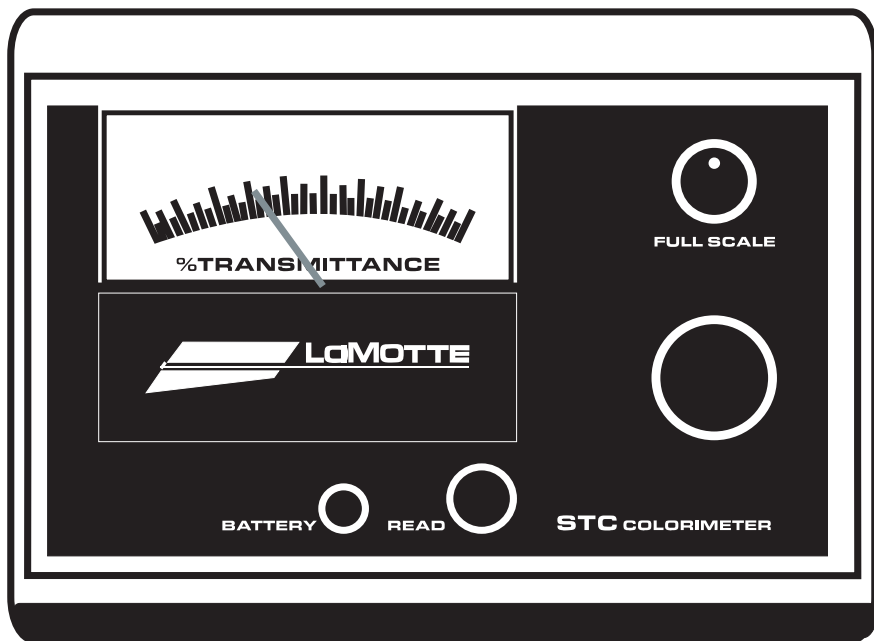


MODEL STC COLORIMETER INSTRUCTION MANUAL



LaMOTTE COMPANY
HELPING PEOPLE SOLVE ANALYTICAL CHALLENGES^b

INTRODUCTION TO COLORIMETRY

“Colorimetry” means simply the measurement of color. In colorimetric procedures of chemical analysis, the shade or intensity of color resulting from a chemical test reaction is directly related to the concentration of the substance being tested.

The test result can be determined by visually comparing the sample color against color standards representing known concentrations of the substance being tested. However, the reliability and accuracy of such visual comparisons are limited by the eyesight of the analyst and the lighting conditions under which the comparisons are made.

The use of a colorimeter, or filter photometer, to measure the color of chemical reactions provides greater speed, objectivity, and precision. The colorimeter is an instrument that sends a beam of light through the colored sample in a dark test chamber. A light-sensitive photocell at the other end of the light path detects the amount of light that has been transmitted through the sample. The photocell generates an electrical response in proportion to the amount of light it detects, and this response is displayed on the meter.

The sensitivity of the colorimeter’s response is maximized by selecting light of a particular color, or wavelength, to be transmitted through the test sample. Generally a color which is complimentary to that of the test sample is used. For example, a green light is chosen to pass through a red test sample. The more intense the red color of the sample, the less green light is transmitted through the sample to the photocell. The use of the complimentary color enables the colorimeter to respond to minute variations in the intensity of the transmitted light.

In most chemical tests, the intensity of the color reaction is directly proportional to the concentration of the substance being tested - the more intense the color, the higher the concentration. Or in terms of the colorimeter, the less light (of a complimentary color) transmitted to the photocell, the higher the concentration. By preparing test samples of known concentrations and recording the colorimeter’s response under controlled conditions, the analyst can produce a graph representing the relationship between the amount of light transmitted (% Transmittance) and the concentration of the substance being tested (usually in milligrams per liter, mg/L or ppm). If a sample of unknown concentration is then tested under the same conditions, its concentration can be determined from this graph.

THE MODEL STC COLORIMETER

The Model STC Colorimeter eliminates the need for calibration graphs or conversions from % Transmittance. The Model STC responds directly in terms of the concentration of the substance being tested. The operator simply places the test sample in the covered chamber, presses the "read" button, and reads the test result, usually in mg/L or ppm, directly on the meter scale. Model STC test results are instantaneous, accurate, and reproducible.

