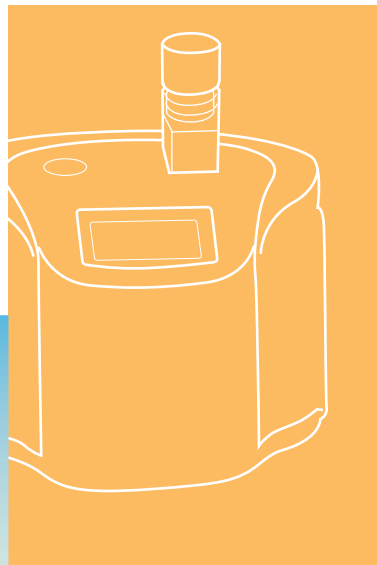
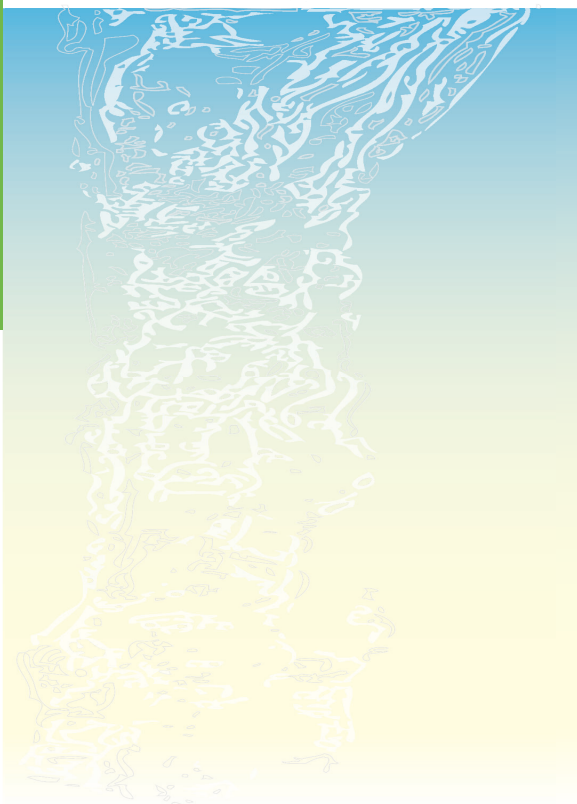


# Model S/DuoSoft with ColorQ

*water quality*

**DEMO OUTFIT**



**AT-Q  
38/40**

 **LaMotte**



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# Safety Information

Read the instruction manual thoroughly to familiarize yourself with the test procedures before you begin. Make note of any precautions in the instructions.

Read the labels on all LaMotte reagent containers prior to use. Some containers include precautionary notices and first aid information. \*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]

Keep equipment and reagent chemicals out of the reach of young children.

Protect Yourself and Equipment: Use Proper Analytical Techniques

## Testing Hints

1



Tightly close all reagent containers immediately after use. Be sure not to interchange caps and pipets from different containers.

2



Avoid prolonged exposure of equipment and reagents to direct sunlight.

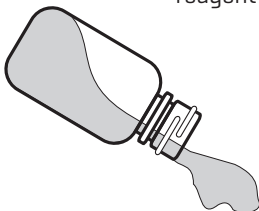
3



Protect reagents and components from extreme heat and cold.

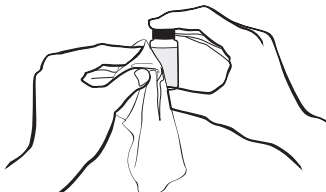
4

Wipe up any reagent chemical spills, liquid or powder, as soon as they occur. Refer to label and accompanying SDS for proper reagent disposal.



5

Use care when dispensing or handling all reagents due to safety reasons. Some chemicals also may cause permanent stains if spilled.



# ANALYTICAL TECHNIQUE

1. Clean glassware is a must for accurate results. Thoroughly rinse test tubes before and after each test. Caps and stoppers should also be cleaned after each use.
2. Use test tube caps or stoppers, not your fingers, to cover test tubes and flasks during shaking or mixing.
3. When adding sample to calibrated test tube, be sure vial is filled to the appropriate mark. The bottom of the liquid [meniscus] should be level with the desired mark. [Fig. 1]
4. When dispensing reagents from bottles filled with dropper plug and cap, be sure to hold bottle vertically and gently squeeze to dispense the appropriate number of uniform drops. [Fig. 2]
5. For those reagents to be added with the screwcap pipet assemblies enclosed, remove polyseal cap on bottle and replace with the screwcap pipet.  
NOTE: Place the polyseal caps back on the reagent bottles for longer periods of storage. Be sure that both pipet assemblies and polyseal caps are thoroughly cleaned before placing on bottles to avoid contamination.
6. When dispensing reagents from pipets, hold pipet vertically to assure uniform drop size. This is extremely important when performing drop count titrations. [Fig. 3]
7. To fill pipets, squeeze rubber bulb and immerse into reagent. Release bulb to fill. [Fig. 4]
8. To add tablets, place over test vial with silver plastic side facing up. Press tablet through the foil into the tube. [Fig. 5]

Fig. 1

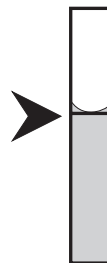


Fig. 2

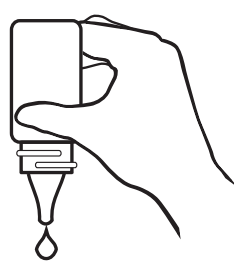


Fig. 3

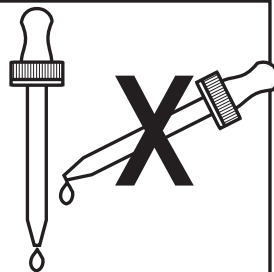
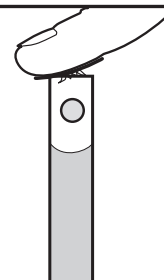


Fig. 4



Fig. 5



# Model S and DuoSoft Softeners

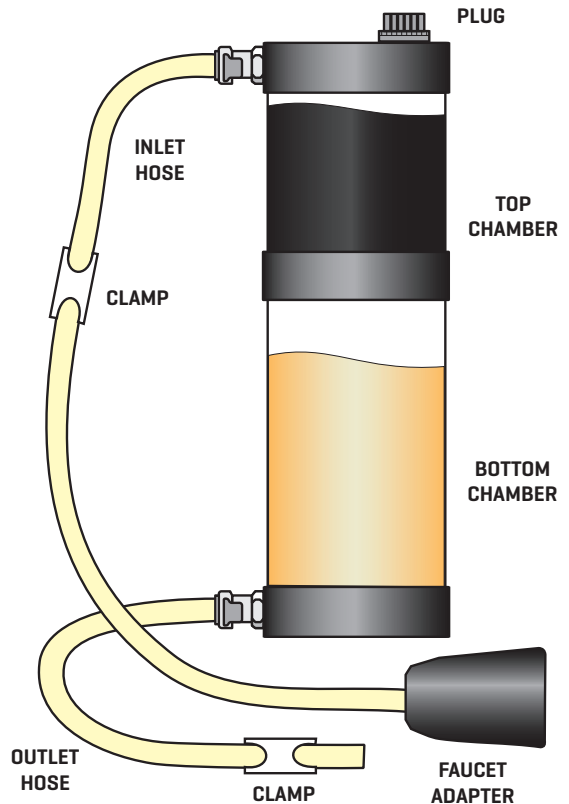
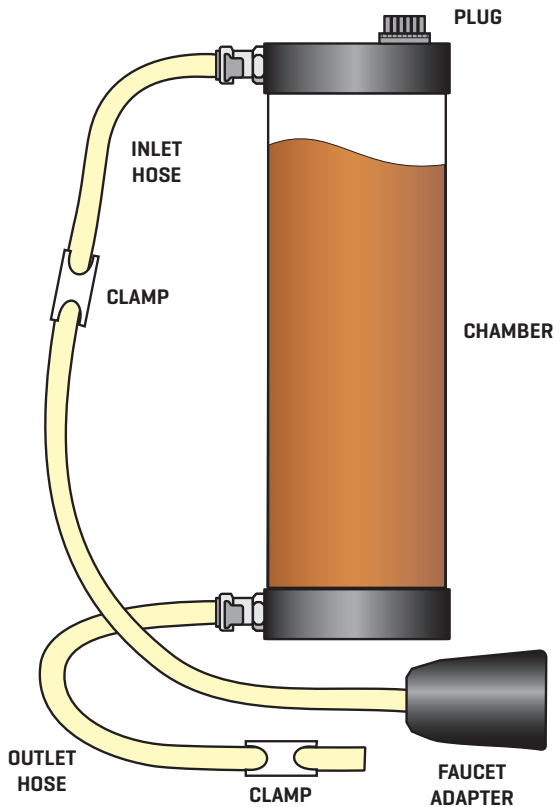
## INTRODUCTION

The **Model S** and the **DuoSoft Water Softeners** are designed to produce high quality softened water. As water passes through the Model S chamber, the resin column causes scale-forming calcium and magnesium ions to be exchanged for non-scale-forming sodium ions. When the resin is exhausted it must be replaced or regenerated. Inexpensive resin refill packages are available, or the original resin can be regenerated by chemical treatment.

