



Tracer™ Total Chlorine
PockeTester

Code 1740



Water Testing Leader Since 1919!

INTRODUCTION

Congratulations on your purchase of the TRACER Total Chlorine PocketTester. The TRACER is a revolutionary, first of its kind measurement device that offers direct reading of Total Chlorine from 0.01 to 10.00 ppm. The TRACER is easy to use and maintain, and offers high accuracy, automatic calibration, with fast response and simultaneous Chlorine and Temperature displays and a 15-reading memory storage. Careful use and maintenance will provide years of reliable service. The TRACER testing procedure complies with the electrode method described in EPA 40 CFR Part 136.3, Table 1B (1994) and *Standard Methods for the Examination of Wastewater*, 18th Ed., 4500-Cl I, p 4-65, which requires that potassium iodide and a buffer be added to the sample before testing.

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.

TRACER™ TOTAL CHLORINE POCKETESTER • CODE 1740

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SPECIFICATIONS

Display	Multifunction display with bar graph
Operating conditions	32 to 122°F (0 to 50°C) and < 80% RH
Chlorine range	0.01 to 10.00 ppm (Total Chlorine)
Chlorine accuracy	0.5 to 5.00 ppm; ± (10% reading + 0.01 ppm) 5.00 to 10.00 ppm; ± (15% reading + 0.05 ppm)
Temperature measurement range	23 to 194°F (5 to 90°C)
Temperature range for Chlorine	32 to 122°F (0 to 50°C)
Temperature resolution	0.1 up to 99.9, then 1
Temperature accuracy	± 1.8F (1°C) from 23 to 122°F (5 to 50°C) ± 5.4F (3°C) from 122 to 194°F (50 to 90°C)
Measurement storage	15 readings can be stored and recalled
Low battery indicator	'BAT' appears on the display
Power	Four CR 2032 button batteries
Auto power off	After 10 minutes of inactivity

CONTENTS

Total Chlorine TRACER Kit, 0-10.00ppm Range	Code 1740
Includes:	
TRACER TCL Tablets (100)	Code 7044A-J
Tablet Crusher	Code 0175
Sample Cup w/cap†	

† not sold individually.

*WARNING: Reagents marked with an * are considered to be potential health hazards. To view or print Safety Data Sheet (SDS) for these reagents

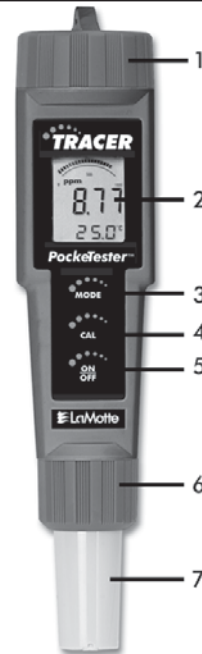
PARTS & ACCESSORIES

Total Chlorine Replacement Electrode	Code 1732
Weighted Stand w/ Sample Cups (5)	Code 1746
Sample Cups w/caps (24)	Code 1745

METER DESCRIPTION

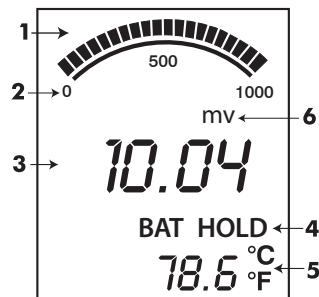
Front Panel Description

1. Battery compartment cover
2. LCD Display
3. MODE/HOLD button
4. CAL/RECALL button
5. ON/OFF button
6. Electrode Retaining Collar (ring)
7. Electrode Sensor
(Note: The Electrode storage cap is not shown)



LCD Display

1. Bargraph reading
2. Bar graph scale designations
3. Measurement reading
4. BAT (low battery) and HOLD (data hold) indicator
5. Temperature display
6. Units of measure



BASIC OPERATION

Powering the TRACER

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 10 minutes of inactivity.

