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Chlorophyll Fluorometer Characterization in Reflective Solid Proxy (pre-service char,old method)

Date:	**02/20/13**
Serial #:	AFLT-015
Tech:	SML

Dark Counts	**0.1834 volts**
CEV	**2.682 volts**
SF	**8.845**
FSV	**5.39 volts**
Linearity:	**0.999 R^2 (0–1.5 volts)**
	0.995 R^2 (0– 5.45 volts)

Notes:

Dark Counts: Signal output of the meter in clean water with black tape over detector.

CEV is the chlorophyll equivalent voltage. This value is the signal output of the fluorometer when using a fluorescent solid proxy that has been determined to be approximately equivalent to **22.1 µg/l** of a *Thalassiosira weissflogii* phytoplankton culture.

SF is the scale factor used to derive chlorophyll concentration from the signal voltage output of the fluorometer. The scale factor is determine by using the following equation: SF = (22.1) / (CEV – dark).

FSV is the maximum signal voltage output that the fluorometer is capable of.

Chlorophyll concentration expressed in µg/l (mg/m^3) can be derived by using the following equation: (µg/l) = (Vmeasured – dark) * SF

The relationship between fluorescence and chlorophyll-*a* concentrations in-situ is high variable. The scale factor listed on this document was determined by using a mono-culture of phytoplankton (*Thalassiosira weissflogii*). The population was assumed to be reasonably healthy and the concentration was determined by using the absorption method. To accurately determine chlorophyll concentration using a fluorometer you must perform secondary measurements on the populations of interest. This is typically done using extraction based measurement techniques on discrete samples. For additional information on determination of chlorophyll concentration see [Standard Methods For The Examination Of Water And Wastewater] part 10200 H published jointly by: American Public Health Association, American Water Works Association and Water Environment Federation.

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Chlorophyll Fluorometer Characterization in Uranine liquid Proxy (pre-service char,new method)

Date:	**02/20/13**
Serial #:	AFLT-015
Tech:	SML

Dark Counts	**0.1834 volts**
CEV	**0.984volts**
SF	**27.30**
FSV	**5.39 volts**
Linearity:	**0.999 R^2 (0–1.5 volts)** **0.995 R^2 (0– 5.45 volts)**

Notes:

Dark Counts: Signal output of the meter in clean water with black tape over detector.

CEV is the chlorophyll equivalent voltage. This value is the signal output of the fluorometer when using a Uranine dye fluorescent proxy that has been determined to be approximately equivalent to **21.86 µg/l** of a *Thalassiosira weissflogii* phytoplankton culture.

SF is the scale factor used to derive chlorophyll concentration from the signal voltage output of the fluorometer. The scale factor is determine by using the following equation: SF = (21.86) / (CEV – dark).

FSV is the maximum signal voltage output that the fluorometer is capable of.

Chlorophyll concentration expressed in µg/l (mg/m^3) can be derived by using the following equation: (µg/l) = (Vmeasured – dark) * SF

The relationship between fluorescence and chlorophyll-*a* concentrations in-situ is high variable. The scale factor listed on this document was determined by using a mono-culture of phytoplankton (*Thalassiosira weissflogii*). The population was assumed to be reasonably healthy and the concentration was determined by using the absorption method. To accurately determine chlorophyll concentration using a fluorometer you must perform secondary measurements on the populations of interest. This is typically done using extraction based measurement techniques on discrete samples. For additional information on determination of chlorophyll concentration see [Standard Methods For The Examination Of Water And Wastewater] part 10200 H published jointly by: American Public Health Association, American Water Works Association and Water Environment Federation.

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Chlorophyll Fluorometer Characterization in Uranine liquid Proxy (post-service char,new method)

Date:	**02/21/13**
Serial #:	AFLT-015
Tech:	SML

Dark Counts	**0.1834 volts**
CEV	**1.564 volts**
SF	**15.62**
FSV	**5.39 volts**
Linearity:	**0.999 R^2 (0–1.5 volts)** **0.995 R^2 (0– 5.45 volts)**

Notes:

Dark Counts: Signal output of the meter in clean water with black tape over detector.

CEV is the chlorophyll equivalent voltage. This value is the signal output of the fluorometer when using a Uranine dye fluorescent proxy that has been determined to be approximately equivalent to **21.57 µg/l** of a *Thalassiosira weissflogii* phytoplankton culture.