In the DuoSoft, water passes through both chambers and will be treated by both types of media. The two chambers of the DuoSoft may be easily filled with the media of choice for specific problem water.

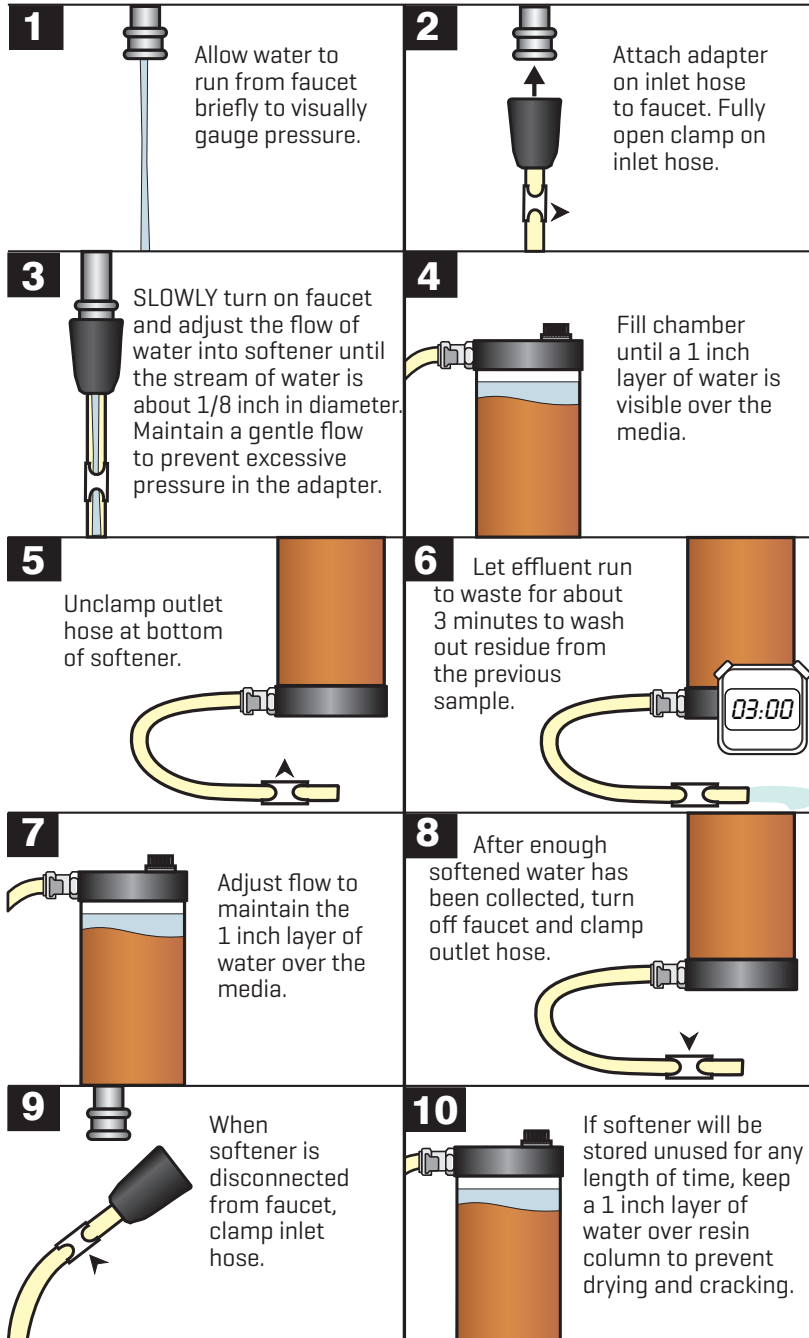
NOTE: These softeners DO NOT yield water suitable for drinking .

READ INSTRUCTIONS BEFORE USE.



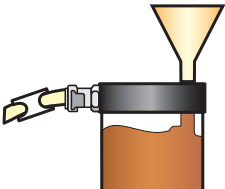
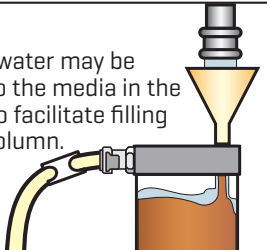
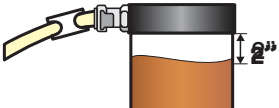
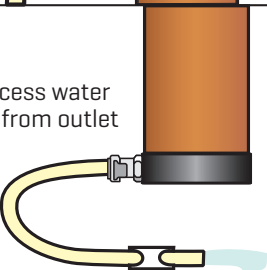
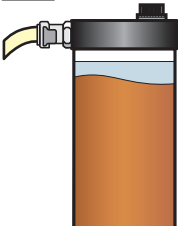
# Instructions for Use

## PROCEDURE A — Use of the Softeners

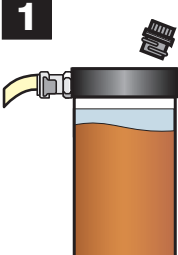
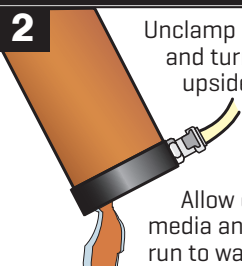
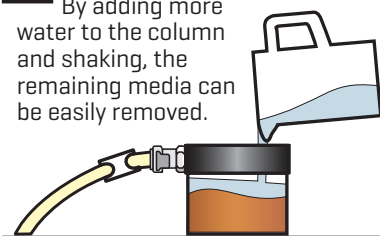


# PROCEDURE B — Replacing the Media in the Softeners

## ADDITION

<b>1</b>	 <p>With the aid of a funnel, add the fresh media to the column.</p>	<b>2</b>	 <p>Tap water may be added to the media in the funnel to facilitate filling of the column.</p>
<b>3</b>	 <p>Continue adding media to the column until the resin is about 2 inches from the top of the column.</p>	<b>4</b>	 <p>Allow excess water to drain from outlet hose.</p>
<b>5</b>	 <p>Clean threaded area completely and replace the black plug in the top of column.</p>	<b>DuoSoft Unit</b> To add the media in the bottom chamber, turn unit upside down and repeat Addition Steps 1-5. When media has been added to both chambers, proceed with Procedure A. When using carbon media, it is suggested that it be used in the top chamber.	