Electrode Recognition

When the TRACER is turned on, it will recognize the type of electrode that is connected and will display the appropriate unit of measure.

Automatic Calibration

NOTE: The automatic calibration process calibrates internal circuitry for drift. This does not calibrate the electrode.

The TRACER should not be immersed in a solution until after the unit is turned on. When the TRACER is turned on, it will automatically self calibrate and the *SELF* and *CAL* icons will be displayed. These icons will disappear after the self calibration is complete. The main display and bar graph will then read the Total Chlorine concentration in ppm units. The bar graph will read 0 ppm (far left), 5 ppm (center), and 10 ppm (far right). The unit of measure for the lower temperature display will be °C or °F as selected. The readings on the display will flash until they have stabilized.

Changing the Displayed Temperature Units

Press and hold the CAL/RECALL button for approximately 3 seconds. The °C or °F icon will change first and temperature readings will change only after the button has been released.

Low Battery Indicator

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

TESTING

Conditioning the Electrode

The TRACER electrode comes in a factory cleaned condition. If the meter is new or has been in storage for an extended period of time, at least two tests should be performed to condition the electrode. The electrode will perform best when in continuous use. Gently wipe the electrode surface with a paper towel between uses.

Measurement

1. Fill a sample cup with exactly 20 ml of the sample water.
NOTE: Turbidity of the solution has no effect on the reading.
2. Add one TRACER TCL Tablet (7044A).
3. Use the tablet crusher (0175) to crush the tablet.
4. Cap and shake vigorously for 20-30 seconds. The tablet should be completely disintegrated.
5. Turn the TRACER on. Wait 3 seconds for self-calibration. Immediately immerse in the sample.
6. Stir the sample with the TRACER for 10 seconds. Stop stirring.
The sample and the electrode must remain still and stable during the entire measurement.
7. The display will flash while readings are changing rapidly. The result should be read when the display stabilizes. The reading will be held and the HOLD annunciator will come on after 120 seconds.
8. Remove the TRACER from the sample. Turn the unit off. Replace electrode cap.
NOTE: If a series of subsequent measurements is to be carried out, briefly rinse the electrode with water (deionized, if available) and shake off. Gently wipe the electrode surface with a paper towel between uses.
9. The TRACER must be turned off and on again between samples.

Storing Readings

1. When the display is steady and not flashing, press the MODE/HOLD button to store the data. The storage location number, the stored reading and HOLD will be displayed. Press MODE/HOLD to return to the current reading.
2. Only one reading can be stored during the 120 second measurement cycle.
3. After fifteen readings are stored, the sixteenth stored reading will over-write the first stored reading.

Recalling Stored Readings

NOTE: The HOLD symbol should not be displayed. If it is, exit the HOLD function by pressing the MODE button.

1. Press the CAL/RECALL button and then press the MODE/HOLD button immediately after *CL* is displayed; the location number (1 through 15) will flash.
2. The last stored reading taken will be displayed first. To advance through the stored readings, press the MODE/HOLD button. The location number is displayed first, followed by the reading stored in that location.
3. To exit the storage mode, press the CAL/RECALL button and the meter will return to normal operation.
4. If the batteries are removed, all stored readings will be lost.

For Best Accuracy

1. Remove TRACER from sample when power is off. Even though power is off, leaving TRACER in solution can shorten unit life.
2. Wash sample cups and caps and rinse completely before use.
3. If measuring solutions with large differences in chlorine concentration, for example, 0.1 ppm and 5.0 ppm, use a separate sample cup for each concentration.
4. Discard the sample cup when it becomes stained.
5. The process requires an acidic solution. The reagent tablet provides sufficient buffering capacity to deal with alkalinity, calculated as calcium carbonate, up to and in excess of 500 ppm. This will cover all common water samples.
6. When the electrode is new or after dry storage, chlorine measurements should be repeated at least twice until a repeatable reading is obtained.
7. Gently wipe the electrode surface with a paper towel between uses.
8. When measuring a lower chlorine concentration after a higher concentration, the meter will temporarily give slightly elevated readings.
9. All oxidizing species that interfere with other chlorine methods, such as manganese, iodine and bromine will interfere. Silver and mercuric ions over 20 ppm will also interfere.
10. Do not touch the tablets. It can contaminate them.
11. Do not touch the sensor surface.

