



Hardness (Calcium) – EGTA Method

7/10/2024, Ver #1

Applications and Industries

Drinking water, highly purified wastewater, seawater

References

West, T. S., DSC, Ph.D., Complexometry with EDTA and Related Reagents, 3rd ed., pp.46, 164 (1969).

Chemistry

This method employs the ethyleneglycol-bis(2-aminoethylether)-N,N,N1,N1-tetraacetic acid (EGTA) titrimetric chemistry. Results are expressed as ppm (mg/L) calcium carbonate as CaCO₃.

Available Analysis Systems

Titrimetric: Titrets®

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:

Titrets kit: 1 year

Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

Due to the non-linear nature of the test scale, the accuracy of these tests varies with the location of the test result on the scale. At twice the minimum concentration for a particular kit range, the accuracy is $\pm 10\%$ error.

K-1705: ± 10 ppm at 100 ppm

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air when a valve assembly is not attached may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.

Interference Information

1. Zinc, copper, nickel, cobalt, mercury will cause positive (high) bias.
2. Magnesium - The EGTA reagent is buffered to pH 10 with sodium borate – soluble magnesium does not interfere in this pH region as long as the Mg:Ca calcium ratio does not exceed 10. Otherwise magnesium may read positively..
3. Strontium will cause positive bias. Other alkaline earth metals are not expected to interfere.
4. pH – The test method has been validated with sample pH =2. *Note: A-1700 acts as a pH indicator; at pH 5-7.5 it turns orange, pH 2 turns purple.*
5. EDTA - interferes at concentrations above 10 ppm. Increasing negative interference as EDTA concentration increases.

Interpretation of Results

At the endpoint of this titration, the color of the solution in the test ampoule changes from orange to bright blue. If the Titret ampoule is filled with sample but the color of the solution remains orange (i.e. does not change to bright blue), the hardness (calcium) concentration is below the test range. If the solution in the ampoule changes to bright blue immediately upon introduction of the first small dose of sample, the hardness (calcium) concentration is above the test range.