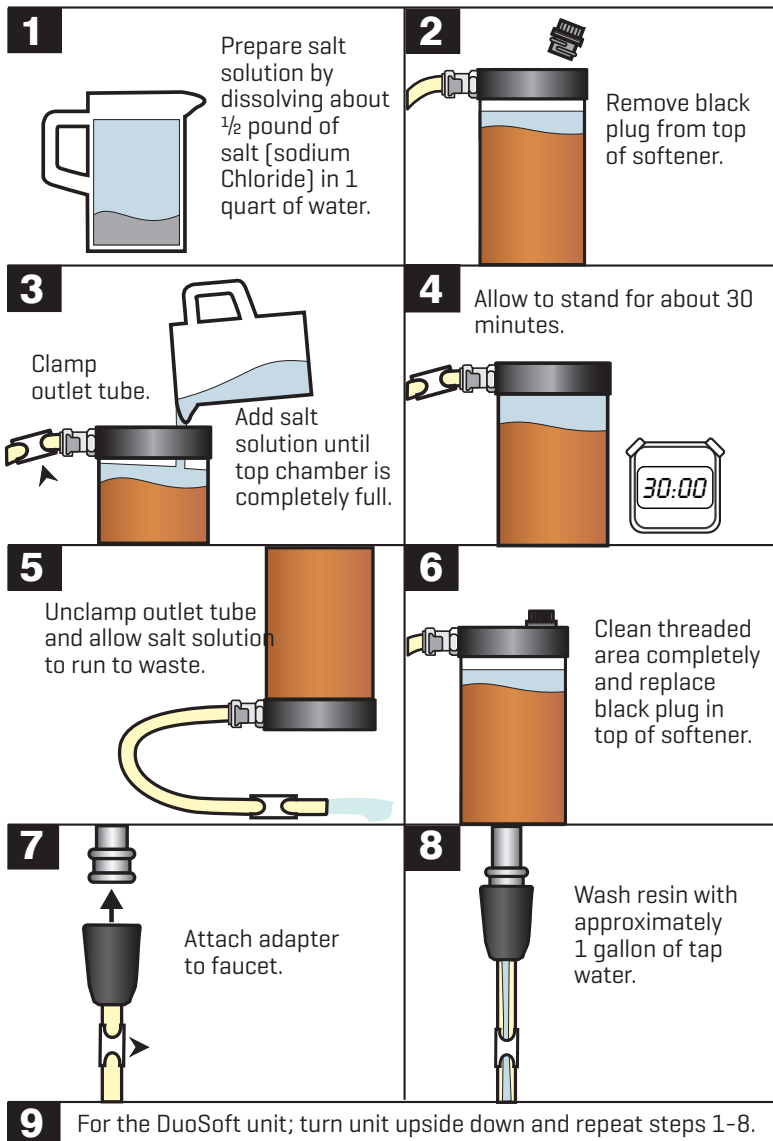
## REMOVAL

<b>1</b>	 <p>To replace media, remove black plug from the top of dispenser.</p>	<b>2</b>	 <p>Unclamp outlet hose and turn softener upside down.  Allow exhausted media and water to run to waste.</p>
<b>3</b>	 <p>By adding more water to the column and shaking, the remaining media can be easily removed.</p>	<b>DuoSoft Unit</b> To remove the media in the bottom chamber, turn unit upside down and repeat Removal Steps 1-3. To add new media, follow Addition Steps 1-5 for both chambers.	

## PROCEDURE C — Regeneration of Media

Follow manufacturers' instructions for regeneration of media. Cation exchange resin may be regenerated in the following manner. NOTE: Due to build up of air pressure, it is not possible to regenerate both chambers of the DuoSoft unit at the same time. Follow steps 1-8 to regenerate top chamber, then see step 9 to regenerate bottom chamber.

NOTE: Due to build up of air pressure, it is not possible to regenerate both chambers of the DuoSoft unit at the same time. Follow steps 1-8 to regenerate top chamber, then see step 9 to regenerate bottom chamber.



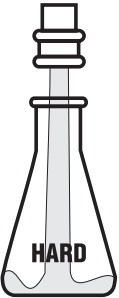
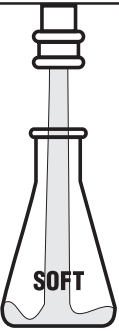
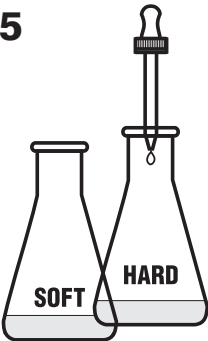






# Soap Demonstration

Calcium and Magnesium ions present in a water supply are the principle contributors to the total hardness. Hard water tends to consume excessive quantities of soap and forms curds and deposits on glassware, fabrics, etc.

\*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). See Safety Information on page 4 for more information.

## TEST PROCEDURE

<b>1</b>  <p>Thoroughly rinse the "SOFT" water flask [0453] with softened water.</p>	<b>2</b>  <p>Thoroughly rinse the "HARD" water flask [0452] with untreated water.</p>	<b>3</b>  <p>Fill the "HARD" flask [0452] with untreated water until the bottom surface is covered with a layer of water about <math>\frac{1}{2}</math> inch deep.</p>
<b>4</b>  <p>Fill the "SOFT" flask [0453] with softened water to the same level.</p>	<b>5</b>  <p>With the pipet [0392], add 4 drops of *Soap Reagent #4 [4767] to each flask.</p>	<b>6</b>  <p>Cap and shake the flask.</p>
<b>7</b>  <p>A thick lather will form in the softened water.</p>	<b>8</b>  <p>Continue to add *Soap Reagent #4 [4767], one drop at a time, to the untreated "HARD" water, shake periodically until a lather forms. Count the number of drops added.</p>	<b>9</b>  <p>Extremely hard water may require 30, 40, or even 60 drops of *Soap Reagent #4 to produce a lasting lather.</p>


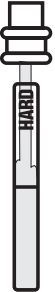



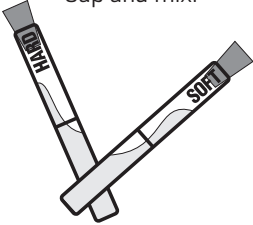

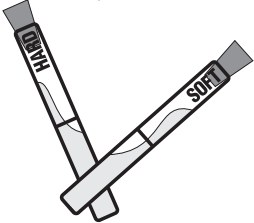
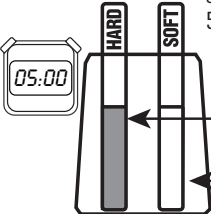
# Precipitation Demonstration

Calcium and Magnesium ions are the major contributors to water hardness. The chemical reagents in this demonstration pull the Calcium and Magnesium ions out of solution to form a cloudy precipitate in hard water. The water that has been run through the ion exchange column has had these ions removed, therefore, the sample should remain clear.

NOTE: This portion of the AT-38/40 Water Quality Demo Kit is ONLY a visual demonstration illustrating the removal of Calcium and Magnesium ions from tap water after treatment by the ion exchange process. The results should not be interpreted beyond the intent of the demonstration.

\*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). See Safety Information on page 4 for more information.

## TEST PROCEDURE

<div>1</div> <div></div> <div>Thoroughly rinse the "SOFT" water Demo Tube [0298] with softened water.</div>	<div>2</div> <div></div> <div>Thoroughly rinse the "HARD" water Demo Tube [0297] with softened water.</div>	<div>3</div> <div></div> <div>Fill the "SOFT" Demo tube [0298] to the line with softened water.</div>
<div>4</div> <div></div> <div>Fill the "HARD" Demo tube [0297] to the line with untreated water.</div>	<div>5</div> <div></div> <div>Add 7 drops of *Precipitation Reagent A [4542WT] to each tube.</div>	<div>6</div> <div></div> <div>Cap and mix.</div>
<div>7</div> <div></div> <div>Add 7 drops of Precipitation Reagent B [4543WT] to each tube.</div>	<div>8</div> <div></div> <div>Cap and mix.</div>	<div>9</div> <div></div> <div>Place tubes in the Precipitation Rack [0879] and allow the tubes to stand for 5 minutes.</div> <div>Heavy Precipitate</div> <div>Remains clear</div>

# ColorQ DW

ColorQ Photometer for Drinking Water

For software Version 5.73 or higher

To insure proper testing results.

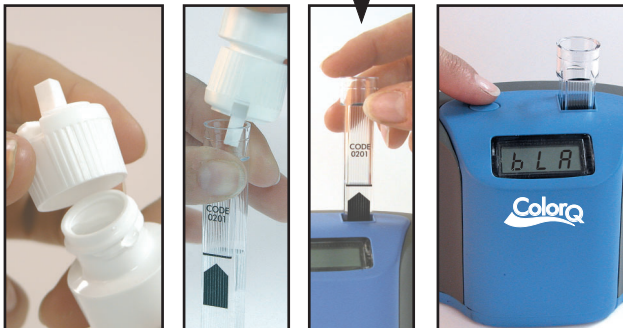
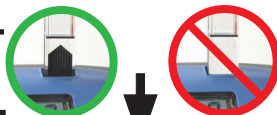
- Insert tubes into ColorQ with line and arrow facing forward.
- **Sun** = Shade meter from bright sunlight. Press/Hold button to turn off.
- **Er7** = Tube is misaligned or scratched, or light chamber is stained. See Users Guide for more instructions.
- Brush and rinse all tubes promptly after use.
- Rinse tablet crusher between test factors.
- Allow tubes to dry before returning to case.
- Replace reagent caps securely.
- Use only LaMotte replacement reagents and ColorQ test tubes Code 0201.
- If unit should auto-off during testing rinse and fill one tube to Blank and return to testing.
- To skip test in the sequence press button to advance past that test factor.
- To turn meter off at any time, press and hold the button until “off” is displayed.
- **bAt** = battery is low.



