – 4 ppm

Chromate – 0.5 ppm

(over)

Test Method

Calmagite

In a strongly alkaline solution, the indicator calmagite reacts with free calcium and magnesium to produce a red color. The chelating agent EGTA is added to destroy any red color due to calcium, and the corresponding change in absorbance is proportional to the concentration of calcium hardness in a sample.

Estimated Detection Limit

0.04 ppm calcium hardness as $CaCO_3$

Precision

Using a single lot of reagent and a standard solution of 2.0 ppm total hardness (1.0 ppm magnesium + 1.0 ppm calcium), an individual analyst obtained a standard deviation with the instrument of ± 0.02 ppm calcium hardness as $CaCO_3$.

Application

Industrial Water – This method is best suited for testing water treated by an ion exchange resin or membrane filter. Testing samples with higher levels of hardness will require sample dilution.

Ordering Info

Reagent Pack

K-8026 Hardness Calcium 4

Formulated for exclusive use with Taylor's TTi® Colorimeter.

Reagent Pack Components

R-8026A Hardness Calcium 4 - Reagent A
R-8026B Hardness Calcium 4 - Reagent B
R-8026C Hardness Calcium 4 - Reagent C

Optional Reagents & Accessories

R-0737 Hydrochloric Acid 3N
R-0833 DI Water

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