Total Chlorine Tracer Offset Adjustment Procedure

1. Obtain a sample with a known concentration of total chlorine.
2. Follow the Chlorine Measurement procedure on page 7.
3. Wait for the display to read HOLD. This may take approximately 2 minutes.
4. Press the MODE/HOLD button for approximately 5 seconds until "C_O" appears at the bottom of the display.
5. IMMEDIATELY press the MODE/HOLD button repeatedly to increase the value or press the CAL/RECALL button repeatedly to decrease the value on the display until it matches the known concentration of the sample.
6. Once the value is adjusted, IMMEDIATELY press the ON/OFF button to save the adjusted value to memory. "SA" will appear on the display.
7. Turn the meter off and proceed with the Chlorine Measurement procedure.

VALIDATION PROCEDURE

Perform this procedure or an appropriate calibration procedure when TRACER is used for compliance monitoring or before the first use after replacing the Total Chlorine TRACER electrode.

Required Materials and Chemicals

- 1 Analytical Balance, Readability 0.0005g
- 5 g Chloramine-T trihydrate, Analytical grade, 98%
- 1 Pipet, or Pipettor with disposable plastic tips, 1 mL
- 3 Volumetric flasks, 100 mL
- 2 Amber glass bottles, 100 mL
- 1 Sample cup (included in kit)
- 5 TRACER TCl Tablets (included in kit)
- Deionized or distilled water

Preparation of 1ppm Standard Solution

- 1. Fill a 100 mL volumetric flask approximately half full with deionized water. Weigh and add exactly 4.050 g Chloramine-T trihydrate. Dissolve. Dilute to the 100 mL line with deionized water. Cap and mix. This standard is 10,000 ppm.
- 2. Pipet exactly 1.00 mL of the 10,000 ppm standard into another 100 mL volumetric flask. Dilute to the 100 mL line with deionized water. Cap and mix. This standard is 100 ppm.
- 3. Pipet exactly 1.00 mL of the 100 ppm solution into a third 100 mL volumetric flask. Dilute to the 100 mL line with deionized water. Cap and mix. This standard is 1 ppm.
- 4. Add 5 TRACER TCl Tablets (7044A) to the flask of 1 ppm standard from Step 3. Cap and mix until the tablets disintegrate. The tablets contain a small amount of insoluble material and will not dissolve completely. This standard is 1 ppm Converted Chlorine.

Procedure

- 1. Mix the 1 ppm Converted Chlorine standard.
- 2. Fill a sample cup with 20 ml of newly prepared 1 ppm Converted Chlorine standard. Tightly cap the standard immediately after use.
- 3. Turn the TRACER on. Wait 3 seconds for auto-calibration (circuit's not electrode). Immediately immerse in the standard.
- 4. Stir the standard with the TRACER for 10 seconds. Stop stirring. The standard and the TRACER must remain still and stable during measurement.

5. The display will flash while readings are changing rapidly. The result should be read when the display stabilizes. The reading will be held and the HOLD annunciator will come on after 120 seconds.
6. Remove the TRACER from the standard. Rinse in deionized water and shake dry.
7. Repeat steps 2 - 6 three more times on the same sample cup of standard.
8. After the fourth time, press and hold the CAL key. While continuing to hold the CAL key, press the MODE key. Immediately release both keys. The main display should flash *1.00*. If *1.00* is not displayed, keep the electrode in standard and press the CAL key again until *CAL* is displayed, then press the CAL and MODE keys again simultaneously. Immediately release both keys.
9. After approximately 5 to 7 seconds the display will briefly flash *END*. Rinse the TRACER in deionized water and shake dry.

