

Brew your best batch EVERY time!

BREWLABTM
PLUS

Water Analysis Kit
for Home Brewers

Code 7188-01

 **LaMotte**



Scan for direct access to LaMotte Brewlab web page.
For further tips and information, go to instructions/tips tab.

NOTE: Samples should be at room temperature for all tests.

WARNING! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision

*WARNING: Reagents with an * are potential health hazards. To view or print a Material Safety Data Sheet (MSDS) for these reagents go to www.lamotte.com.

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

BREWLABTM PLUS

Welcome to the **BrewLabTM** —
the easy-to-use and economical test kit for
home and craft brewers. Endorsed by world-
renowned brewing author and consultant,
John Palmer, the BrewLab Water Analysis Kit
enables brewers to effectively measure and
adjust the minerals in brewing water to improve
beer flavor and yield. The Brewlab PlusTM also
includes a high quality, waterproof, digital pH
meter for measuring the resulting mash, wort,
and beer pH.

BrewLabTM, the only test kit a brewer needs
to take control of their brewing water.



Helping People Solve Analytical Challenges

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HARDNESS TESTS (as CaCO₃)

QUANTITY	CONTENTS	CODE
15 mL	*Sodium Hydroxide Reagent w/Metal Inhibitors	*4259-E
50	Calcium Hardness Indicator Tablets	T-5250-H
15 mL	*Hardness Reagent #5	*4483-E
100	Hardness Reagent #6 Tablets	4484-J
60 mL	Hardness Reagent #7	4487WT-H
1	Test Tube, w/cap	4488
1	Pipet, 0.5 mL, plastic	0353

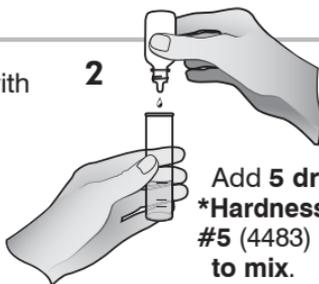
TOTAL HARDNESS

- 1 Fill tube (4488) to the line with sample water.



Line	Equivalence (ppm per drop)
Upper	1 drop = 10 ppm
Lower	1 drop = 20 ppm

2



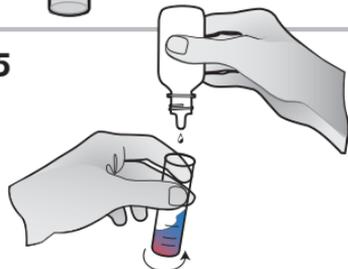
Add 5 drops of *Hardness Reagent #5 (4483) and swirl to mix.

- 3 Add 1 Hardness Reagent #6 Tablet (4484) and swirl to dissolve tablet.



- 4 Sample will turn **Red** if Hardness is present. Proceed to next step. If sample is **Blue**, Total Hardness is 0 ppm.

- 5 Hold the Hardness Reagent #7 (4487WT) vertically to add one drop at a time (**swirling and counting after each drop**) until color changes completely from **Red to Blue** and remains for 30 seconds. Brush and rinse tube promptly after testing.



- 6 Multiply number of drops:
Upper line multiply x 10
Lower line multiply x 20

Record as **TOTAL Hardness** (CaCO₃ ppm)

If the total hardness is greater than 500 ppm, use the 0.5 mL pipet (0353) to transfer 0.5 mL of the water sample to the test tube (4488). Fill tube to 10 ppm line with distilled water. Follow Steps 2 through 5. Multiply the number of drops by 172.

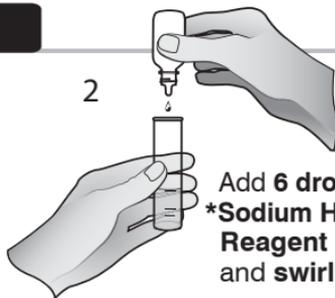
CALCIUM HARDNESS

- 1 Fill tube (4488) to line with water sample.



