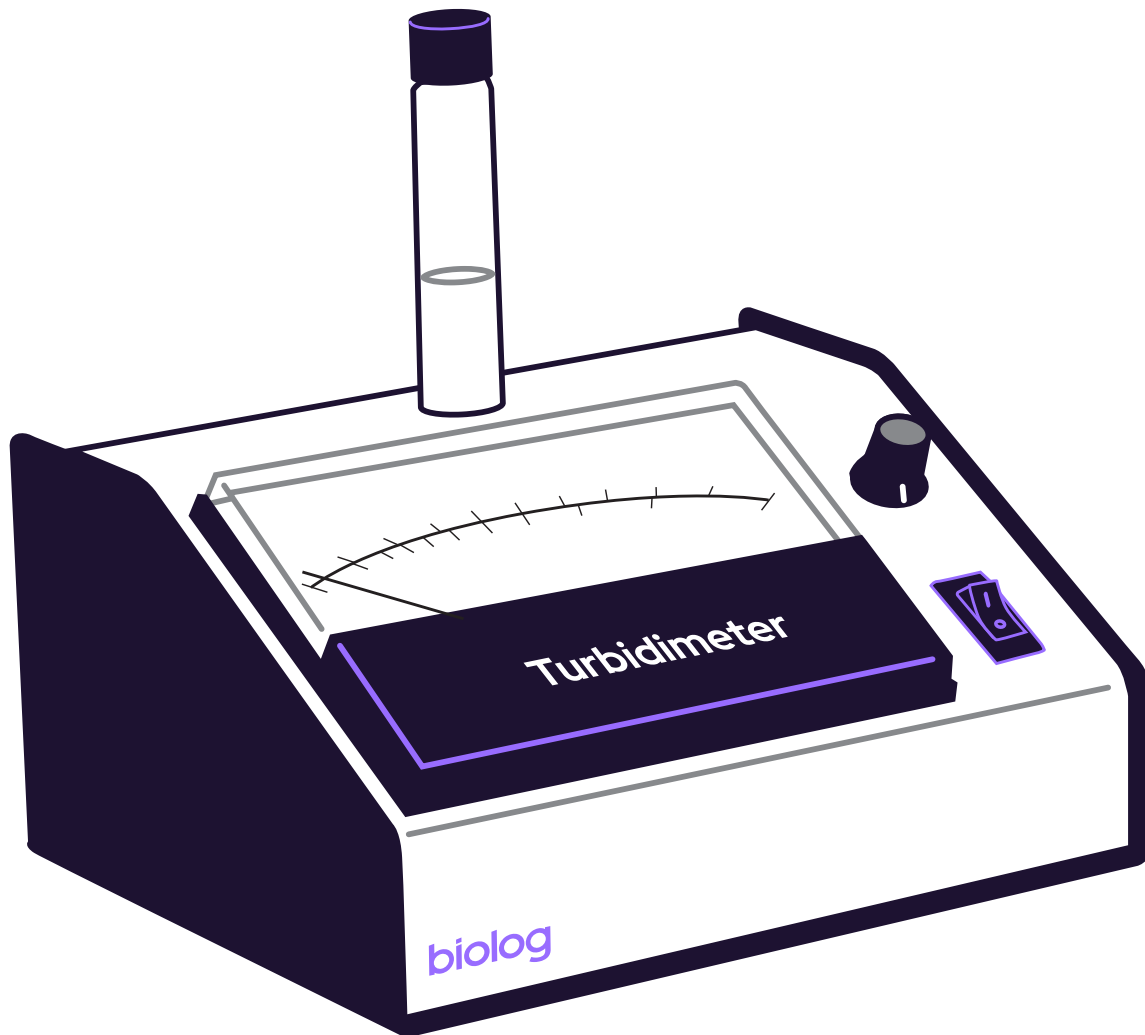


# Biolog Turbidimeter User Guide



© 2023 Biolog, Inc.

All rights reserved. No parts of this work may be reproduced in any form or by any means – graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems – without the written permission of the publisher.

Other products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

For Research Use Only. Not for human in vitro diagnostic use.

