LaMotte

TRACER POCKETESTER

Waterproof Series

TCI

TOTAL CHLORINE

CODE 1740

TRACER

TOTAL CHLORINE POCKETESTER™

CODE 1740

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Introduction

Congratulations on your purchase of the TRACER Total Chlorine PockeTester. 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.

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	± (10% of reading + 0.01ppm) from 0.05 to 5.00ppm
Temperature range	23 to 194°F (–5 to 90°C)
Temperature resolution	0.1° up to 99.9°, then 1°
Temperature accuracy	± 1.8°F (1°C) from 23 to 122°F (–5 to 50°C)
	± 5.4°F (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 SR-44 button batteries
Auto power off	After 10 minutes of inactivity

Contents

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

†Not sold individually. See below.

Parts & Accessories

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

Meter Description

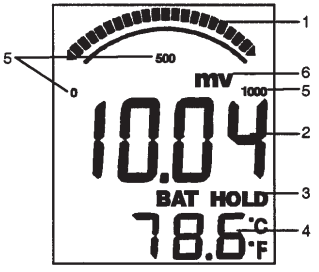
Front Panel Description

1. Battery compartment
2. Display
3. MODE button
4. CAL button
5. ON/OFF button
6. Electrode Collar
7. Electrode

(*Note: The Electrode cap is not shown*)

TRACER Display

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



Basic Operation

Powering the TRACER

The tab located in the battery compartment must be removed before use. 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 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.

Effect of Temperature

Temperature has an effect on the offset but not the gain, resulting in approximately 1/2% shift per °C change in temperature. The TRACER will automatically compensate for this effect.

Chlorine

Conditioning the Electrode

The TRACER electrode comes in a factory-cleaned condition, ready to be used for analysis. A separate preconditioning method is not required. The electrode will perform best when in continuous use. Gently wipe the electrode surface with a paper towel between uses.

Chlorine Measurements

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 (7044).
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 30 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.

Storing Readings

1. When the display is steady and not flashing, press the MODE button to store and hold the data. The storage location number, the stored reading and HOLD will be displayed. Press MODE to return to the current reading.
2. If the final reading and HOLD are displayed after 120 seconds, press MODE button to store data.
   NOTE: Data cannot be stored at this time if it was stored during the first 120 seconds.
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 button once and then press the MODE button **immediately** after CAL 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 button. The location number is displayed first, followed by the reading stored in that location.
3. To exit the storage mode, press the CAL button and normal operation will return.

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 operated directly 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.

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 (7044) 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 15 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 ±2°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

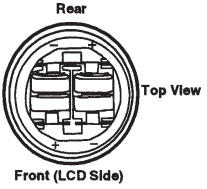
When not in use, the TRACER should be stored dry with the electrode cap in place.

Battery Replacement

For maximum battery life, use battery style SR-44 (Silver Oxide) such as Energizer™ No. 356 or Duracell™ No. 303/357.

1. Twist off the battery compartment cap.

2. Replace the four (4) SR-44 button batteries observing polarity.



3. Replace the battery compartment cap.

NOTE: Stored readings will be lost when the batteries are removed.

Cleaning the Electrode

The TRACER Chlorine Electrode arrives in a factory-cleaned condition and is ready to be used. Preconditioning is not required. The electrode will perform better and yield more stable readings with use. Gently wipe the electrode surface with a paper towel between uses. Rinse the electrode in deionized water to clean it.

Replacing the Electrode

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

1. To remove an electrode, unscrew and completely remove the electrode collar. Turn the collar counter-clockwise.
2. Gently rock the electrode from side to side, pulling it downwards, until it disconnects from the meter.
3. To attach an electrode, carefully plug the electrode into the meter socket. The electrode connector is keyed to ensure proper connection.
4. Tighten the electrode collar firmly enough to make a good seal. A rubber gasket will seal the electrode with the meter.
5. Cover the connector end of the removed electrode with the small clear plastic cap.

Troubleshooting

Problem	Check	Action
Power on but no display	Batteries	Insert batteries
		Verify correct polarity
		Replace
Unstable reading	Probe	Immerse probe more deeply in sample
		Remove air bubbles caught under electrode
		Clean electrode
		Replace electrode
Slow response	Probe	Clean electrode
Unexpected low results	Tablet	Confirm tablet has been added
Unexpected high results	Tablet	Dissolve tablet completely
Display frozen	HOLD function	Press MODE or turn meter off
	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

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 3983-J
pH 7.0 Mini Buffer Tablets (100)	Code 3984-J
pH 10.0 Mini Buffer Tablets (100)	Code 3985-J
ORP TRACER Electrode, ±999 mV	Code 1734

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 3893-J).

Warranty

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

LaMotte Company warrants this instrument to be free of defects in parts and workmanship for six months from date of shipment. If it should become necessary to return the instrument for service during or beyond the warranty period, contact our Technical Service Department at (800) 344-3100 for a return authorization or visit our website at www.lamotte.com. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. LaMotte Company specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. LaMotte Company's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

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