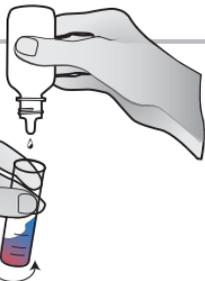
Line	Equivalence (ppm per drop)
Upper	1 drop = 10 ppm
Lower	1 drop = 20 ppm

2



Add **6 drops** of ***Sodium Hydroxide Reagent (4259)** and **swirl to mix**.

- 3 Add 1 **Calcium Hardness Indicator Tablet (T-5250)** and **swirl to dissolve** tablet.



- 4 Sample will turn **Red** if Hardness is present. Proceed to next step.

If sample is **Blue**, Calcium Hardness is 0 ppm.

- 5 Hold the **Hardness Reagent #7 (4487WT)** vertically to add one drop at a time (**swirling and counting after each drop**) until color changes completely from **Red to Blue** and remains for 30 seconds. Brush and rinse tube promptly after testing.

- 6 Multiply number of drops:

Upper line multiply x 10
Lower line multiply x 20

Record as ppm **CALCIUM Hardness** (CaCO_3 ppm).

To convert to calcium (Ca^{+2}) multiply the test result by 0.4.

If the calcium hardness is greater than 500 ppm, use the 0.5 mL pipet (0353) to transfer 1.0 mL (two measures) of the water sample to the test tube (4488). Fill tube to 10 ppm line with distilled water. Follow Steps 2 through 5. Multiply the number of drops by 86.

MAGNESIUM HARDNESS

TOTAL Hardness value ___ minus **CALCIUM Hardness** value ___ =
MAGNESIUM Hardness (CaCO_3 ppm)

To convert to magnesium (Mg^{+2}) multiply the test result by 0.24.

CHLORIDE TEST

QUANTITY	CONTENTS	CODE
15 mL	*Chloride Reagent A	*4069-E
30 mL	*Silver Nitrate, 0.171N	*3824WT-G
1	Test Tube, 5-10-25 mL, plastic, w/cap	0715

CHLORIDE

- 1 Fill tube (0715) to the line with sample water.

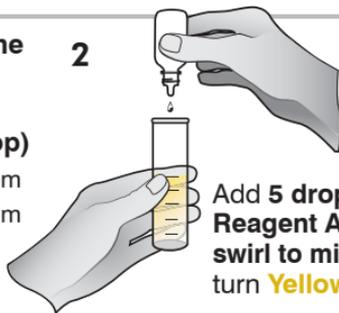


Sample Size **Equivalence (ppm per drop)**

25 mL 1 drop = 10 ppm

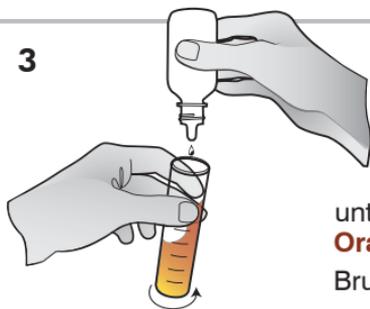
10 mL 1 drop = 25 ppm

2



Add **5 drops** of **Chloride Reagent A** (4069) and **swirl to mix**. Solution will turn **Yellow**.

3



Hold the ***Silver Nitrate, 0.171N** (3824WT) vertically to add one drop at a time (**swirling and counting after each drop**), until color changes completely from **Yellow to Orange-brown** and remains for 30 seconds. Brush and rinse tube promptly after testing.

- 4 Multiply number of **drops**:

25 mL multiply x 10

10 mL multiply x 25

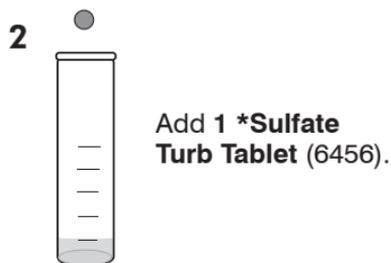
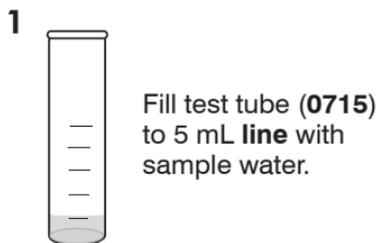
Record as ppm Chloride.

