



## Vernier Software & Technology

# Colorimeter User Manual



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COL-BTA

U.S. EDUCATOR PRICE

\$147

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The Vernier Colorimeter is used to determine the concentration of a solution by analyzing its color intensity. The cuvette slot is designed to accommodate most cuvettes with a 10 millimeter path length. The Colorimeter measures the amount of light transmitted through a sample at a user-selectable wavelength. You may choose from four wavelengths: 430 nm, 470 nm, 565 nm, and 635 nm. Features such as automatic sensor identification and one-step calibration make this sensor easy to use.

**Note:** Vernier products are designed for educational use. Our products are not designed nor are they recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

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## What's Included

- Colorimeter
- 15 polystyrene cuvettes
- 15 plastic cuvette lids

## Compatible Software and Interfaces

The Colorimeter may require a compatible [interface](#) and [software](#). Choose a platform below to see compatible interface and software options.

LabQuest 2

Computers



Chromebook



Mobile Devices

## Getting Started

1. Connect the sensor to the interface (LabQuest Mini, LabQuest 2, etc.).
2. Start the appropriate data-collection software (Logger *Pro*, Logger Lite, LabQuest App) if not already running, and choose New from File menu.

The software will identify the sensor and load a default data-collection setup.

If you are collecting data using a Chromebook™, mobile device such as iPad® or Android™ tablet, or a Vernier wireless sensor or interface, please see the following link for up-to-date connection information:

[See Connection Instructions](#)

## Using the Product

Connect the sensor following the steps in the Getting Started section of this user manual. After connecting the sensor, the following steps must be completed prior to starting data collection.

1. Press the < or > button on the Colorimeter to select the correct wavelength for your experiment (430 nm, 470 nm, 565 nm, or 635 nm).
2. Allow the Colorimeter to warm up for about five minutes before calibrating.
3. Calibrate the Colorimeter.
  - a. Slide the lid of the Colorimeter open to reveal the cuvette slot.
  - b. Insert a cuvette, filled with distilled water or other solvent used to prepare your solutions, for your calibration blank (100% transmittance or 0 absorbance).
 

**Important:** Line up one of the clear sides of the cuvette with the arrow at the right side of the cuvette slot. Slide the Colorimeter lid closed.
  - c. Press the CAL button on the Colorimeter to begin the calibration process. Release the CAL button when the red LED begins to flash.
  - d. When the red LED stops flashing, the calibration is complete. The absorbance reading should be very close to 0.000 (100%T).
  - e. Remove the blank cuvette from the Colorimeter.
4. Continue with data collection.

## Videos

### Using Colorimeter with Vernier Chemistry Investigations for Use with AP Chemistry

The 4-wavelength Colorimeter measures the amount of light transmitted through a sample at a user-selectable wavelength in order to determine the concentration of a solution. Features such as automatic sensor identification and one-step calibration make this sensor easy to use.



### Vernier Colorimeter - Beer's Law - Tech Tips

Elaine Nam, Ph.D., introduces the experiment, *Determining the Concentration of a Solution: Beer's Law*, from *Chemistry with Vernier*. Use a Vernier Colorimeter to determine the concentration of an unknown solution.

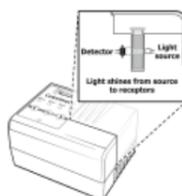


## Specifications

Colorimeter range	0 to 3 (absorbance)
Useful range	0.05 to 1.0 absorbance (90% to 10% T)
Wavelengths	430 nm, 470 nm, 565 nm, 635 nm
Supply voltage	5VDC $\pm$ 25 mV
Supply current (typical)	40 mA
Power up time	700 ms (maximum)
Output voltage range	0 to 4 V
Transfer function	$V_{\text{out}} = 0.035*(\%T)+0$
Stored calibration values	slope: 28.571 intercept: 0

## How the Sensor Works

Light from an LED light source passes through a cuvette containing a solution sample. Some of the incoming light is absorbed by the solution. As a result, light of a lower intensity strikes a photodiode.



## Troubleshooting

Here are some tips for best data-collection practices:

- Allow the Colorimeter to warm up for about 5 minutes before calibrating.
- Fill a cuvette two-thirds to three-fourths full with liquid, including the calibration blank, so that the light travels through the liquid reliably.
- After filling a cuvette with liquid, seal the cuvette with a cap to prevent spills.
- Make sure to place a cuvette in the Colorimeter so the path of the light source travels through the clear sides of the cuvette. An arrow to the right of the cuvette slot shows the light path.
- For best results, use one cuvette to make all your measurements for a given experiment.
- If you calibrate a Colorimeter and then change the wavelength, calibrate the Colorimeter again to ensure the proper identification of the new wavelength.

For best results, a sample's absorbance or transmittance values should fall within these ranges:

percent transmittance: 10–90%

absorbance: 0.05–1.0

We have found that Beer's law experiment results begin to lose their linearity at absorbance values above 1.0 (percent transmittance values less than 10%). If you have a solution that transmits such a low level of light, consider diluting the solution so that it falls within this range.

## Repair Information

If you have watched the related product video(s), followed the troubleshooting steps, and are still having trouble with your Colorimeter, contact Vernier Technical Support at [support@vernier.com](mailto:support@vernier.com) or call 888-837-6437. Support specialists will work with you to determine if the unit needs to be sent in for repair. At that time, a Return Merchandise Authorization (RMA) number will be issued and instructions will be communicated on how to return the unit for repair.

## Accessories/Replacements

Item	Order Code
Replacement cuvettes (package of 100 with 20 lids)	CUV
Replacement cuvette lids (package of 100)	CUV-LID
Cuvette rack, holds 10 cuvettes	CUV-RACK

## Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. This warranty covers educational institutions only.

This warranty does not cover consumables, such as the cuvettes and lids.

## Contact Support

Fill out our [online support form](#) or call us toll-free at [1-888-837-6437](tel:1-888-837-6437).

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Have a nice day!