The Model STC Colorimeter is powered by a standard transistor battery. A battery indicator light signifies when there is adequate output to take a reading. The color or wavelength of the light transmitted through the sample has been pre-selected for maximum sensitivity, and the intensity of this transmitted light is measured by a sensitive cadmium sulfide photocell. The instrument's response is registered on a taut-band meter movement with an easy-to-read 3 1/2" display. The Model STC Colorimeter is compact, simple to use, and ruggedly built to give years of reliable performance under harsh operating conditions, with no maintenance other than battery replacement. See complete specifications on the back cover.

MODEL STC SINGLE-PARAMETER TEST KITS

Each Model STC Test Kit is designed to test a particular chemical parameter in aqueous solution. The colorimeter, reagents, glassware, and complete accessories are mounted in foam in a compact carrying case. The meter itself is furnished with a direct-reading scale for the parameter in question and a light source of the appropriate color or wavelength. The instrument has been carefully calibrated to perform that particular test. The reagents, supplied in sufficient quantity to perform 100 analyses (50 analyses per parameter in the multi-parameter pool kit), have been accurately standardized for use with the colorimeter.

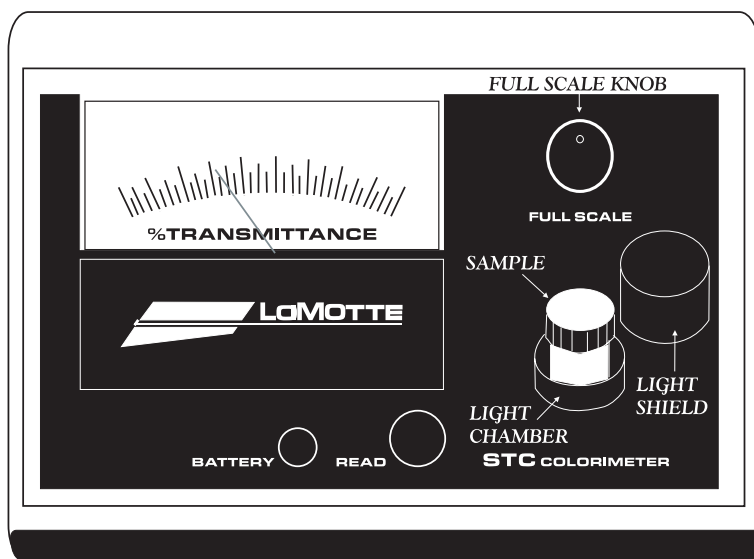
The analytical method used in each Model STC Single-Parameter Test Kit has been selected for its accuracy, reliability, and simplicity. Model STC test procedures do not require any special training or analytical skill. The reagents are formulated for maximum stability, and they undergo a stringent program of quality control to assure valid test results. The Model STC reagent systems include both APHA and EPA approved methods and can be used for industrial process control, wastewater monitoring, boiler and cooling water testing, pool and spa water testing, public health inspection, environmental studies, aquaculture, hydroponics, and other general water analysis applications.

GENERAL OPERATING INSTRUCTIONS

1. Fill Water Sample Bottle (0688) with the water sample.
2. Transfer 10 mL to a colorimeter tube (0967). The bottom of the surface curve, or meniscus, should rest on the line.
3. Cap and place in the Model STC Reading Chamber, and cover the chamber with the light shield.

NOTE: For accurate results, wipe colorimeter tubes with tissue to remove moisture before inserting into chamber. Keep chamber clean and dry at all times.

4. Press Read button, the red battery indicator light should light. If the battery light does not light, replace the battery or use an AC adaptor. Do not use if battery indicator light does not light.



5. Press the "Read" button and adjust the "Full Scale" knob, until the needle reads the full scale position at the far right of the meter scale (usually 0 mg/L). Once this full scale adjustment has been made, do not move the "Full Scale" knob during the remainder of the test procedure.
6. Release the "Read" button. Remove sample from the chamber.
7. Add the reagents to the sample. Carefully following the individual test instructions provided with the Model STC Reagent System.
8. Cap treated sample and place the colorimeter tube in the reading chamber. Cover the chamber with the light shield.
9. Press the "Read" button. Record reading from meter scale.