### **Technical Support**

For technical or sales assistance, contact your sales representative or local distribution partner, or contact Biolog directly at:

[tech@biolog.com](mailto:tech@biolog.com)

510-785-2564

Monday – Friday

8:00 a.m. to 5:00 p.m., PST

21124 Cabot Blvd

Hayward, CA 94545

USA

### **Ordering Information**

For information on ordering any of our products, contact your sales representative or local distribution partner, or contact Biolog directly at:

[csorders@biolog.com](mailto:csorders@biolog.com)

### **Website**

For more information on our products or services, contact your sales representative or local distribution partner, or refer to our website at:

[www.biolog.com](http://www.biolog.com)

Biolog Turbidimeter User Guide, Rev C

November, 2023

OOP 058

## Table of Contents

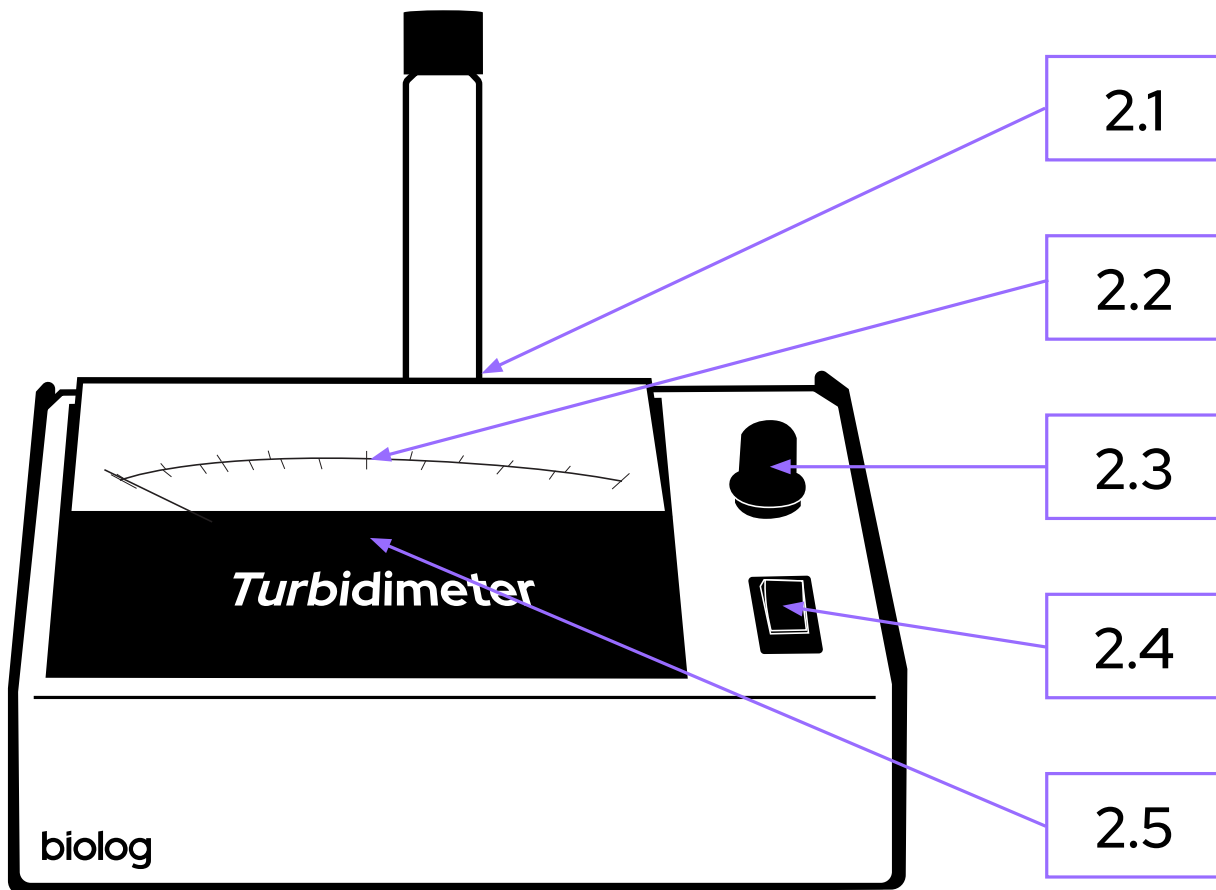
1	Specifications .....	4
2	Instrument Familiarity .....	5
3	Calibration.....	6
4	Measurement Guidelines .....	6
5	Battery	6
6	Instrumentation Theory .....	7
7	Troubleshooting Guide .....	7
8	Recommended Preventative Maintenance .....	7
9	Recommended Performance Testing and Maintenance .....	8
10	Performance Certificate .....	10
11	Decontamination Procedure .....	11
12	Service for International Users .....	11
13	Certificate of Decontamination .....	12

