

	Environmental Analysis Teaching and Research Laboratory	Date: 02/07/2017	Number: X
	Standard Operating Procedure	Title: Trilogy Laboratory Fluorometer	
	Approved By: TBD	Revision Date: February 9, 2017	

1. Scope and Application

1.1 The scope of this SOP is train researchers in the use of the Trilogy Laboratory Fluorometer, a compact, multifunctional laboratory instrument that can be used for making fluorescence, absorbance, or turbidity measurements using the appropriate snap-in Optical Module.

1.2 The applications of this SOP are for...

2. Summary of Method

2.1 The Trilogy Laboratory Fluorometer is a compact, multifunctional laboratory instrument that can be used for making fluorescence, absorbance, and turbidity measurements using the appropriate snap-in Optical Module. A color touch screen with simple menus makes for an intuitive user interface.

Contents

1	Scope and Application	1
2	Summary of Method	1
3	Acknowledgements	3
4	Modules	3
5	Fluorometer Operation	3
	Measuring Samples	3
	Continuous Sampling	4
6	Absorbance Operation	4
	Measuring Samples	4
	Continuous Sampling	5
7	Turbidity Operation	5
	Measuring Samples	5
	Continuous Sampling	6

8 Calibration Overview	6
9 Health and Safety	6
Safety and Personnel Protective Equipment	6
10 Personnel & Training Responsibilities	6
11 Required Materials and Apparati	7
12 Reagents and Standards	7
13 Estimated Time	7
14 Sample Collection, Preservation, and Storage	7
15 Procedure	7
16 Data Analysis and Calculations	7
17 QC/QA Criteria	7
18 Trouble Shooting	7
19 References	7

3. Acknowledgements

4. Modules

4.1 There are several different modules available to the Trilogy Laboratory Fluorometer:

- 1. The Absorbance Module accepts interchangeable filter paddles so measurements can be made at different wavelengths in order to identify or place a sample in a particular class of compounds. The standard filter paddle wavelengths/bandwidths are: 560/10; 600/10 and 750/10 nm.
- The Turbidity Module uses an Infrared (IR) LED with a wavelength of 850 nm as required for reference method: ISO 7027/DIN EN 27027, "Water Quality- Determination of Turbidity". Using Infrared allows Turbidity to be measured at wavelengths that are not normally absorbed by organic matter thereby reducing susceptibility to interference by sample color.

4.2 When properly calibrated, the Trilogy Fluorometer will read out the actual concentration of the solution. Optical Modules contain the necessary light source and filters for the relevant application.

5. Fluorometer Operation

Measuring Samples

5.1 There are two measurement modes available on the Trilogy when using the Fluorescence Module:

- 1. Raw Fluorescence Mode: No calibration required.
- 2. Direct Concentration Mode: No calibration required (see calibration overview).

5.2 Touch "Mode" on the Home Screen to select the measurement mode.

- 1. Raw Fluorescence Mode: The Raw Fluorescence Mode should be used for qualitative measurement, for example where measuring changes is required, rather than absolute concentration values. Readings are displayed in Relative Fluorescence Units (RFU).
- 2. Direct Concentration Mode: The Direct Concentration mode makes absolute measurements based on a calibration (see Calibration Overview).

5.3 The Trilogy accommodates 10 x 10 mm methacrylate and polystyrene cuvettes (minimum 2mL volume). Use 12 mm x 35mm glass test tubes for extracted chlorophyll measurements, and use methacrylate for ammonium measurements.

- 1. Open the lid of the trilogy and insert the cuvette. Close the lid.
- 2. Touch "Sample ID" to name your sample (optional).
- 3. Using the keypad, enter the sample name into the name field. Touch "Save" to save the sample ID.
- 4. Touch "Measure Fluorescence" to commence measurement. The Trilogy will measure the sample for 6 seconds and report the average reading for the sample.

5.4 The Trilogy reports data on the "Home" screen and displays the results for the most recent 20 measurements. Use the arrow keys to scroll through the most recent measurements. The data automatically exports to a printer or PC when properly connected. Please note the Trilogy does NOT store more than 20 measurements at one time. If more than 20 readings are taken, the oldest reading will be overwritten. Measurements are not stored between power cycles.

Continuous Sampling

5.5 The Continuous Sampling feature enables repeat measurements at user-defined intervals.

- 1. Touch "Continuous Sampling" and turn the feature ON. Highlight the frequency of measurement and the number of total measurements. The maximum number of total measurements is 9999.
- 2. Touch "OK" to return to the "Home" screen.
- 3. Connect the Trilogy to a printer or a PC to collect the data. Touching the screen repeatedly causes an early-abort of Continuous Sampling measurements.