Notes

1. The 1 ppm Converted Chlorine standard should be at room temperature ($23 \pm 2^{\circ}\text{C}$) during the validation procedure.
2. The 10,000 ppm Standard Solution can be stored for up to one year in a tightly sealed, amber, glass bottle.
3. The 10 ppm Standard Solution can be stored for up thirty days in a tightly sealed, amber, glass bottle.
4. The 1 ppm Converted Chlorine Standard is stable for up to approximately 30 minutes. Discard the standard after use.

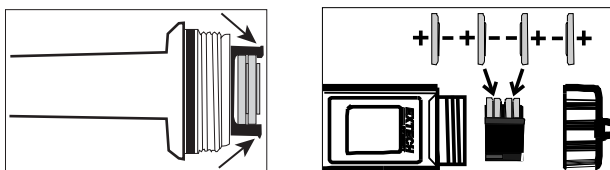
MAINTENANCE

Storage

When not in use, the TRACER should be stored dry with the electrode cap in place. Cover the connector with the clear cover whenever the electrode is removed from the meter body.

Battery Replacement

1. Twist off the battery compartment cap.
2. Hold the battery housing in place with one finger. Remove the battery carrier by pulling on the small tabs.
3. Replace the four CR2032 batteries. Observe polarity.
4. Replace the battery compartment cap.



Cleaning the Electrode

The TRACER Chlorine Electrode arrives in a factory-cleaned condition and is ready to be used. The electrode will perform better and yield more stable readings after the first few tests. Firmly wipe the electrode surface with a clean, dry paper towel before and after use to remove any compounds that may have formed.

Rinse the electrode in deionized water to clean it. When not in use, the TRACER should be stored with the electrode cap in place.

Replacing the Electrode

The TRACER is shipped with an electrode attached. If the electrode needs to be replaced or changed, follow these steps.

1. Press the ON/OFF button to turn the meter off.
2. To remove an electrode, unscrew and completely remove the electrode collar. Turn the collar counter-clockwise.
3. Gently rock the electrode from side to side, pulling it downwards, until it disconnects from the meter.
4. 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.
5. Firmly tighten the electrode collar to create a seal with the rubber gasket between the electrode and the meter. Do not over tighten.
6. Cover the connector end of the removed electrode with the clear plastic cap.

TROUBLESHOOTING

Problem	Check	Action
Power on but no display	Batteries	Insert batteries
		Verify correct polarity
		Replace
Unstable reading	Electrode	Immerse probe more deeply in sample
		Remove air bubbles caught under electrode
		Clean electrode
		Replace electrode
Slow response	Electrode	Clean electrode
Unexpected low results	Tablet	Confirm tablet has been added
Unexpected high results	Tablet	Dissolve tablet completely
Display frozen	HOLD function	Press MODE/HOLD or turn meter off.Restart.
	Button press	Remove batteries (stored data will be lost)

EXPANDING YOUR TRACER

Interchangeable electrodes are available to convert the Total Chlorine TRACER to a pH TRACER or an ORP TRACER.

Remember to ask for instructions and appropriate reagent or buffer tablets when ordering pH or ORP electrodes.

pH TRACER Electrode, 0.00-14.00 pH	Code 1733
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The pH TRACER Electrode is used with pH 4.0, 7.0 and 10.0 buffers. Order using the following codes:

pH 4.0 Mini Buffer Tablets (100)	Code 3983A-J
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pH 7.0 Mini Buffer Tablets (100)	Code 3984A-J
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pH 10.0 Mini Buffer Tablets (100)	Code 3985A-J
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ORP TRACER Electrode, ±999 mV	Code 1734
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The ORP TRACER Electrode (code 1734) requires an initial soaking in a pH 4.0 buffer solution. Order pH 4.0 Mini Buffer Tablets/100 pack (Code 3983A-J).

WARRANTY

The TRACER PocketTester is specifically calibrated for use with the TRACER TC1 Tablets (Code 7044A). Use with other reagent systems will void the warranty and may damage the meter.