# 1 Specifications

Wavelength	590 nm
Display	6" analog meter
Transmission	0 – 100 %
Absorbance	0 – 2
Linearity	± 2 %
Repeatability	± 0.5 % Transmittance
Test Time	10 – 15 seconds minimum
Operating Temperature Range	15 – 35 °C
Storage Temperature Range	5 – 50 °C
Operating Relative Humidity	20-70% RH, non-condensing
Storage Relative Humidity	0-90% RH, non-condensing
Bandwidth	10 nm
Wavelength Peak	± 2 nm
Size	4.5" x 8" x 7" (11cm x 20cm x 18cm) (H W D)
Weight	1.9 lbs. (0.86 kg)
Power	9V rechargeable NiCd battery or plug-in 9V, 100 mA power

## 2 Instrument Familiarity

- 2.1 Test Tube Well – designed to hold a round, 20 mm diameter test tube.  
The recommended test tube size is 20 mm x 150 mm.
- 2.2 Analog Display – 6" meter face.
- 2.3 100 %T Adjust – knob for adjusting to 100 %T with a blank reference test tube in the test tube well.
- 2.4 Power Button – power switch for instrument.
- 2.5 0 %T Adjust – set screw for adjusting to 0 %T when meter is turned off.



### 3. Calibration

- 3.1 Check the needle position when the turbidimeter is turned off. Adjust set screw to 0 %T if necessary.
- 3.2 Turn the turbidimeter on. Allow ~ 15 minutes warm up time to prevent needle drift.
- 3.3 Insert a blank reference test tube into test tube well and adjust the transmittance to 100 %T.
- 3.4 Instrument is now ready for operation.

### 4. Measurement Guidelines

- 4.1 Wipe clean the outside surfaces of standards and sample solution test tubes as needed to prevent inaccurate measurement.
- 4.2 Use the same size test tubes for standards and samples. Perform a 100 % transmittance adjustment for each test tube before adding a sample into it.
- 4.3 Test Tubes are not optically uniform. Rotate the tube in the test tube well to the highest transmission point. Orient the tube consistently so that the light beam passes through the same portion of the tube.\*

\*If the test tube is removed before the sample is added, place a reference mark on the test tube making the alignment of the test tube easier.

### 5. Battery

The turbidimeter uses a 9V rechargeable NiCd (Nickel-Cadmium) battery. The battery will charge whenever the plug-in power pack is supplied with power. It is not necessary for the instrument to be turned on for the recharger to work.

**Warning:** Failure to recharge the battery could result in its premature aging.

A fully charged battery will operate the turbidimeter for approximately 8 hours. As the battery ages, the operating time may decline. End of life will usually occur after over 1000 discharge/recharge cycles. When recharging does not result in significant operating time, the battery should be replaced.

#### Replacing the battery

1. Turn power off and disconnect power supply.
2. Remove the four rubber feet from bottom of instrument.
3. Remove black plate.
4. Locate battery holder on inside back panel.
5. Loosen the two screws on back panel of instrument to allow the battery to slide out of bracket.
6. Remove battery snap from battery.
7. Remove the old battery and replace it with a new battery.
8. Place battery snap on the new battery.
9. Place the battery in the bracket and tighten the screws.
10. Test the instrument for proper operation.
11. Place black plate back on instrument and reattach the rubber feet.

**Warning:** Use only a NiCd rechargeable battery. Use of a Carbon-Zinc or an Alkaline battery could result in battery rupturing and subsequently causing harm to personnel or equipment.

**Note:** Properly dispose of old batteries per local regulations.

## 6. Instrumentation Theory

The Biolog Turbidimeter uses a light emitting diode and 590 bandpass filter, which produces a monochromatic light at 590 nm. A current is developed by the photodiode proportional to the amount of light received. The current is then converted to a numerical value, shown as either absorbance or percent transmittance, depending on the scale chosen.

Power is applied to all circuitry by pressing the power button. A power jack on the rear panel of the instrument is used to apply external power and recharge batteries. A precision current regulator provides a stable, adjustable current to the LED lamp. The 100 %T knob adjusts this current, allowing standardization to 100 %T.

The silicon photodiode generates a current proportional to the light it receives, i.e., that passes through the test tube. This current is amplified and used to drive the meter movement. The meter scale is calibrated in % Transmittance (linear with respect to transmitted light) and Absorbance (logarithmic with respect to transmitted light).

