

## Methods

The alkalinity of water is a measurement of its buffering capacity. Alkalinity of natural waters is typically a combination of bicarbonate, carbonate, and hydroxide ions. Sewage and wastewaters usually exhibit higher alkalinities due to the presence of silicates and phosphates.

Alkalinity inhibits corrosion in boiler and cooling waters. It is also measured as a means of controlling water and wastewater treatment processes or the quality of various process waters.

### Alkalinity (total)

References: ASTM D 1067-06, Acidity or Alkalinity of Water, Test Method B. APHA Standard Methods, 23<sup>rd</sup> ed., Method 2320 B -1997. USEPA Methods for Chemical Analysis of Water and Wastes, Method 310.1 (1983).

CHEMetrics' total alkalinity tests determine total or *M* alkalinity 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 as ppm (mg/L) CaCO<sub>3</sub>.

## Visual Kits

Range: 10-100 ppm as CaCO <sub>3</sub> MDL: 10 ppm / Method: Acid Titrant with pH Indicator	
Alkalinity (total) Titrets Kit	Cat# K-9810
Increments: 10, 11, 12, 13, 14, 15, 16, 18, 20, 25, 30, 35, 40, 50, 70, 100 ppm	
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules with valve assemblies, Activator Solution, titrettor, 25 mL sample cup and instructions.	

Range: 50-500 ppm as CaCO <sub>3</sub> MDL: 50 ppm / Method: Acid Titrant with pH Indicator	
Alkalinity (total) Titrets Kit	Cat# K-9815
Increments: 50, 55, 60, 65, 70, 75, 80, 90, 100, 125, 150, 175, 200, 250, 350, 500 ppm	
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules with valve assemblies, Activator Solution, titrettor, 25 mL sample cup and instructions.	

Range: 100-1000 ppm as CaCO <sub>3</sub> MDL: 100 ppm / Method: Acid Titrant with pH Indicator	
Alkalinity (total) Titrets Kit	Cat# K-9820
Increments: 100, 110, 120, 130, 140, 150, 160, 180, 200, 250, 300, 350, 400, 500, 700, 1000 ppm	
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules with valve assemblies, Activator Solution, titrettor, 25 mL sample cup and instructions.	

Components and Accessories	
Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Titrettor Pack (1 ea)	A-0053

Instructions and SDSs are posted on our website.

If no shelf life is listed for a product, then the shelf life is at least 1 year.

## Methods

Low-level ammonia nitrogen may be naturally present in water as a result of the biological decay of plant and animal matter. Higher concentrations in surface waters can indicate contamination from waste treatment facilities, raw sewage, industrial effluents (particularly from petroleum refineries), or fertilizer runoff. Excessive ammonia concentrations are toxic to aquatic life.

### The Direct Nesslerization Method

References: ASTM D 1426-08, Ammonia Nitrogen in Water, Test Method A. APHA Standard Methods, 18<sup>th</sup> ed., Method 4500-NH<sub>3</sub> C-1988.

The ammonia test kits employing the well-established Nessler reagent\* to determine ammonia concentrations are applicable to drinking water, clean surface water, good-quality nitrified wastewater effluent, and seawater.\*\* In some waters, calcium and magnesium concentrations can cause cloudiness of the reagent. Adding a few drops of stabilizer solution (Rochelle Salt) will prevent this cloudiness. References recommend distilling samples prior to ammonia analysis. Results are expressed as ppm (mg/L) ammonia-nitrogen, NH<sub>3</sub>-N.

Shelf life: Although the Nessler reagent is stable, its high alkali content attacks the glass ampoule. The resulting precipitate interferes with color comparison.

CHEMetrics and VACUettes: 5 month limit on supply is recommended, however refrigeration can extend shelf life.

K-1503 and K-1523 Vacu-vials: 2 month limit on supply is recommended, however refrigeration can extend shelf life.

K-1513 Vacu-vials: Stable for at least 1 year without refrigeration.

\*Contains mercury. Dispose according to local, state or federal laws.

\*\*Seawater analysis requires additional accessory solutions (sold separately).

### The Hydroxybenzyl Alcohol (HBA) Method

References: Krom, Michael D., Spectrophotometric Determination of Ammonia: A Study of a Modified Berthelot Reduction Using Salicylate and Dichloroisocyanurate, *The Analyst*, V105, pp. 305-316, 1980.

In the ammonia test method that employs the hydroxybenzyl alcohol chemistry, free ammonia reacts with hypochlorite to form monochloramine. Monochloramine reacts with HBA, in the presence of sodium nitro-ferricyanide, to form a green-colored complex.

This test method measures the sum of free ammonia and monochloramine. Results are expressed in ppm (mg/L) ammonia nitrogen, NH<sub>3</sub>-N. The HBA Method offers similar sensitivity to the Nesslerization Method and there is no generation of mercury-containing waste.

**WARNING!** The products employing the Direct Nesslerization method can expose you to chemicals including mercury, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## Visual Kits

Range: 0-1 & 1-10 ppm MDL: 0.05 ppm / Method: Direct Nesslerization	
CHEMetrics Kit	Cat# *K-1510
CHEMetrics Refill, 30 ampoules, Shelf life 5 months	
Stabilizer Solution Pack, six 10 mL bottles	A-1500 <sup>1</sup>
Low Range Comparator 0, 0.1, 0.2, 0.3, 0.4, 0.6, 0.8, 1.0 ppm	C-1501
High Range Comparator 1, 2, 3, 4, 5, 6, 7, 8, 10 ppm	C-1510
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Low and High Range Comparators, Stabilizer Solution, 25 mL sample cup, and instructions.	

Range: 0-4 & 0-80 ppm MDL: 0.125 ppm / Method: Hydroxybenzyl Alcohol (HBA)	
CHEMetrics Kit	Cat# K-1420
CHEMetrics Refill, 30 ampoules	
Activator Solution Pack, Shelf life 8 months	A-1410 <sup>3</sup>
A-1404 Stabilizer Solution, two 10 mL bottles	
A-1405 Catalyzer Solution, two 10 mL bottles	
A-1406 Activator Solution, two 10 mL bottles	
Dual Range Comparator 0, 0.25, 0.50, 0.75, 1.0, 1.5, 2.0, 3.0, 4.0 ppm 0, 5, 10, 15, 20, 30, 40, 60, 80 ppm	C-1404
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Comparator, Stabilizer Solution, Catalyzer Solution, Activator Solution, 25 mL sample cup, 3 mL syringe, and instructions.	

Range: 0-30 & 30-300 ppm MDL: 5 ppm / Method: Direct Nesslerization	
VACUettes Kit	Cat# *K-1510D
VACUettes Refill, 30 ampoules, Shelf life 5 months	
Low Range Comparator 0, 5, 7.5, 10, 15, 20, 25, 30 ppm	C-1501D
High Range Comparator 30, 60, 90, 120, 150, 175, 200, 250, 300 ppm	C-1510D
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, dilutor snapper cup, micro test tube and instructions.	

Range: 0-60 & 60-600 ppm MDL: 10 ppm / Method: Direct Nesslerization	
VACUettes Kit	Cat# *K-1510A
VACUettes Refill, 30 ampoules, Shelf life 5 months	
Low Range Comparator 0, 10, 15, 20, 30, 40, 50, 60 ppm	C-1501A
High Range Comparator 60, 120, 180, 240, 300, 350, 400, 500, 600 ppm	C-1510A
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, dilutor snapper cup, micro test tube and instructions.	

\*Contains mercury. Dispose according to local, state or federal laws.