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.

## BLANK [CALIBRATION]

**1** bLA



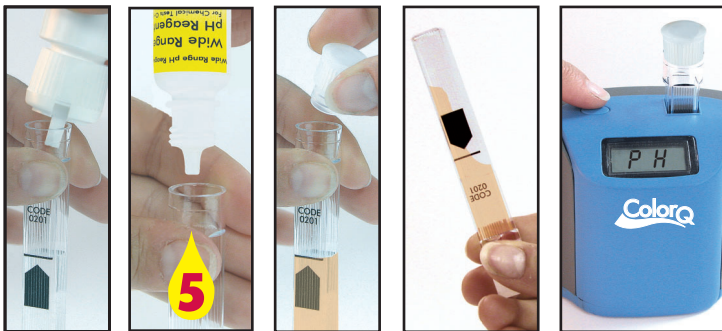
1. Fill sample bottle with water sample. Replace cap.
2. Fill clean tube (#0201) to the 5mL line with water sample.
3. Insert tube into ColorQ as shown.
4. Press button to turn meter on. When “bLA” appears press button to “Blank” the meter, and go to pH. Remove tube.

pH

ColorQ Range: 4.0-9.0

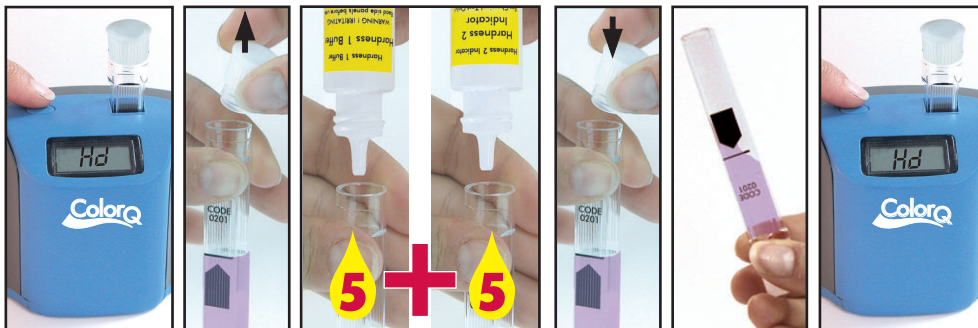
**2** PH

pH - Code 7059-E



1. Add 5 drops **Wide Range pH Reagent (7059)** to the same tube.
2. Cap. Invert 3 times to mix. Insert tube into ColorQ.
3. Press button to read “pH” pH. Remove tube.

\* Reagent is a potential health hazard. Read SDS at [www.lamotte.com](http://www.lamotte.com).

**3** Hd\*Hardness 1 Buffer: Code 7045-G  
Hardness 2 Indicator: Code 7046-G

1. Press button to go to "Hd" Hardness.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 5 drops **Hardness 1 Buffer (7045)** and **Hardness 2 Indicator (7046)** to same tube.
4. Cap. Invert 3 times to mix. Insert tube into ColorQ.
5. Press button to read "Hd" Hardness in gpg. Remove tube.

---

## DILUTION

---

Samples with hardness concentrations above **41 gpg** must be diluted. The meter will display "**Hi**".

- A. Use the 1 mL pipet [0354] to add 2 measures [2mL] water sample to a clean test tube [0201].
- B. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
- C. Blank with the diluted sample from Step B. Follow test procedure Step 3-5 with diluted sample. **Multiply** the displayed result by **2.5**

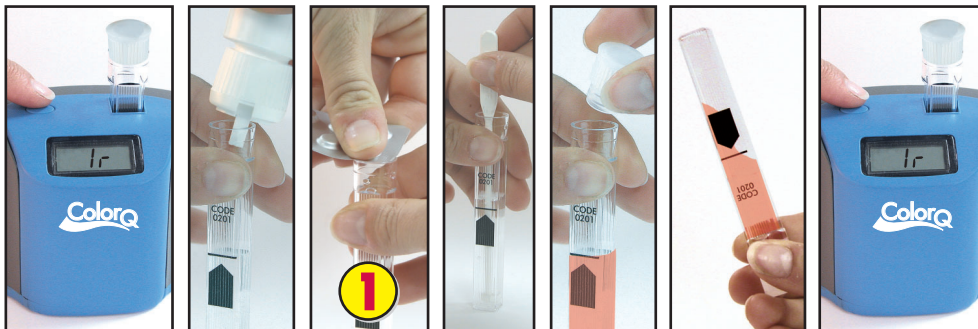
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NOTE: To convert from GPG to ppm; Multiply GPG by 17.1

---

**4** *Ir*

\*Iron IG- Code 3725A-H



1. Press button to go to “Ir” Iron.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 1 **Iron IG (3725)** Tablet. Crush with tablet crusher [0175].
4. Cap. Invert 3 times to mix. Tablet will not dissolve completely. Insert tube into Color Q.
5. Press button to read “Ir” Total Iron in ppm. Remove tube.

---

## DILUTION

---

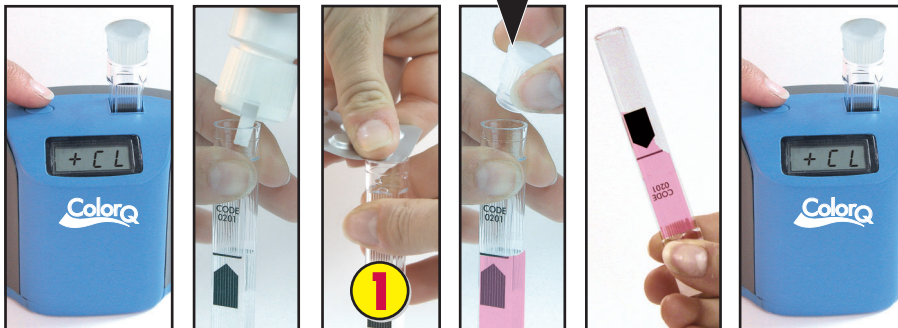
Samples with iron concentrations above **3 ppm** must be diluted. The meter will display “Hi”.

- A. Use the 1 mL pipet [0354] to add 1 mL water sample to a test tube.
  - B. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
  - C. Blank with the diluted sample from Step B. Follow Steps 3-5 of the test procedure with the diluted sample.. **Multiply** the displayed result by **5**.
-

# 5 FCL/+CL

DPD#1 IG - Code 6903A-H

DPD#3 IG - Code 6197A-H



## Free Chlorine and Total Chlorine

1. Press button to go to "FCL" Free Chlorine.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 1 **DPD#1 IG (6903A)** Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
4. Press button to read "FCL" Free Chlorine in ppm. Remove tube.

1. Press button to go to "tCL" Total Chlorine.
2. Remove cap from reacted FCL tube.
3. Add 1 **DPD#3 IG (6197A)** Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
4. Insert tube into ColorQ.
5. Press button to read "tCL" Total Chlorine in ppm. Remove tube.