Brush and rinse tube promptly after testing.

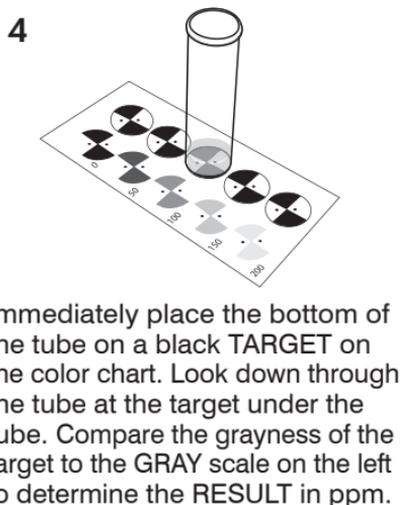
SULFATE TEST

QUANTITY	CONTENTS	CODE
50	*Sulfate Turb Tablets	*6456-H
1	Test Tube, 5-10-25 mL, plastic, w/cap	0715
1	Sulfate Color Chart	7188-01-CC

SULFATE



Remove the cap.



- 5** If the sample is more turbid than the 200 ppm target, fill a clean tube to the 5 mL line with sample. Fill to the 10 mL line with distilled water. Mix. Repeat the test with 5 mL of this diluted sample. Multiply the result by 2.

Thoroughly brush and rinse tubes immediately after each use.

ALKALINITY TEST (as CaCO₃)

QUANTITY	CONTENTS	CODE
15 mL	Total Alkalinity Indicator	2786-E
30 mL	*Sulfuric Acid, 0.12N	*7748WT-G
1	Test Tube, 5-10-25 mL, plastic, w/cap	0715

TOTAL ALKALINITY

- 1** Fill tube (0715) to the line with sample water.



Sample Size **Equivalence (ppm per drop)**

25 mL 1 drop = 10 ppm

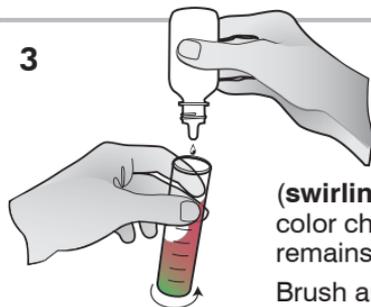
10 mL 1 drop = 25 ppm

2



Add **3 drops** of **Total Alkalinity Indicator (2786)** and **swirl to mix**. Solution will turn **Green**.

3



Hold the ***Sulfuric Acid, 0.12N (7748WT)** vertically to add one drop at a time (**swirling and counting after each drop**), until color changes completely from **Green to Red** and remains for 30 seconds.

Brush and rinse tube promptly after testing.

- 4** Multiply number of **drops**:

25 mL multiply x 10

10 mL multiply x 25

Rinse tube promptly after testing.

To convert to bicarbonate (HCO₃) multiply the test result by 1.2

Record as ppm **Total Alkalinity** (CaCO₃ ppm).

RESIDUAL ALKALINITY

Residual Alkalinity =

Total Alkalinity - $\frac{[\text{Calcium Hardness} + (\text{Magnesium Hardness} \times 0.5)]}{3.5}$

All values are as ppm CaCO₃

3.5

SODIUM (by calculation)

Since water has a neutral charge, the total number of negatively charged anions must equal the total number of positively charged cations. Six ions typically make up 98% of the total ions so the sodium concentration can be estimated by testing for the five other ions.