## 7. Troubleshooting Guide

Symptom	Corrective Measure
Battery not charging	Ensure correct charger is being used (other chargers may look similar). Replace if necessary. Ensure correct rechargeable battery type is being used (NiCd).
No response when sample is inserted	Adjust 100 %T knob clockwise; if still no response, make sure power switch is on, the instrument is plugged in, and/or the battery is charged.
Non-linear standard curves	Check all test solutions for contamination. Replace suspicious solutions and recheck meter. Recheck standard range – a narrower range may be necessary to ensure linearity.
Unstable readings	Make sure samples are completely stable and homogenous. A sample that is changing or settling will result in unstable readings. Potential static electricity. Resolve by grounding the instrument or running an anti-static cloth (for example, a dryer sheet) across the display to stabilize the needle.

## 8. Recommended Preventative Maintenance

The Biolog Turbidimeter was designed with the user in mind to be easy-to-use with very little maintenance. However, there are some things you can do to ensure that the turbidimeter is working correctly.

Check that the needle on the Transmittance scale is set at zero (0) when the instrument is turned off. The setting can be adjusted by turning the Philips-head screw under the Biolog nameplate.

Make sure the battery is charged. The latest model of this instrument, 21907, requires a 9-volt rechargeable battery. It takes approximately 12 hours to charge a battery. Recharge the battery overnight. Replace the battery if the following happens: (1) The instrument will not read to 100 % Transmittance with a blank tube or (2) The instrument reads any valid turbidity standard incorrectly.

Check the reproducibility of the reading of the turbidity standards at least once per year.

Average three readings. Individual readings must be within  $\pm 0.75\%$ T from the average reading (within  $\pm 0.75\%$ T = pass; greater than or equal to  $\pm 0.75\%$ T = fail). Ensure that the average value is within 5 %T of the assigned value of the standard.

*Note: If reproducibility fails, check the battery. Approximately every two to three years the instrument may require servicing by the manufacturer, as the lamp and photodetector have to be replaced due to decreased reliability over time.*

## 9. Recommended Performance Testing and Maintenance

### Purpose

This procedure provides instructions for the uniform testing of Biolog Turbidimeter for quality control (variability, linearity, and stability). Each Biolog Turbidimeter should be tested on a yearly basis to ensure correct operation.

### Associated Materials

- 9.1 Turbidimeter and charger
- 9.2 Sterile Biolog YT-IF or 20 mL test tube of water used as a 100 %T blank
- 9.3 Select any two Biolog Turbidity standards. These standards are the same standards that are used during the setup of a Biolog microplate.

9.4

Name	Value	Part Number
YT / 47%T	47 %T	3415
AN/GEN III 65 %T	65 %T	3427/3440
FF 75 %T	75 %T	3426
GEN III 85 %T	85 %T	3441

### Procedure

1. The turbidimeter battery should be fully charged before starting by plugging the turbidimeter into the charger for at least 12 hours.
2. Record the Technician and Date on the Biolog Turbidimeter Performance Certificate. Record the Serial Number and Model Number of the turbidimeter being tested. Record the Lot Number and Expiration Date of sterile 100 %T blank.
3. Record the lot number, expiration date, and assigned value (%T) of the standards used for testing. Make sure that all of the turbidity standards are mixed thoroughly by inverting them and allow the bubbles to rise to the top.
4. With the power off, adjust the meter to "0" by turning the set screw on the front of the meter if required. Turn on the power.
5. Clean all test tubes of any fingerprints or debris using a delicate Task wipe (e.g. Kimwipe®). Insert the 100 %T blank in the test tube well.
6. Place the first %T standard into the turbidimeter. Turn the tube until the needle is at the farthest point to the right. Record the value. Repeat two more times and record each reading.
7. Calculate and record the average of all three readings. Each individual reading should be within  $\pm 0.75\%$ T of the average of all three readings.
8. Adjust the turbidimeter using the 100 %T blank. Turn the tube until the needle is at the farthest point to the right and set the needle to 100 %T by turning the 100 %T Adjust knob.
9. Place the second %T standard into the turbidimeter. Turn the tube until the needle is at the farthest point to the right. Record the value. Repeat two more times and record each reading.



