

# Turbidity Sensor

## (Order Code TRB-BTA)



Turbidity is a measure of water's lack of clarity and is an important indicator of water quality. Water with high turbidity is cloudy, while water with low turbidity is clear. The cloudiness is produced by light reflecting off particles in the water; therefore, the more particles in the water, the higher the turbidity.

**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.

### What's Included

- Turbidity Sensor
- Turbidity Accessories Kit (includes one empty cuvette and one cuvette containing 100 NTU StablCal® Formazin Standard)
- Safety Data Sheet for StablCal Formazin Standard

### Compatible Software

See [www.vernier.com/manuals/trb-bta](http://www.vernier.com/manuals/trb-bta) for a list of interfaces and software compatible with the Turbidity Sensor.

### 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.

See the following link for additional connection information:

[www.vernier.com/start/trb-bta](http://www.vernier.com/start/trb-bta)

### Using the Product

#### Collecting Data

1. Warm up the sensor by connecting it to the software for at least five minutes prior to use.
2. Gently invert the sample water to mix in any particles that may have settled to the bottom. **Important:** Do not shake the sample. Shaking will introduce tiny air bubbles that will affect turbidity.
3. Empty the distilled water from the cuvette and rinse it with sample water. Fill the cuvette to the top of the line with sample water.
4. Screw the lid on the cuvette. Wipe the outside with a soft, lint-free cloth or tissue.
5. Hold the cuvette by the lid and place it into the Turbidity Sensor. Make sure the marks are aligned. Close the lid.

6. Monitor the turbidity value. **Note:** Particles in the water will settle over time and show a slow downward drift in turbidity readings; therefore, take your readings soon after placing the cuvette in the sensor.

### Videos

View videos related to this product at [www.vernier.com/trb-bta](http://www.vernier.com/trb-bta)

### Calibrating the Sensor

For many experiments, calibrating the Turbidity Sensor is not required. However, periodic calibration will provide the most accurate results. To calibrate:

1. Warm up the sensor by connecting it to the software for at least five minutes prior to use.
2. Enter the calibration routine for your data-collection program.
3. **First Calibration Point:** Obtain the cuvette containing the Turbidity Standard (100 NTU) and gently invert it four times to mix in any particles that may have settled to the bottom. **Important:** Do not shake the standard. Shaking will introduce tiny air bubbles that will affect turbidity readings.
4. Wipe the outside of the cuvette with a soft, lint-free cloth or tissue.
5. Holding the standard by the lid, place it in the Turbidity Sensor. Align the mark on the cuvette with the mark on the Turbidity Sensor. **Important:** These marks must be aligned whenever a reading is taken.
6. Close the lid.
7. Enter **100** as the value in NTU.
8. Remove the standard.
9. **Second Calibration point:** Prepare a *blank* by rinsing the empty cuvette with distilled water, then filling it to the top of the line with distilled water. **Important:** The bottom of the meniscus should be at the top of the line for every measurement throughout this test. This volume level is critical to obtain correct turbidity values.
10. Screw the lid on the cuvette. Wipe the outside with a soft, lint-free cloth or tissue.
11. Holding the cuvette by the lid, place it into the slot of the Turbidity Sensor. Make sure that the marks are aligned. Close the lid.
12. Enter **0** as the value in NTU. You are now ready to collect turbidity data.
13. Store the calibration by following the directions under the Storage tab (Logger Pro and LabQuest only).
14. You are now ready to collect turbidity data.

Specific instructions for each software platform can be found here:

- For instructions on calibration using Logger Pro computer software, see [www.vernier.com/til/2341](http://www.vernier.com/til/2341)
- For instructions on calibration using LabQuest App, see [www.vernier.com/til/3394](http://www.vernier.com/til/3394)
- For instructions on calibration using Graphical Analysis with a Chromebook, see [www.vernier.com/til/3631](http://www.vernier.com/til/3631)

- For instructions on calibration using Graphical Analysis with an iOS or Android device, see [www.vernier.com/til/3630](http://www.vernier.com/til/3630)

## Specifications

Range:	0 to 200 NTU
Resolution:	0.25 NTU
Accuracy:	$\pm 2$ NTU for readings under 25 NTU $\pm 5$ of readings above 25 NTU
LED wavelength:	890 nm
Standard:	StablCal Formazin Standard 100 NTU

## Care and Maintenance

When you have finished using the Turbidity Sensor, simply rinse the sample cuvette with distilled water. It is important to take good care of your cuvette and the Turbidity Standard. Their integrity is essential for accurate turbidity measurements.

Do not wrap the cable tightly around the sensor for storage. Repeatedly doing so can irreparably damage the wires and is not covered under warranty.

## How the Sensor Works

Infrared light is directed at a cuvette containing the sample water. This light is scattered in all directions off the particles in the water. A detector, consisting of a photodiode, is placed at a 90° angle to the light source. The amount of light being scattered directly into the detector is measured in volts and translated into turbidity units. This style of turbidity sensor is called a nephelometer. A standard is used to calibrate the Turbidity Sensor in units of NTU, Nephelometric Turbidity Units.

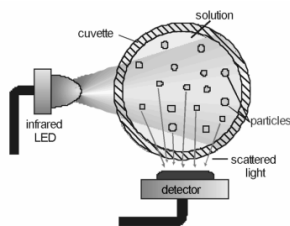


Figure 1 Top View of Turbidity Sensor's Internal Mechanism

This sensor is equipped with circuitry that supports auto-ID. When used with LabQuest 2, LabQuest, LabQuest Mini, LabPro, Go! Link, SensorDAQ, EasyLink, TI-Nspire™ Lab Cradle, or CBL 2™, the data-collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor.

## Troubleshooting

For troubleshooting and FAQs, see [www.vernier.com/til/1388](http://www.vernier.com/til/1388)

## Repair Information

If you have watched the related product video(s), followed the troubleshooting steps, and are still having trouble with your Turbidity Sensor, 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
Turbidity Bottles	TRB-BOT
Turbidity Accessories Replacement Kit	TRB-ACC

## 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.

## Disposal

When disposing of this electronic product, do not treat it as household waste. Its disposal is subject to regulations that vary by country and region. This item should be given to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring that this product is disposed of correctly, you help prevent potential negative consequences on human health or on the environment. The recycling of materials will help to conserve natural resources. For more detailed information about recycling this product, contact your local city office or your disposal service.



The symbol, shown here, indicates that this product must not be disposed of in a standard waste container.



**MEASURE. ANALYZE. LEARN.™**

Vernier Software & Technology  
13979 SW Millikan Way • Beaverton, OR 97005-2886  
Toll Free (888) 837-6437 • (503) 277-2299 • Fax (503) 277-2440  
info@vernier.com • www.vernier.com

Rev. 11/7/18

Logger *Pro*, Logger *Lite*, Vernier LabQuest, Vernier LabQuest Mini, and other marks shown are our trademarks or registered trademarks in the United States.

All other marks not owned by us that appear herein are the property of their respective owners, who may or may not be affiliated with, connected to, or sponsored by us.