Total Alkalinity - Acid Titrant with pH Indicator Method

Version 4 / May 2023

Applications and Industries

Drinking, surface and saline waters, domestic and industrial wastewaters, boiler and cooling waters

References

APHA Standard Methods, 23rd ed., Method 2320 B - 1997
ASTM D 1067-02, Acidity or Alkalinity of Water, Test Method B
USEPA Methods for Chemical Analysis of Water and Wastes, method 310.1 (1983)

Chemistry

Total or "M" alkalinity is determined using a hydrochloric acid titrant and a bromocresol green / methyl red indicator. The end point of the titration occurs at pH 4.5. Results are expressed in ppm (mg/L) calcium carbonate ($CaCO_3$).

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 kits: at least 1 year

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.

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 this test varies with the location of the test result on the scale. At twice the minimum concentration for a particular kit range, the accuracy is ± 10% error.

Interference Information

- Alkalinity of a water is its acid-neutralizing capacity and is the sum of all titratable bases. Because the alkalinity of many surface waters is primarily a function of carbonate, bicarbonate, and hydroxide content, total alkalinity results are typically assumed to be an indication of the combined concentration of these constituents. However, test results may also include contributions from borate, phosphates, silicates or other bases if present.
- Samples should be analyzed as soon as practical after collection in order to prevent prolonged exposure to air. Filtering, diluting, or otherwise manipulating the sample may cause erroneous results.
- Sample color or turbidity or the formation of a precipitate during titration may mask the end point color change.
- Oxidizing or reducing agents may interfere by destroying the indicator.

Interpretation of Results

At the endpoint of this titration, the color of the solution in the test ampoule changes from pink to bright green. If the ampoule is filled with sample but the color of the solution remains pink (i.e. does not change to green), the total alkalinity of the sample is below the test range. If the solution in the ampoule changes to bright green immediately upon introduction of the first small dose of sample, the total alkalinity of the sample is above the test range. If the sample itself turns pink or red immediately upon addition of the indicator ("Activator") solution (prior to introduction of the sample into the test ampoule), the sample pH is less than or equal to 4.5, which indicates that the alkalinity of the sample is 0 ppm.