



## ALKALINITY P&T KIT

DROP COUNT, 1 Drop = 10 ppm

CODE 4533-01

QUANTITY	CONTENTS	CODE
100	BCG-MR Indicator Tablets	2311A-J
100	Phenolphthalein Tablets	2248A-J
60 mL	*Alkalinity Titration Reagent B	*4493PS-H
1	Test Tube, 5-10-15 mL, glass, w/cap	0778
1	Pipet, plain	0352

\*WARNING: Reagents marked with an \* are considered to be potential health hazards. To view or print a Safety Data Sheet (SDS) for these reagents go to [www.lamotte.com](http://www.lamotte.com). Search for the four digit reagent code number listed on the reagent label, in the contents list or in the test procedures. Omit any letter that follows or precedes the four digit code number. For example, if the code is 4450WT-H, search 4450. To obtain a printed copy, contact LaMotte by email, phone or fax.

Emergency information for all LaMotte reagents is available from Chem-Tel: (US, 1-800-255-3924) (International, call collect, 813-248-0585)

To order individual reagents or test kit components, use the specified code number.

### PROCEDURE

#### PHENOLPHTHALEIN [P] ALKALINITY

1. Fill the test tube (0778) to 5 mL line with sample water.
2. Add one Phenolphthalein Tablet (2248A). Cap and mix until disintegrated. If sample turns red, proceed to Step 3. If no red color develops, P Alkalinity is zero.
3. Fill pipet (0352) with \*Alkalinity Reagent B (4493PS). While gently swirling the tube, hold pipet vertically and add \*Alkalinity Reagent B drop by drop until color changes from red to colorless. Count the drops added. **DO NOT DISCARD SAMPLE IF TESTING TOTAL ALKALINITY.**
4. Calculate result. Record as ppm Phenolphthalein Alkalinity as CaCO<sub>3</sub>.

**Number of drops in Step 3 x 10 = ppm P Alkalinity**

#### TOTAL [T] ALKALINITY

5. Add one BCG-MR Indicator (2311A) to sample from previous procedure. Cap and mix until disintegrated. Sample color will be green.
6. Fill pipet (0352) with \*Alkalinity Reagent B (4493PS). While gently swirling the tube, hold pipet vertically and add \*Alkalinity Reagent B drop by drop until color changes from green to pink. Count the drops added.
7. Multiply number of drops used in Step 6 by 10. Add to result from P Alkalinity procedure. Record as ppm Total Alkalinity as CaCO<sub>3</sub>.

**ppm T Alkalinity = (Number of drops in Step 6 x 10) + ppm P Alkalinity**

If testing only Total Alkalinity, do Steps 1, 5 and 6. Multiply number of drops used in Step 6 by 10. Record as ppm Total Alkalinity as CaCO<sub>3</sub>.

## CALCULATION OF ALKALINITY RELATIONSHIPS

---

The results obtained from the Phenolphthalein and Total Alkalinity determinations offer a means for the stoichiometric classification of the three principal forms of alkalinity present in many water supplies. The classification attributes the entire alkalinity to bicarbonate, carbonate and hydroxide, and attributes the absence of other weak acids of inorganic or organic composition, such as silica, phosphoric and boric.

This classification system assumes the incompatibility of hydroxide and bicarbonate alkalities in the same sample. Since the calculations are on a stoichiometric basis, ion concentrations in the strictest sense are not represented in the results.

According to this scheme:

- A. Carbonate alkalinity is present when the phenolphthalein alkalinity is not zero but is less than the total alkalinity.
- B. Hydroxide alkalinity is present if the phenolphthalein alkalinity is more than one-half the total alkalinity.
- C. Bicarbonate alkalinity is present if the phenolphthalein alkalinity is less than one-half the total alkalinity.

### Relationships Between Phenolphthalein Alkalinity,

### Total Alkalinity, Carbonate Alkalinity, & Hydroxide Alkalinity

Result of Titration	Hydroxide Alkalinity as $\text{CaCO}_3$	Carbonate Alkalinity as $\text{CaCO}_3$	Bicarbonate Alkalinity as $\text{CaCO}_3$
$P = 0$	0	0	T
$P < \frac{1}{2}T$	0	2P	$T - 2P$
$P = \frac{1}{2}T$	0	2P	0
$P > \frac{1}{2}T$	$2P - T$	$2(T - P)$	0
$P = T$	T	0	0

## LaMOTTE COMPANY

Helping People Solve Analytical Challenges

PO Box 329 · Chestertown · Maryland · 21620 · USA  
800-344-3100 · 410-778-3100 [Outside U.S.A.] · Fax 410-778-6394

Visit us on the web at [www.lamotte.com](http://www.lamotte.com)