TEST SAMPLE DILUTIONS & VOLUMETRIC MEASUREMENTS

Sometimes the color developed in a chemical test may be too dark to be measured in the colorimeter. The water sample must be diluted with demineralized water and the test repeated to bring the color reaction within a range which can be accurately measured on the colorimeter. The colorimeter reading is then multiplied by an appropriate dilution factor to obtain the test result.

EXAMPLE 1: Measure 5 mL of the water sample into a graduated cylinder. Add deionized water until the cylinder is filled to the 10 mL mark. The sample has been diluted by one-half, and the dilution factor is therefore 2. Perform the test procedure on the diluted sample, measure the color reaction on the colorimeter, and multiply the colorimeter reading by 2 to obtain the test result.

EXAMPLE 2: Measure 2.5 mL of the water sample into a graduated cylinder and add deionized water to the 10 mL mark. The sample has been diluted by one-fourth, and the colorimeter reading should be multiplied by a dilution factor of 4.

The following table gives quick-reference guidelines on dilutions of various proportions. Most of the colorimeter tests employ 10 mL samples, and therefore dilutions may involve very small volumes of the water sample. Graduated pipets should be used to insure accurate measurement of these small volumes. Pipet the appropriate volume of the water sample into the graduated cylinder and then fill the cylinder to the 10 mL mark with deionized water.

<i>Volume of Water Sample Used</i>	<i>Volume of Deionized Water Required to Obtain a 10 mL Diluted Test Sample</i>	<i>Multiply Colorimeter Reading by the Following Dilution Factor</i>
10.0 mL	0.0 mL	1
5.0 mL	5.0 mL	2
2.5 mL	7.5 mL	4
1.0 mL	9.0 mL	10
0.5 mL	9.5 mL	20

REAGENT BLANK

Sometimes it may be necessary to carry a reagent blank through the test procedure to compensate for any color or turbidity which develops from the reagents themselves. A reagent blank consists of deionized water which is subjected to the same test procedure as will be used on the actual test sample. If the reagent blank reading on the colorimeter is significant, it can either be subtracted from the test sample reading or nullified by using the reagent blank to set the full scale reading. It is important that the operator check a reagent blank to determine whether or not it is a significant factor.

COLORIMETER TUBES

The colorimeter tubes furnished with each Model STC Colorimeter are optically matched for light transmittance. Tubes which have become scratched through excessive use should be replaced by new ones. Dirty tubes should be cleaned inside and out. Fingerprints can cause excessive light scattering and reading errors. Handle the tubes carefully, making sure that the bottom half of the tube is not smudged. *Only insert tubes that have been wiped dry.*

BATTERY REPLACEMENT

When the battery indicator does not light, replace the battery, which is located at the back of the instrument. Pull open battery compartment door to expose battery and replace with new battery. Make sure the battery contacts are properly aligned with the correct terminals. Close compartment door.

SPECIFICATIONS

Models STC-A, STC-B, STC-C, STC-D Colorimeters

METER

Photometric Accuracy: 2%

Readability: 0.5%

Readout: Direct Reading in mg/L or other appropriate units of concentration

Scale: 3 1/2"

Movement: Taut-band, dampened movement

PHOTOMETRIC DATA

PHOTODETECTOR: Cadmium Sulfide - Maximum response 550 nm

<i>Wavelength:</i>	Model STC-A	565 nm	Model STC-C	585 nm
	Model STC-B	415 nm	Model STC-D	650 nm

Bandpass: 20 nm

Path Length: 3/4"

FUNCTION CONTROLS

“Read” Button: SPST (momentary switch)

“Full Scale” Knob: To set full scale reading

Battery Indicator: Signifies battery output. Replace battery if not lit.

POWER REQUIREMENTS

Battery-Operated: Single 9 volt DC transistor battery*

METER HOUSING

Dimensions: 6 3/4" long x 4 3/4" wide x 3 1/2" high

Weight: 1 pound

*Model STC-B only employs four 1.5V AA batteries instead of the 9V battery.

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