10. Calculate and record the average of all three readings. Each individual reading should be within  $\pm 0.75\%$  T of the average of all three readings.
11. Adjust the turbidimeter using the 100 %T blank. Turn the tube until the needle is at the farthest point to the right and set the needle to 100 %T by turning the 100 %T Adjust knob.
12. Subtract the average value for each standard from the given standard value. Record this difference.
13. For each standard used the difference between the average value minus the standard %T should be less than 5. Record final approval (Pass < 5 %T) or rejection (Fail > 5 %T) and also note any comments.
14. Date and initial the certificate.

# Biolog Turbidimeter Performance Certificate

Technician: \_\_\_\_\_ Date: \_\_\_\_\_

Serial Number: \_\_\_\_\_ Model Number: \_\_\_\_\_

100 %T Blank Lot Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Std 1: Assigned value \_\_\_\_\_ Lot Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

Std 2: Assigned value \_\_\_\_\_ Lot Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

Initial Measurements				
STD %T (Actual)	____ %T	Reading - Average	____ %T	Reading - Average
Reading 1				
Reading 2				
		$< \pm 0.75 \%T$		$< \pm 0.75 \%T$
Average		Pass / Fail		Pass / Fail
Average - Actual Value		$< \pm 5 \%T$ Pass / Fail		$< \pm 5 \%T$ Pass / Fail

Individual readings must be within  $\pm 0.75 \%T$  from the average reading  
 (Within  $\pm 0.75 \%T$  = pass; greater than or equal to  $\pm 0.75 \%T$  = fail)  
 Average value must be within  $\pm 5 \%T$  of the Actual Value for each standard.

RESULT: Pass / Fail                      DATE/INITIAL: \_\_\_\_\_

## 11. Decontamination Procedure

Prior to returning a Biolog Turbidimeter (for repair or returning a loaner), certain procedures must be followed. Contact Biolog Technical Support or your distributor with the following information:

- The serial number of your turbidimeter
- A PO No. if the turbidimeter is out of warranty
- Obtain a Returned Materials Authorization Number (RMA No.)

### Decontamination Materials

- 70% aqueous Ethanol (EtOH)
- Spray bottle
- Lint free cloth

### Procedure

1. Spray the outside of the turbidimeter as well as the test tube holder, underneath the turbidimeter, and the feet thoroughly with 70% EtOH.
2. Allow to air dry for 10-15 minutes. Repeat.
3. Spray thoroughly a third time and wipe with cloth.

*Note: Spraying alcohol into the holder will not damage the elements.*

*You may want to use a LongSwab wrapped in lint free cloth to wipe the inside of the test tube holder.*

4. Complete the Certificate of Decontamination (Biolog Turbidimeter User Guide, p. 12) and obtain the address to where your turbidimeter should be shipped.

## 12. Service for International Users

We strongly advise that you register all your equipment with us (see Product Registration Form) and that you label your turbidimeter as "Property of YOUR NAME." Please note your distributor contact details on this page for your records.

Distributor Address

Contact Person: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

If your country does not have a distribution partner please e-mail [info@biolog.com](mailto:info@biolog.com) and put your country name in the subject line.

# CERTIFICATE OF DECONTAMINATION BIOLOG TURBIDIMETER

## Customer Information

Contact Person \_\_\_\_\_ Facility \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_

## Equipment Information

Instrument \_\_\_\_\_

Model \_\_\_\_\_ Serial No. \_\_\_\_\_ RMA No. \_\_\_\_\_

Materials used in unit

Chemical  Biological  Radioactive\*  Never Used

## Authorization

I certify that I have followed the Manufacturer's instructions, using recommended materials and completed all steps of the decontamination procedure for the instrument listed above prior to packaging for shipment.

\_\_\_\_\_  
(Printed Name of company representative) (Title)

\_\_\_\_\_  
(Signature) (Date)

\*Signature of Radiation Safety Officer is also required when unit had been used with radioactive materials.

I certify unit to be free of any monitor detected radioactive contamination.

\_\_\_\_\_  
(Printed Name, Title) (Signature) (Date)

### Return Instruments for Repair to:

BioLab LLC  
1826 Minnesota St  
The Dalles, OR 97058 USA  
RA No. \_\_\_\_\_

www.biolabsupplyus.com  
O +1 503 515 6331

### Return Loaner Instruments to:

Biolog, Inc.  
21124 Cabot Blvd.  
Hayward, CA 94545 USA  
Attn: Technical Service, RA No. \_\_\_\_\_

www.biolog.com  
O +1 510 785 2564  
F +1 510 782 4639