

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, 23rd 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) CaCO₃.

Visual Kits

Range: 10-100 ppm as CaCO ₃ 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 ₃ 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 ₃ 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, 18th ed., Method 4500-NH₃ 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, NH₃-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, NH₃-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.

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 *R-1501 ²	
Stabilizer Solution Pack, six 10 mL bottles A-1500 ¹	
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 R-1402	
Activator Solution Pack, Shelf life 8 months A-1410 ³	
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 *R-1501D ²	
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 *R-1501A ²	
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.



Range: 0-120 & 120-1200 ppm MDL: 20 ppm / Method: Direct Nesslerization	
VACUettes Kit	Cat# *K-1510B
VACUettes Refill, 30 ampoules, Shelf life 5 months	*R-1501B ²
Low Range Comparator 0, 20, 30, 40, 60, 80, 100, 120 ppm	C-1501B
High Range Comparator 120, 240, 360, 480, 600, 700, 800, 1000, 1200 ppm	C-1510B
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 0-1000 & 1000-10,000 ppm MDL: 100 ppm / Method: Direct Nesslerization	
VACUettes Kit	Cat# *K-1510C
VACUettes Refill, 30 ampoules, Shelf life 5 months	*R-1501C ²
Low Range Comparator 0, 100, 200, 300, 400, 600, 800, 1000 ppm	C-1501C
High Range Comparator 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 10,000 ppm	C-1510C
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: 0-125 & 0-2500 ppm MDL: 8 ppm / Method: Hydroxybenzyl Alcohol (HBA)	
VACUettes Kit	Cat# K-1420D
VACUettes Refill, 30 ampoules	R-1402D
Activator Solution Pack, Shelf life 8 months	A-1410 ³
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, 8, 15, 25, 35, 50, 70, 100, 125 ppm	C-1404D
0, 160, 300, 500, 700, 1000, 1400, 2000, 2500 ppm	
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, dilutor snapper cup, sample cup top, micro test tube and instructions.	

Range: 0-500 & 0-10,000 ppm MDL: 30 ppm / Method: Hydroxybenzyl Alcohol (HBA)	
VACUettes Kit	Cat# K-1420B
VACUettes Refill, 30 ampoules	R-1402B
Activator Solution Pack, Shelf life 8 months	A-1410 ³
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, 30, 60, 100, 150, 225, 300, 400, 500 ppm	C-1404B
0, 600, 1200, 2000, 3000, 4500, 6000, 8000, 10,000 ppm	
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, dilutor snapper cup, sample cup top, micro test tube and instructions.	

Instrumental Kits

Range: 0-7.00 ppm Method: Direct Nesslerization
Multi-Analyte Photometers V-2000 / V-3000 (See page 14 for instrumental features)

Range: 0-7.00 ppm Method: Direct Nesslerization	
Vacu-vials Kit , Shelf life 2 months	Cat# *K-1503²
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, Stabilizer Solution, 25 mL sample cup, ampoule blank, and instructions.	

Range: 0-10.00 ppm & 0-150 ppm Method: Direct Nesslerization (extended shelf life)	
Vacu-vials Kit , Shelf life 12 months	Cat# *K-1513
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, Stabilizer Solution, 25 mL sample cup, 3-mL syringe, ampoule blank and instructions. Seawater analysis requires A-1503 Accessory Solution Pack (sold separately).	

Range: 0-14.0 ppm Method: Direct Nesslerization	
Vacu-vials Kit , Shelf life 2 months	Cat# *K-1523²
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, Stabilizer Solution, 25 mL sample cup, ampoule blank, and instructions.	

Range: 0-3.00 & 0-60.0 ppm Method: Hydroxybenzyl Alcohol (HBA)	
Vacu-vials Kit , Shelf life 8 months	Cat# K-1413
Kit comes in a cardboard box and contains everything needed to perform 30 tests (except distilled water): thirty ampoules, Stabilizer Solution, Catalyzer Solution, Activator Solution, 25 mL sample cup, 3 mL syringe, ampoule blank and instructions.	

Vacu-vials Kits require the use of a CHEMetrics Direct-Readout Photometer (photometers sold separately) or a spectrophotometer capable of accepting a 13 mm diameter round cell. See page 14 for details.

⚠ 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.

Components and Accessories

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Sample Cup Top Pack (6 ea)	A-0014
Micro Test Tube Pack (10 ea)	A-0015
Dilutor Snapper Cup Pack (6 ea)	A-0018
Ampoule Blank Pack (5 ea)	A-0023
** Sample Zeroing Accessory Pack	A-0025
Syringe Pack, 1.0 mL (6 ea)	A-0027
Syringe Pack, 3.0 mL (6 ea)	A-0063
** Sample Zeroing Accessory Pack	A-0503
** Sample Zeroing Accessory Pack	A-0504
Seawater Accessory Pack (4 bottles)	A-1503

Bromine

Method

Bromine, a less volatile compound than chlorine, is used as a sanitizing agent in drinking water systems, swimming pools, and spas.

The DPD Method

References: USEPA Methods for Chemical Analysis of Water and Wastes, Method 330.5 (1983). APHA Standard Methods, 23rd ed., Method 4500-Cl G -2000.

The bromine test method employs the DPD chemistry. Potassium iodide is added to the sample before analysis. Bromine reacts with the iodide to liberate iodine. The iodine reacts with DPD (N, N-diethyl-p-phenylenediamine) to form a pink color. Results are expressed in ppm (mg/L) bromine as Br₂.



Visual Kit

Range: 0-2.2 & 0-11 ppm MDL: 0.125 ppm / Method: DPD	
CHEMetrics Kit	Cat# K-1605
CHEMetrics Refill, 30 ampoules	R-1605
Activator Solution Pack, six 10 mL bottles	A-1600 ¹
Low Range Comparator 0, 0.25, 0.5, 0.7, 0.9, 1.4, 1.8, 2.2 ppm	C-1601
High Range Comparator 0, 2.2, 3.4, 4.5, 5.6, 6.8, 7.9, 9, 11 ppm	C-1605
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Low and High Range Comparators, Activator Solution, 25 mL sample cup and instructions.	

Components and Accessories

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Ampoule Blank Pack (5 ea)	A-0023

¹ The accessory pack supplies enough solution to perform at least 200 tests.

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.

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

** For use when testing colored or turbid samples. See page 13 for details.

¹ The accessory pack supplies enough solution to perform at least 200 tests.

² Shelf life is based on storage at room temperature and in the dark.

This shelf life can be extended by 18 months if the ampoules are stored in the refrigerator when not in use.

³ The A-1410 Accessory Solution Pack supplies enough Ammonia Activator,

Catalyzer, and Stabilizer Solutions to perform approximately 80 tests. An

accessory solution contained in this pack has a shelf life of 8 months.

(Test kits contain one bottle of each solution.)

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.