## Total Chlorine Only

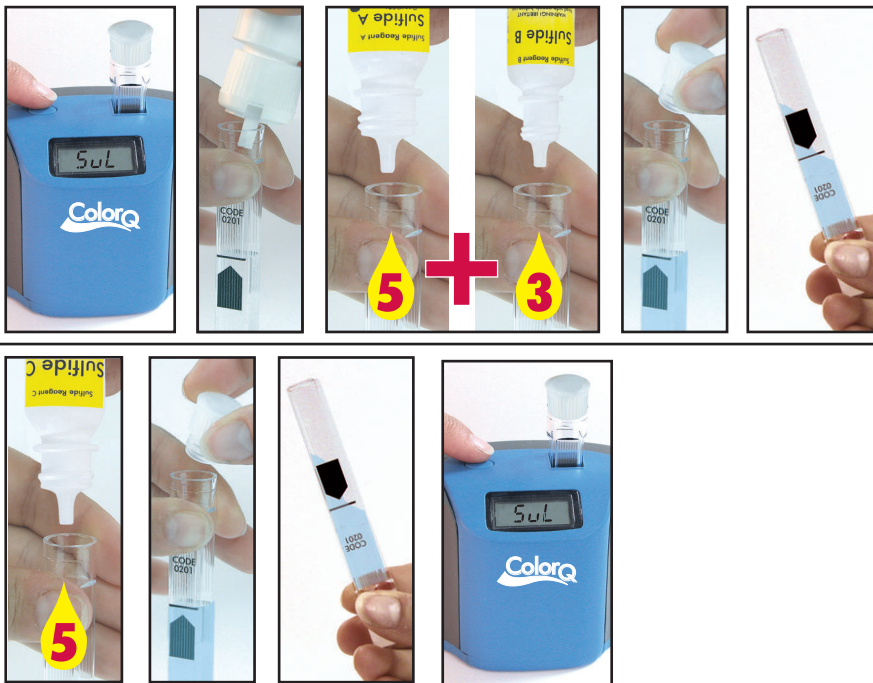
1. Press button past "FCL" Free Chlorine to go to "tCL" Total Chlorine.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 1 **DPD#1 IG (6903A)** Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
4. Remove cap. Add 1 **DPD#3 IG (6197A)** Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
5. Insert tube into ColorQ.
6. Press button to read "tCL" Total Chlorine in ppm. Remove tube.

# 6 SuL

\*Sulfide Reagent A: Code V-4458LWT-G

\*Sulfide Reagent B: Code V-4459-E

Sulfide Reagent C: Code 4460LWT-G



1. Press button to go to "SuL" Sulfide.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 5 drops of **SULFIDE REAGENT A [4458]**.
4. Add 3 drops of **SULFIDE REAGENT B [4459]**.
5. Cap and invert 3 times to mix. Allow tube to sit for ONE minute.
6. Add 5 drops of **SULFIDE REAGENT C [4460]**.
7. Cap. Invert 3 times to mix. Insert tube into ColorQ.
8. Press button to read "SuL" Total Sulfide in ppm. Remove tube.

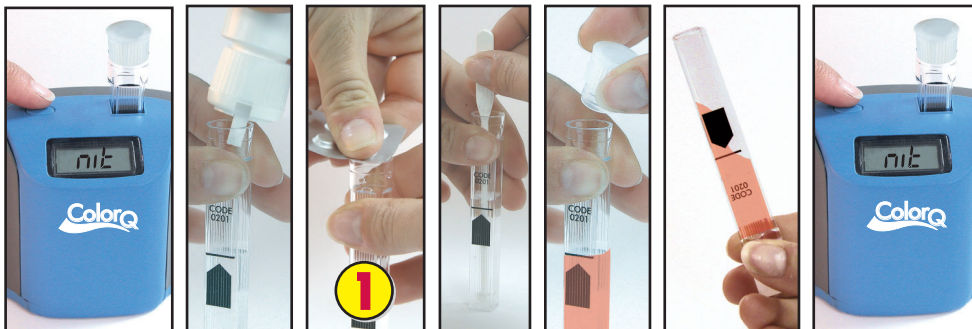
## DILUTION

Samples with sulfide concentrations above **3 ppm** must be diluted. The meter will display "**Hi**".

- A. Use the 1 mL pipet [0354] to add 1 mL water sample to a test tube.
- B. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
- C. Blank with the diluted sample from Step B. Follow the test procedure, steps 3 - 8, with the diluted sample. **Multiply** the displayed result by **5**.

**7** nit

\*Nitrate IG - Code 3884A-H



1. Press button to go to "nit" Nitrate.
2. Fill a clean tube [0201] to the 5 mL line with water sample.
3. Add 1 **NITRATE IG (3884A)** Tablet. Crush with tablet crusher.
4. Cap. Invert 30 times per minute for TWO minutes.
5. Wait FIVE minutes. Insert tube into Color Q.
6. Press button to read "nit" Nitrate-Nitrogen in ppm. Remove tube.

## Testing Tips

- Read all instructions before testing.
- If not testing all tests in the sequence, follow blanking procedure and then press button until desired test factor is shown. Follow test procedure.
- In one complete inversion, the tube will be turned cap down and then right side up. The air bubble will move slowly to the bottom of the tube and back again to the cap end.
- If small bubbles form after adding reagents, tap bottom of tube sharply once or twice to dislodge bubbles. Bubbles will interfere with the test results.
- Samples with concentrations greater than the range of the reagent system must be diluted. Add 2.5 mL of sample water to a test tube. Fill to the 5 mL line with distilled or deionized water. Cap and mix. Blank with the diluted sample. Follow the test procedure with the diluted sample. Multiply the displayed result by 2. (This will not work for the pH test).
- Be sure the outside of the tubes are dry before putting them into the ColorQ. This is best accomplished by dispensing the water sample from the sample bottle.
- Always rinse tubes and caps after testing. Reagent left behind can affect the next test or stain the tube.
- Replace liquid reagents annually. To learn more about reagent storage guidelines and shelf-life go to Support Section then Reagent Refills/ Shelf Life at [www.lamotte.com](http://www.lamotte.com).

**Low pH** Low pH levels can significantly lower the hardness results.

## Error Messages

**Er 3** = Insufficient light is reaching the detector. Sample may be too dark, or tube may be in sideways. Turn off meter and retest.

**Er 7** = The blank was not properly set. Turn off meter and retest blank making sure the black arrow on the tube is facing forward, toward the user (not left or right).

**SUN** = Extremely bright sunlight is penetrating the chamber. Turn your back to the sun to shade the meter from bright sunlight.

**Lo** = Result is below the effective measuring range for the system [e.g. < 4.0 pH for Code 7059 reagent.]

**Hi** = Result is above the effective measuring range for the system [e.g. >9.0 pH for Code 7059 reagent.]

**bAt** = Battery is low.

## Maintenance

- Clean ColorQ optics with a damp cotton swab. Avoid abrasive cleaners that can damage plastic.
- **Do not use** the test tube **brush** to clean the ColorQ meter chamber.
- Replace stained or scratched tubes (0201).

## Battery Replacement

Use a small Phillips head screwdriver to remove all 5 screws in the base. Gently pull the battery holder from the inside and replace TWO AA style batteries. Replace screws securely but do not over-tighten screws which can tear the rubber base.

# METER DESCRIPTION

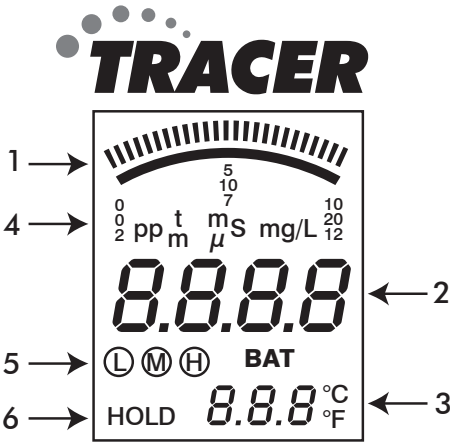
## Front Panel Description

- 1. Battery compartment cap
  - 2. LCD Display
  - 3. MODE button - change mode, hold data, store data
  - 4. CAL button - calibration, change temperature units, recall data
  - 5. ON/OFF button
  - 6. Electrode Collar
  - 7. Electrode
- [Note: The Electrode cap is not shown]



## TRACER Display

- 1. Bar graph display
- 2. Main display
- 3. Temperature display
- 4. Measurement units
- 5. Range calibration and low battery indicators
- 6. Reading hold indicator



# BASIC OPERATION

## Powering the TRACER

The Tracer uses four CR2032 Lithium Ion batteries. If the batteries are weak, the BAT indicator will appear on the display. Press the ON/OFF key to turn the TRACER on or off. The auto power off feature will shut the TRACER off automatically after ten minutes of inactivity.

## Automatic Calibration

When the TRACER is turned on, it will enter the Automatic Calibration mode. *SELF* and *CAL* will appear while the calibration is in progress. After the calibration is completed, the *SELF* and *CAL* display icons will extinguish.

## Changing Temperature Units

To change the displayed temperature units between °F or °C:

1. With the TRACER off, press and hold the CAL button.
2. With the CAL button pressed, momentarily press the ON/OFF button. When SELF CAL appears in the display, release the CAL button. The TRACER will return to the operational mode with the temperature displayed in the new units.

## Low Battery Indicator

The “*BAT*” indicator will be displayed when the batteries become weak. Refer to the maintenance section for battery replacement information.

