

Using the CYCLOPS-7 Solid Secondary Standard

Introduction

The following information will describe how to use the Solid Secondary Standard, P/No. 2100-900, with any version of the CYCLOPS-7 sensors, (Chlorophyll *a*, Rhodamine WT, etc).

The two main benefits of using the Solid Secondary Standard are:

- 1) It can be used in place of a primary liquid standard once a correlation between a primary standard and the solid standard has been established.
- 2) It can be used to check the fluorometer stability, and/or check for loss in sensitivity resulting from the growth of bio-fouling organisms on the sensor optics.

The Solid Secondary Standard provides a very stable fluorescent signal. It has an adjustment screw so that you can tune the Solid Standard to provide a signal to match a specific sample.

Installing the Secondary Standard

1. Before installing the Solid Standard you must ensure that the optical surface of the CYCLOPS-7 is completely clean and dry. The Solid Standard is indexed and it must be installed so that the indexing is precisely aligned for proper use (see Figure 1).

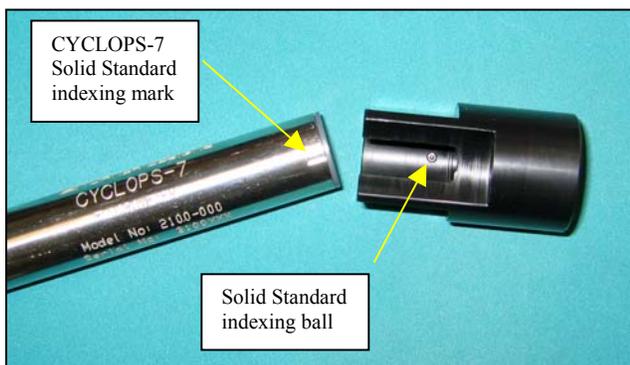


Figure 1.
Align the index mark and indexing ball when installing CYCLOPS-7 in the Solid Secondary Standard.

- 2) To install, place the Solid Standard on to the optical end of the CYCLOPS-7.

3. With the Solid Standard fully pressed on, rotate in either direction until you feel the Solid Standard indexing ball click into the indexing mark on the CYCLOPS-7.
4. To begin, use a flathead screwdriver to unscrew the locking nut as far as it will go.
5. Next, to change the signal level, use the green screwdriver provided and insert the blade through the hole in the locking nut. Rotate it until it engages with the adjustment screw that is beneath the locking nut. Now the screw can be used to adjust the signal level as necessary.

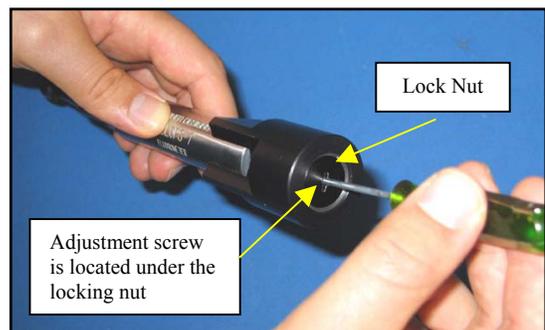


Figure 2.
Insert the supplied green screwdriver through the calibration hole in the locking nut to reach the adjustment screw.

6. Once the desired reading has been obtained, the locking nut should be screwed down so that the adjustment screw is held firmly in place.
7. Finish by noting the output voltage and gain setting used, (X1, X10 or X100) in the "Value" space on the Secondary Standard label
8. Note that the response of every solid standard is unique. Hence, a new correlation must be determined for every sensor. For future identification, use the "ID" space on the label for a unique identifier for the Secondary Standard.

Use of the Solid Secondary Standard for In Vivo Chlorophyll Applications:

1. To establish a correlation between a known chlorophyll concentration and the fluorometer output voltage, immerse the sensor in a sample containing algae and note the sensor output.
 2. Dry off the CYCLOPS-7 and attach the Solid Standard to the fluorometer, (with the same gain setting), and adjust the Solid Standard to produce the same output voltage from the sensor as in step 1.
 3. Next, perform a chlorophyll extraction using a Laboratory Fluorometer, Spectrophotometer or HPLC to determine the actual chlorophyll *a* concentration in the sample¹. This will provide the correlation of actual chlorophyll *a* concentration for the sensor output voltage at that given gain setting.
 4. Now, at any time, the Solid Standard can be used to check/establish a new correlation between a known equivalent concentration and the current CYCLOPS-7 output voltage, (CYCLOPS-7 must be on the same gain setting as in Step 1).
2. Dry off the optical end of the CYCLOPS-7 and attach the Solid Standard to the fluorometer and adjust to produce the same output voltage from the sensor as in step 1, (turning the secondary standard adjustment screw clockwise produces a higher signal).
 3. Now, at any time, the Secondary Standard can be used to check/establish a new correlation between a known equivalent concentration and the current CYCLOPS-7 output voltage.
 4. Comprehensive information on dye trace measurements can be found at the following Turner Designs URL:

<http://www.turnerdesigns.com/t2/doc/appnotes/main.html#fluorescent>

Additional Information

Further information on Solid Secondary Standards can be found on the Turner Designs web site at the following URL:

http://www.turnerdesigns.com/t2/instrument/accessories/998_0056.html

Use of the Solid Secondary Standard for Dye Tracing Applications:

The Solid Secondary Standard accessory can also be used to check the fluorometer stability for making dye concentration measurements. If necessary, the Solid Standard can be used to establish a new correlation voltage without the need to use a calibration solution each time.

1. To use the Solid Standard to establish a correlation between a known dye concentration and the fluorometer output voltage, immerse the sensor in a dye solution of known concentration, say 50 ppb, and note the sensor output voltage and gain setting used.

¹ Information on doing a chlorophyll extraction can be found on the Turner Designs web site at this URL:
http://www.turnerdesigns.com/t2/doc/appnotes/998_9000.html

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