Negative Ions

$$\frac{\boxed{} \text{ Chloride (ppm)}}{35} + \frac{\boxed{} \text{ Sulfate (ppm)}}{48} + \frac{\boxed{} \text{ Alkalinity (ppm as CaCO}_3\text{)}}{50} = A$$

Positive Ions

$$\frac{\boxed{} \text{ Total Hardness (ppm as CaCO}_3\text{)}}{50} = B$$

$$\boxed{} \text{ Sodium (ppm)} = (A - B) \times 23$$

NOTE: The Total Hardness result incorporates two ions - calcium hardness and magnesium hardness.

pH

QUANTITY	CONTENTS	CODE
1	pH Tracer PockeTester	1741
10	pH 7.0 Mini Buffer Tablets	3894A
10	pH 4.0 Mini Buffer Tablets	3983A

Before First Use or After Storage

1. Hold meter by top battery compartment. Swiftly tap back of meter downward into palm - not a hard surface - to move electrolyte into electrode tip.
2. Remove cap. Soak electrode in pH 4.0 buffer or tap water for 10 minutes.

pH

Sample should be below 122 °F (50 °C). Let cool if necessary.

NOTE: The purpose of ATC in this meter is to maintain electrode calibration across the capability range of 32-194 °F (0-90 °C). It is recommended that wort samples be cooled to room temperature (68 °F/20 °C) before testing. This allows better comparison of measurements at different temperatures due to the natural change in wort pH due to changes in temperature, and improves electrode life.

1. Remove cap. Press ON/OFF to turn meter on.
2. Dip sensor in sample water.
3. Record pH after reading becomes stable and display stops flashing.
4. Press MODE to hold reading and store reading in memory
5. Press ON/OFF to shut meter off.
6. Store in pH 4.0 buffer. Store upright.

Daily Calibration Procedure

1. Fill tube (0715) to 20 mL line with distilled water. Pour into small container. Add pH 7.0 Mini Buffer Tablet (3984A). Stir until tablet disintegrates.
2. Remove cap. Press ON/OFF to turn the meter on.
3. Dip sensor in buffer.
4. Press CAL. END will be displayed and the circled 7 indicator will be displayed.
5. Repeat Steps 1-4 with pH 4 Mini Buffer Tablet (3983A). **Save pH 4 Buffer to use as storage solution.** Tester is calibrated.

Do Not allow pH sensor to dry out.

- Store Upright
- Before first use, tap meter against palm to move electrolyte to tip.



Maintenance

1. Rinse sensor with clean water immediately after each use.
2. **Do not allow sensor to dry out.** Store tester with cap on. Moisten sponge in cap with pH 4.0 buffer. Store upright. **Do not store in deionized water.**
3. If surface contamination is visible or readings become erratic, wet disposable towel with ethanol or isopropyl alcohol and gently rub surface of sensor until no more residue is visible.

Notes:

1. White crystals may form around cap and should periodically be rinsed off. These deposits could affect measurements at low conductivity.
2. Tester automatically shuts off after 8.5 minutes of non-use.
3. For testing samples at high pH, tester can be calibrated with pH 7.0 Mini Buffer Tablets (3984A) and pH 10.0 Mini Buffer Tablets. (3985A) (Sold Separately).
4. The tester requires 4 X CR2032 batteries. Removing the batteries will clear stored data and user calibrations. The factory calibration will be retained.
5. For more information see the pH Tracer Manual (included).

*Plug your test results into the
Brewing Water Adjustment Calculator
at www.lamotte.com/brewlab
to brew your best batch!*



Brewing Resources

To use John Palmer's Brewing Water Adjustment Calculator, and for further tips and information, go to www.lamotte.com/brewlab and select the instructions/tips tab.

How To:

How to Brew by John Palmer
(Brewers Publications, 2006)
The home brewing process laid out, step by step.
Excerpts available at <http://www.howtobrew.com>

Water - A Comprehensive Guide for Brewers
by John Palmer and Colin Kaminski
(Brewers Publications, 2013) - *Water use and adjustment in the brewery from beginning to end.*

Organizations:

American Homebrewers Association - *An organization supporting home brewers*
<http://www.homebrewersassociation.org>

Brewers Association - *The association for brewers' world wide*
<http://www.brewersassociation.org>

American Society of Brewing Chemists - *Experts in the chemistry of brewing*
<http://www.asbcnet.org>

Events:

Craft Brewers Conference - *An annual event for the craft brewing industry*
<http://www.craftbrewersconference.org>

National Homebrewers Conference - *A conference dedicated to the home brew enthusiast*
<http://www.ahaconference.org>