SF is the scale factor used to derive chlorophyll concentration from the signal voltage output of the fluorometer. The scale factor is determine by using the following equation: SF = (21.57) / (CEV – dark).

FSV is the maximum signal voltage output that the fluorometer is capable of.

Chlorophyll concentration expressed in µg/l (mg/m^3) can be derived by using the following equation: (µg/l) = (Vmeasured – dark) * SF

The relationship between fluorescence and chlorophyll-*a* concentrations in-situ is high variable. The scale factor listed on this document was determined by using a mono-culture of phytoplankton (*Thalassiosira weissflogii*). The population was assumed to be reasonably healthy and the concentration was determined by using the absorption method. To accurately determine chlorophyll concentration using a fluorometer you must perform secondary measurements on the populations of interest. This is typically done using extraction based measurement techniques on discrete samples. For additional information on determination of chlorophyll concentration see [Standard Methods For The Examination Of Water And Wastewater] part 10200 H published jointly by: American Public Health Association, American Water Works Association and Water Environment Federation.

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July 2011 Customer Alert:

Chlorophyll-a Scale Factors Shift

Affected instruments:

- ✓ All *ECO* chl-a fluorometers built or characterized before January 2011.
- ✓ All WETStar chl-a fluorometers built or characterized before July 2011.

WET Labs characterization testing has revealed that the chlorophyll-*a* (chl-a) solid proxy used to characterize our *ECO* and WETStar fluorometers allows a large amount of instrument-to-instrument variability. There are also differences in scaling between WETStar chl-a fluorometers and *ECO* chl-a fluorometers because of differences in the solid proxy used to characterize these instruments. A new methodology using a liquid proxy has been implemented to assure stable characterizations between instruments and to match up the *ECO* and WETStar fluorometers' corrected data outputs.

WET Labs' Actions

New Instruments:

WET Labs has instituted a new characterization standard solution preparation methodology. All new *ECO* and WETStar chl-a fluorometers delivered from this date forward will have range characteristics as per current specifications and scale factors.

Instruments returned for service and characterization:

Instruments returned for service and characterization will be characterized using the new methodology. All instruments returned for servicing will be tuned to the new liquid proxy to decrease instrument-to-instrument variability.

In some cases, we will not be able to achieve the previously stated range of an instrument. In these cases, we will strive for the highest resolution with the highest signal-to-noise ratio possible.

WET Labs service technicians will incorporate these improvements during service when practical. WET Labs' term for this service is "retuning." Accordingly, a serviced instrument may well perform better after retuning than when it was first built. For instruments that are retuned and benefit from either improved resolution or signal-to-noise ratio, WET Labs can provide pre-characterization data to allow you to link your data sets prior to service with your data sets after the instrument is returned to you.

Recommended Customer Actions:

- If you characterize your instruments, you do not need to take any action. Continue to use your characterization.
- If you report scaled or raw data, you should adjust your reported values.
- For instruments returned for service, you will use the ratio between the previous scale factor and pre-service scale factor. This ratio will cover both the change in the methodology and any change in your instrument between the previous characterization and current service.
- Use the post-service scale factor going forward.

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Date: 2/21/13 **Customer: University of Alaska/ Steve Hartz**

S/N# AFLT-015 **Technician: SML**

Repairs and Modifications: Evaluated instrument. Found optics face to be very hazy and bulkhead to require replacing. Performed incoming pre-cal in both old (obsolete solid proxy) and current Uranine proxy. Polished optics face. Replaced degraded bulkhead and case seals. Performed testing then characterization.

Comments: Pre-service characterization sheets and post service characterization sheets included. Please see included Customer Alert for more information on the proxy change. New scale factors are included on the characterization sheets. Due to age of instrument no retuning was done.

WET Labs

Instrument Checklist

Date: 2/22/2013 **S/N:** AFLT-015 **Order #** 18367

Contents:

Description	Qty	Packed
■ ECO Meter	1	X
■ Calibration/Characterization Sheet	1	X
■ Repair/Modification Sheet	1	X
■ Dummy Plug		
■ Lock Collar	1	X
■ Anti-Static Shipping Bag	1	X
■ Hard Plastic Protective End Cap	1	X
■ Pigtail with Lock Collar		
■ Spare Parts Card		
■ Dummy Plug Switch		
■ Compact Disc	1	X
■ Test Cable		
■ ECO to SBE Patch Cable		
■ White Saddle		

Checked by: CMH

Comments: _____