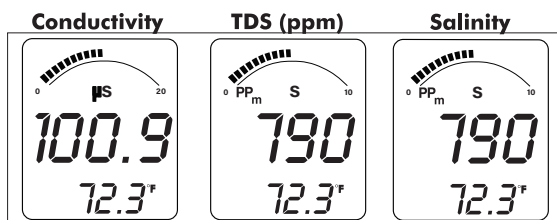
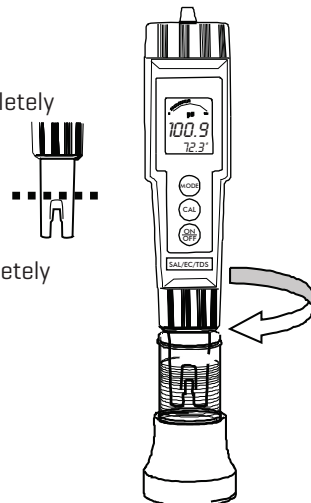
# TESTING

## Getting Started

1. Remove the cap from the bottom of the TRACER to expose the electrode.
2. Before the first use, rinse the electrode in deionized water and dry.
3. For best results, calibrate for conductivity with a standard in the expected range of the sample. For maximum accuracy calibrate from low conductivity value standards to high conductivity value standards.
4. Store dry.

## Measurement

1. Fill a sample cup to the 20 mL line with the test sample. Sample depth must be greater than or equal to 1.5 inches.
2. Immerse the TRACER electrode in the sample. Make sure the electrode is completely submersed.
3. Press the ON/OFF button. [8888 and then SELF CAL will appear in the display during the initial diagnostics].
4. Press and hold the MODE button to scroll to the desired measurement mode.
5. Insert the electrode into the sample making sure that the electrodes are completely submerged.
6. Slowly stir the sample with the TRACER to remove air bubbles.
7. The meter will autorange to the proper range and the reading will be displayed.
8. Rinse the electrode in distilled water. Replace the cap.



## CALIBRATION

For the most accurate results, allow sufficient time for the temperature of the probe to reach the temperature of the sample before calibrating. This will be indicated by a stable temperature reading on the display

1. Fill a sample cup to 20 mL line with a Salt Calibration Standard, 3ppt [6005]
2. Press the ON/OFF button to turn the TRACER on. Press MODE button and advance to salinity mode.
3. Insert electrode standard. Tap or stir the sample with TRACER to dislodge air bubbles.
4. Press and hold the CAL button for approximately 2 seconds. "CAL" will appear and the display will flash.
5. The meter will automatically recognize and calibrate to the calibration standard. The display will briefly indicate "SA" and "End" and then return to the measurement mode.  
NOTE: "SA" will not appear if the calibration fails.
6. Meter is now calibrated for salinity, TDS and conductivity.

NOTE: Each time the calibration mode is entered all calibration range indicators will be cleared, but only the calibration data for the currently selected range will be replaced. In the conductivity/TDS modes, the calibrations for the other two ranges will be saved even though the indicators for those ranges are no longer displayed. Calibration of all three ranges must be performed during one power on period for all three calibration range indicators to be displayed.

## Electrode Care

1. Always rinse the electrode in distilled or deionized water between measurements to avoid cross-contamination of the samples. Double rinsing is recommended when high accuracy is required.
2. Do not touch the electrodes. Touching the surface of the platinized electrodes may damage and reduce the life of the electrodes.

## Replacing the Electrode

1. Unscrew and remove the electrode collar. Turn collar counter-clockwise.
2. Gently rock the electrode side to side, while pulling it away from the meter, until it disconnects from the electrode socket.
3. To attach an electrode, align the slots and carefully plug the electrode into the meter socket. CAUTION: Take care to align pins carefully. Bent or broken pins will cause the meter to malfunction.
4. Firmly tighten the electrode collar to create a seal with the rubber gasket between the electrode and the meter.

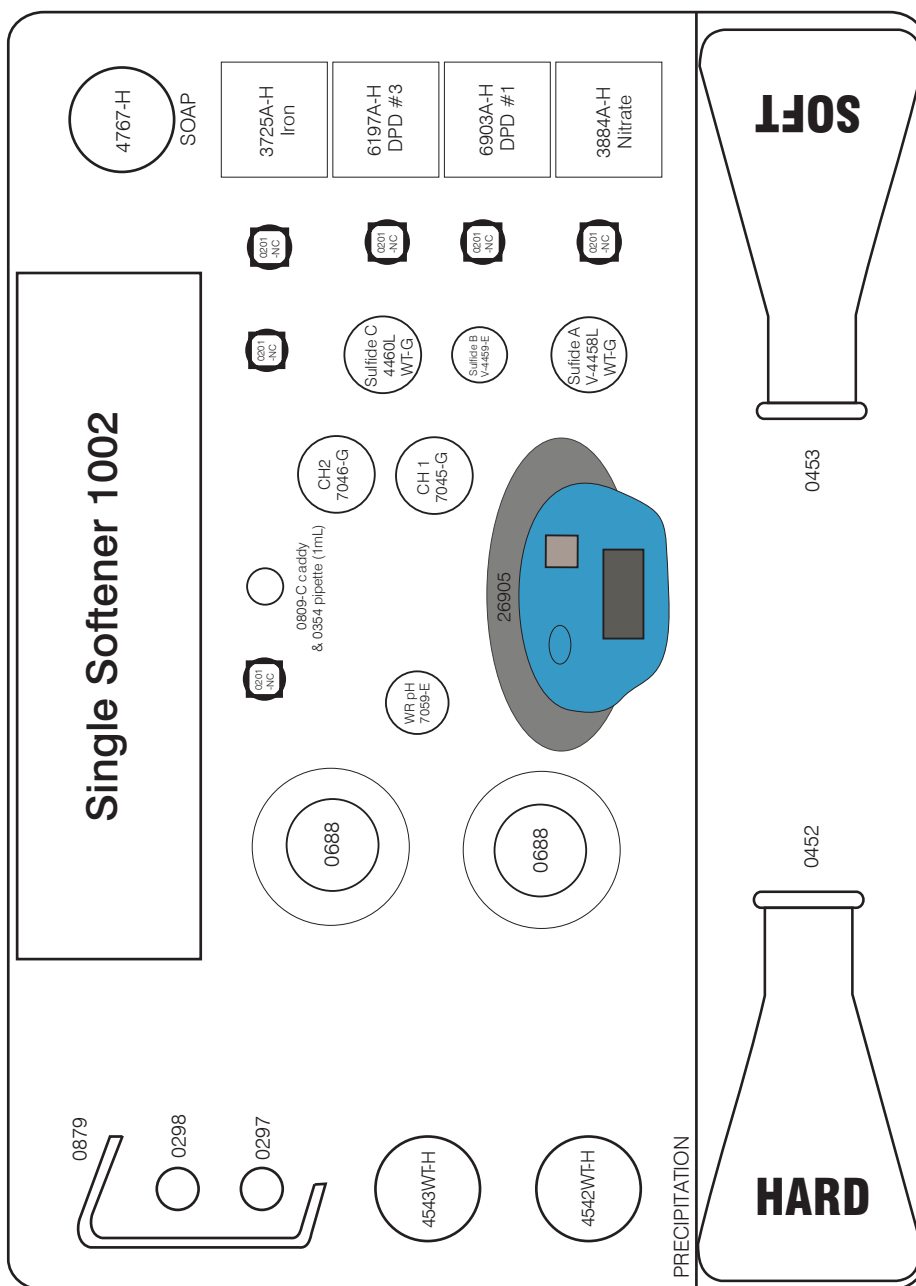
# Replacement Parts

CODE	DESCRIPTION	CODE	DESCRIPTION
1002	Model "S" Softener [AT-38Q]	0688	Sample bottle, 60 mL with flip top
1022	DuoSoft Softener [AT-40Q]	1979	TDS Tracer
2050-DW6	ColorQ DW Photometer		
0452	Flask, 250 mL, "HARD" with cap		
0453	Flask, 250 mL, "SOFT" with cap	7059-E	WR pH ColorQ reagent
0672	Stopper for 250 mL flask	7045-G	Hardness 1 Buffer
*4767-H	*Soap Reagent #4, 60 mL	7046-G	Hardness 2 Indicator
*4767-L	*Soap Reagent #4, 500 mL	0354	Pipet, 1 mL plastic
0392	Pipet, plain plastic with cap	3725A-H	*Iron Tablet, box of 50
0297	Test tube, "HARD" with cap	*3725A-J	*Iron Tablet, box of 100
0298	Test tube, "SOFT" with cap	*6903A-H	*DPD #1 IG Tablet, box of 50
0651	Stopper for test tubes above	*6903A-J	*DPD#1 IG Tablet, box of 100
0879	Precipitation rack, acrylic	6197A-H	DPD #3 IG Tablet, box of 50
4542WT-H	*Precipitation Reagent A, 60 mL	6197A-J	DPD #3 IG Tablet, box of 100
4542-L	Precipitation Reagent A, 500 mL	*V-4458 LWT-G	*Sulfide Reagent A, 60 mL
4543WT-H	Precipitation Reagent B, 60 mL	*V-4459-E	*Sulfide Reagent B, 15 mL
4543-L	Precipitation Reagent B, 500 mL	4460 LWT-G	Sulfide Reagent C, 60 mL
0392	Pipet, plain plastic with cap	* 3384A-H	*Nitrate IG Tablet, box of 50
0201	ColorQ test tube with cap	0175	Tablet Crusher
		4-3051CS	Case & foam insert