6. Absorbance Operation

Measuring Samples

6.1 The Absorbance Module accommodates 10 x 10 mm methacrylate and polystyrene cuvettes as well as glass cuvettes (minimum 1.5 mL volume).

- 1. Open the lid and insert the cuvette. Close the lid.
- 2. Touch "Sample ID" to name your sample (Optional). Using the keypad, enter the sample name into the name field. Touch "Save" to save the sample ID.
- 3. Touch "Measure Absorbance" to commence measurement. The Trilogy will measure the sample for 6 seconds and report the average reading for the sample.

- 6.2** The Trilogy reports data on the "Home" screen and displays the results for the most recent 20 measurements. Use the arrow keys to scroll through the most recent measurements. The data automatically exports to a printer or PC when properly connected. Please note the Trilogy does NOT store more than 20 measurements at one time. If more than 20 readings are taken, the oldest reading will be overwritten. Measurements are not stored between power cycles.

Continuous Sampling

- 6.3** The Continuous Sampling feature enables repeat measurements at user-defined intervals.

- 1. Touch "Continuous Sampling" and turn the feature ON. Highlight the frequency of measurement and the number of total measurements. The maximum number of total measurements is 9999.
- 2. Touch "OK" to return to the "Home" screen.
- 3. Connect the Trilogy to a printer or a PC to collect the data. Touching the screen repeatedly causes an early-abort of Continuous Sampling measurements.

7. Turbidity Operation

Measuring Samples

- 7.1** There are two measurement modes available on the Trilogy when using the Turbidity Module:

- 1. Raw Mode: No calibration required
- 2. Direct Concentration Mode: Calibration required

- 7.2** Touch "Mode" on the House Screen to select the measurement mode.

- 1. Raw Mode: The Raw Mode should be used for qualitative measurement, for example where measuring changes is required, rather than absolute concentration values. Readings are displayed in Nephelometric Turbidity Units (NTU).
- 2. Direct Concentration Mode: The Direct Concentration mode makes absolute measurements based on a calibration.

- 7.3** Use Polystyrene cuvettes for measuring turbidity.

- 1. Open the lid of the Trilogy and insert the cuvette. Close the lid.
- 2. Touch "Sample ID" to name your sample (optional).

- 3. Using the keypad, enter the sample name into the name field. Touch "Save" to save the sample ID.
- 4. Touch "Measure Turbidity" to commence measurement. The Trilogy will measure the sample for 6 seconds and report the average reading for the sample.

7.4 The Trilogy reports data on the "Home" screen and displays the results for the most recent 20 measurements. Use the arrow keys to scroll through the most recent measurements. The data automatically exports to a printer or PC when properly connected. Please note the Trilogy does NOT store more than 20 measurements at one time. If more than 20 readings are taken, the oldest reading will be overwritten. Measurements are not stored between power cycles.

Continuous Sampling

7.5 The Continuous Sampling feature enables repeat measurements at user-defined intervals.

- 1. Touch "Continuous Sampling" and turn the feature ON. Highlight the frequency of measurement and the number of total measurements. The maximum number of total measurements is 9999.
- 2. Touch "OK" to return to the "Home" screen.
- 3. Connect the Trilogy to a printer or a PC to collect the data. Touching the screen repeatedly causes an early-abort of Continuous Sampling measurements.

8. Calibration Overview

9. Health and Safety

9.1 Describe the risk...

Safety and Personnel Protective Equipment

10. Personnel & Training Responsibilities

10.1 Researchers training is required before this the procedures in this method can be used...

10.2 Researchers using this SOP should be trained for the following SOPs:

- SOP01 Laboratory Safety
- SOP02 Field Safety

11. Required Materials and Apparati

11.1 Item 1 w/catalog number!

11.2 Item 2

12. Reagents and Standards

13. Estimated Time

13.1 This procedure requires XX minutes...

14. Sample Collection, Preservation, and Storage

15. Procedure

15.1 Prepare ...

15.2

16. Data Analysis and Calculations

17. QC/QA Criteria

18. Trouble Shooting

19. References

19.1 APHA, AWWA. WEF. (2012) Standard Methods for examination of water and wastewater. 22nd American Public Health Association (Eds.). Washington. 1360 pp. (2014).