**\*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)

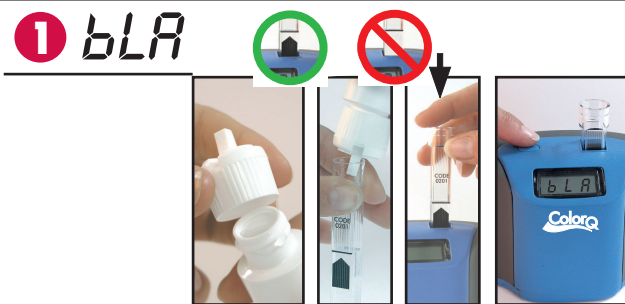
## AT-38 & AT-40 Diagram Layout





PO Box 329 · Chestertown · MD · 21620  
800-344-3100 · 410-778-3100 · f 410-778-6394  
[www.lamotte.com](http://www.lamotte.com)

## BLANK (CALIBRATION)



1. Fill sample bottle with water sample. Replace cap.
2. Fill clean tube (#0201) to the 5mL line with water sample.
3. Insert tube into ColorQ as shown.
4. Press button to turn meter on. When "bLA" appears press button to "Blank" the meter, and go to pH. Remove tube.

pH

ColorQ Range: 4.0-9.0

**2** PH

pH - Code 7059-E



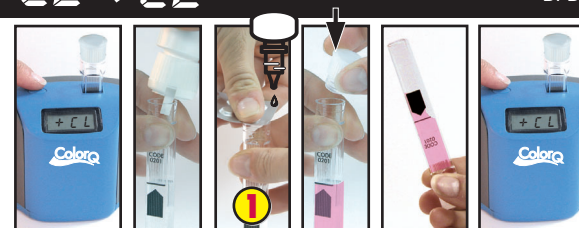
1. Add 5 drops Wide Range pH Reagent (7059) to the same tube.
2. Cap. Invert 3 times to mix. Insert tube into ColorQ.
3. Press button to read "pH" pH. Remove tube.

## FREE CHLORINE/ TOTAL CHLORINE

ColorQ Range: 0.0-10.0 ppm Chlorine

**5** FCL/+CL

DPD 1 - Code 6903A-H  
DPD 3 - Code 6197A-H



### FREE CHLORINE AND TOTAL CHLORINE

1. Press button to go to "FCL" Free Chlorine.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 1 DPD 1 (6903A) Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
4. Press button to read "FCL" Free Chlorine in ppm. Remove tube.
5. Press button to go to "tCL" Total Chlorine.
6. Remove cap from reacted FCL tube.
7. Add 1 DPD 3 (6197A) Tablet. Cap and shake for TEN seconds. Invert slowly 5 times.
8. Insert tube into ColorQ
9. Press button to read "tCL" Total Chlorine in ppm. Remove tube.

### TOTAL CHLORINE ONLY

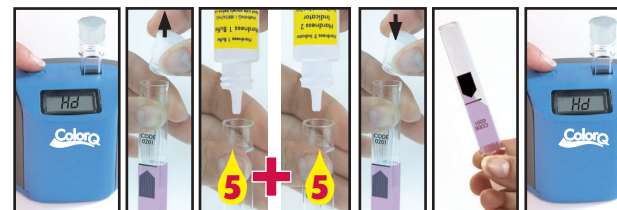
1. Press button past "FCL" Free Chlorine to go to "tCL" Total Chlorine.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 1 DPD 1 (6903A) Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
4. Remove cap. Add 1 DPD 3 (6197A) Tablet. Cap. Shake for TEN seconds. Invert slowly 5 times.
5. Insert tube into ColorQ.
6. Press button to read "tCL" Total Chlorine in ppm. Remove tube.

## HARDNESS

ColorQ Range: 1-41 GPG

**3** Hd

\*Hardness 1 Buffer: Code 7045-G  
Hardness 2 Indicator: Code 7046-G



1. Press button to go to "Hd" Hardness.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 5 drops Hardness 1 Buffer (7045) and Hardness 2 Indicator (7046) to the same tube.
4. Cap. Invert 3 times to mix. Insert tube into ColorQ.
5. Press button to read "Hd" Hardness in gpg. Remove tube.

### DILUTION

Samples with hardness concentrations above 41 gpg must be diluted. The meter will display "Hi".

1. Use the 1 mL pipet (0354) to add 2 measures (2mL) water sample to a clean test tube (0201).
2. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
3. Blank with the diluted sample from Step B. Follow test procedure Steps 3-5 with diluted sample. Multiply the displayed result by 2.5

NOTE: To convert from GPG to ppm; Multiply GPG by 17.1

## TOTAL SULFIDE

ColorQ Range: 0.0-3.0 ppm

**6** SuL

\*Sulfide Reagent A: Code V-4458LWT-G  
\*Sulfide Reagent B: Code V-4459-E  
Sulfide Reagent C: Code 4460LWT-G



1. Press button to go to "SuL" Sulfide.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 5 drops of SULFIDE REAGENT A (4458).
4. Add 3 drops of SULFIDE REAGENT B (4459).
5. Cap and invert 3 times to mix. Allow tube to sit for ONE minute.
6. Add 5 drops of SULFIDE REAGENT C (4460).
7. Cap. Invert 3 times to mix. Insert tube into ColorQ.
8. Press button to read "SuL" Total Sulfide in ppm. Remove tube.

### DILUTION

Samples with sulfide concentrations above 3 ppm must be diluted. The meter will display "Hi".

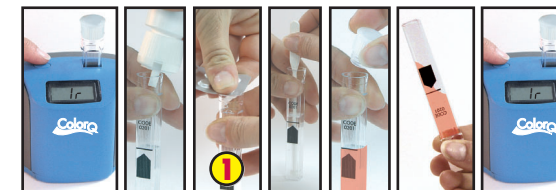
1. Use the 1 mL pipet (0354) to add 1 mL water sample to a test tube.
2. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
3. Blank with the diluted sample from Step B. Follow the test procedure, Steps 3 - 8, with the diluted sample. Multiply the displayed result by 5.

## TOTAL IRON

ColorQ Range: 0.0-3.0 ppm

**4** Ir

\*Ir - Code 3725A-H



1. Press button to go to "Ir" Iron.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 1 IRON (3725) Tablet. Crush with tablet crusher (0175).
4. Cap. Invert 3 times to mix. Tablet will not dissolve completely. Insert tube into Color Q.
5. Press button to read "Ir" Total Iron in ppm. Remove tube.

### DILUTION

Samples with iron concentrations above 3 ppm must be diluted. The meter will display "Hi".

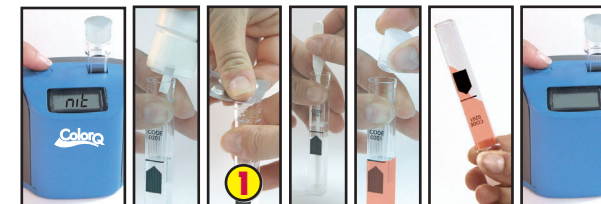
1. Use the 1 mL pipet (0354) to add 1 mL water sample to a test tube.
2. Dilute to the 5 mL line with distilled or deionized water. Cap and mix.
3. Blank with the diluted sample from Step B. Follow Steps 3-5 of the test procedure with the diluted sample. Multiply the displayed result by 5.

## NITRATE/NITROGEN

ColorQ Range: 0-15 ppm

**7** nit

\*Nitrate - Code 3884A-H



1. Press button to go to "nit" Nitrate.
2. Fill a clean tube (0201) to the 5 mL line with water sample.
3. Add 1 NITRATE (3884A) Tablet. Crush with tablet crusher.
4. Cap. Invert 30 times per minute for TWO minutes.
5. Wait FIVE minutes. Insert tube into Color Q.
6. Press button to read "nit" Nitrate-Nitrogen in ppm. Remove tube.

Demo Outfit

# Water Quality

Instruction Mat for Demo Kits


**Lamotte**

SOAP DEMONSTRATION

TEST PROCEDURE


1

Thoroughly rinse the "SOFT" water flask (0453) with softened water.




2

Thoroughly rinse the "HARD" water flask (0452) with untreated water.




3

Fill the "HARD" flask (0452) with untreated water until the bottom surface is covered with a layer of water about 1/2" deep.



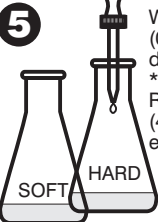
4

Fill the "SOFT" flask (0453) with softened water to the same level.




5

With the pipet (0392), add 4 drops of \*Soap Reagent #4 (4767) to each flask.




6

Cap and shake the flasks.




7

A thick lather will form in the softened water.




8

Continue to add \*Soap Reagent #4 (4767), one drop at a time, to the untreated "HARD" water, shake periodically until a lather forms. Count the number of drops added.



9

Extremely hard water may require 30, 40, or even 60 drops of \*Soap Reagent #4 to produce a lasting lather.




PRECIPITATION DEMONSTRATION

TEST PROCEDURE

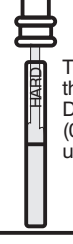
1

Thoroughly rinse the "SOFT" water Demo Tube (0298) with softened water.




2

Thoroughly rinse the "HARD" water Demo Tube (0297) with untreated water.




3

Fill the "SOFT" Demo tube (0298) to the line with softened water.



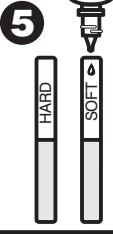
4

Fill the "HARD" water Demo Tube (0297) to the line with untreated water.




5

Add 7 drops of \*Precipitation Reagent A (4542WT) to each tube.




6

Cap and mix.



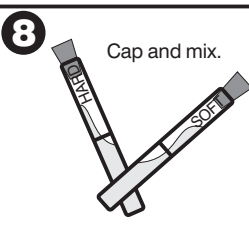
7

Add 7 drops of \*Precipitation Reagent B (4543WT) to each tube.



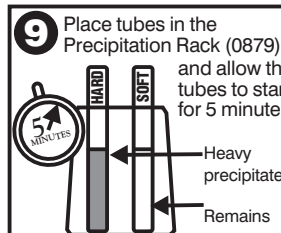
8

Cap and mix.



9

Place tubes in the Precipitation Rack (0879) and allow the tubes to stand for 5 minutes.



NOTE: This portion of the AT-38/40 Water Quality Demo Kit is ONLY a visual demonstration illustrating the removal of Calcium and Magnesium ions from tap water after treatment by the ion exchange process. The results should not be interpreted beyond the intent of the demonstration.

TDS

TEST PROCEDURE

Optional Test Module • Code 5-0080  
Dual mode • 10.0 -1,990 ppm - resolution 10 ppm  
2.0 ppt - 10.0 ppt - resolution 0.10 ppt (100 ppm)

BEFORE FIRST USE


Soak electrodes for a few minutes in alcohol to remove oils. Rinse well with distilled water and shake dry.

CALIBRATION (to be done once a month)

Use a calibration standard between 900 ppm and 5,000 ppm. LaMotte conductivity standard #6354 (989 ppm TDS) is most commonly used.

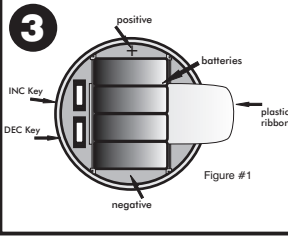
1

Pour 1/2" to 1" of a Calibration Standard into 2 containers, and tap or deionized water into a third container.



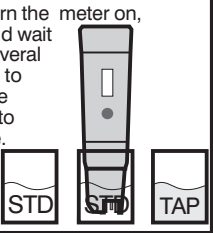
2

Open bottle compartment lid (end with lanyard loop). The two white buttons are Increment (INC) and Decrement (DEC) calibration keys. (See next box Figure #1)



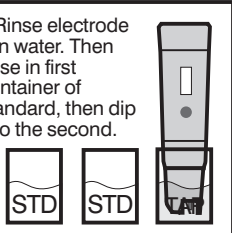
3

Press in INC or DEC keys to adjust reading to match the calibration standard value. After 3 seconds without a key press, the display flashes 3 times, then shows "ENT". The tester accepts calibration value; returns to measurements mode.



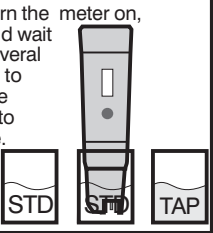
4

Rinse electrode in water. Then rinse in first container of standard, then dip into the second.




5

Turn the meter on, and wait several minutes to allow the display to stabilize.



7

Replace battery cap. Rinse the electrode in the water and proceed with test procedure.



HOLD FUNCTION

Press HOLD key to freeze display. Press HOLD again to release.

MAINTENANCE:

To improve performance, clean the stainless steel electrodes by periodically rinsing them in alcohol for 10-15 minutes. Replace all 4 batteries if the display becomes faint or disappears, or if the readings are unstable or constant. If drift is detected while electrodes are continuously exposed to solution for longer than one hour, allow electrode to fully dry off periodically.

TDS

See TRACER Salt/EC/TDS PockeTester Manual (Code 1749).

\*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) (Internation, call collect, 813-248-0585)

ColorQ User Tips

For software Version 5.73 or higher

To insure proper testing results.

- Insert tubes into ColorQ with line and arrow facing forward.
- Brush and rinse all tubes promptly after use.
- Rinse tablet crusher between test factors.
- Allow tubes to dry before returning to case.
- Replace reagent caps securely.
- Use only LaMotte replacement reagents.
- If unit should auto-off during testing rinse and fill one tube to Blank and return to testing.
- To skip test in the sequence press button to advance past that test factor.
- To turn meter off at any time, press and hold the button until "off" is displayed.

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.

User Tips

Testing Tips

- Read all instructions before testing.
- If not testing all tests in the sequence, follow blanking procedure and then press button until desired test factor is shown. Follow test procedure.
- In one complete inversion, the tube will be turned cap down and then right side up. The air bubble will move slowly to the bottom of the tube and back again to the cap end.
- If small bubbles form after adding reagents, tap bottom of tube sharply once or twice to dislodge bubbles. Bubbles will interfere with the test results.
- Be sure the outside of the tubes are dry before putting them into the ColorQ. This is best accomplished by dispensing the water sample from the sample bottle.
- Low pH Low pH levels can significantly lower the hardness results.

Error Messages

- Er 3 = Insufficient light is reaching the detector. Sample may be too dark, or tube may be in sideways. Turn off meter and retest.
- Er 7 = The blank was not properly set. Turn off meter and retest blank making sure the black arrow on the tube is facing forward, toward the user (not left or right).
- SUN = Extremely bright sunlight is penetrating the chamber. Turn your back to the sun to shade the meter from bright sunlight.
- Lo = Result is below the effective measuring range for the system (e.g. < 4.0 pH for Code 7059 reagent.)
- Hi = Result is above the effective measuring range for the system (e.g. >9.0 pH for Code 7059 reagent.)
- bAt = Battery is low.

Maintenance

- Clean ColorQ optics with a damp cotton swab. Avoid abrasive cleaners that can damage plastic.
- Replace stained or scratched tubes (0201).

Battery Replacement

- Use a small Phillips head screwdriver to remove all 5 screws in the base. Gently pull the battery holder from the inside and replace TWO AA style batteries. Replace screws securely but do not over-tighten screws which can tear the rubber base.



Water Quality  
ATQ38/40 Demo Outfit

Instruction Mat for Demo Kits

