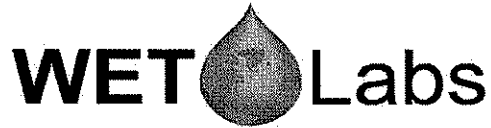


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Scattering Meter Calibration Sheet

8/27/2009

Wavelength: 650

S/N BBFL2VMT-673

Use the following equation to obtain "scaled" output values:

$$\beta(\theta_c) \text{ m}^{-1} \text{ sr}^{-1} = \text{Scale Factor} \times (\text{Output} - \text{Dark Counts})$$

• Scale Factor for 650 nm	=	3.980E-06 (m ⁻¹ sr ⁻¹)/counts
• Output	=	meter reading counts
• Dark Counts	=	47 counts
Instrument Resolution	=	1.2 counts 4.68E-06 (m ⁻¹ sr ⁻¹)

Definitions:

- **Scale Factor:** Calibration scale factor, $\beta(\theta_c)/\text{counts}$. Refer to User's Guide for derivation.
- **Output:** Measured signal output of the scattering meter.
- **Dark Counts:** Signal obtained by covering detector with black tape and submersing sensor in water.

Instrument Resolution: Standard deviation of 1 minute of collected data.

ECO Chlorophyll Fluorometer Characterization Sheet

Date: 8/27/2009

S/N: BBFL2VMT-673

Chlorophyll concentration expressed in $\mu\text{g/l}$ can be derived using the equation:

$$\text{CHL } (\mu\text{g/l}) = \text{Scale Factor} * (\text{Output} - \text{Dark counts})$$

Dark counts	Digital 48 counts
Scale Factor (SF)	0.0121 $\mu\text{g/l/count}$
Maximum Output	4119 counts
Resolution	1.1 counts
Ambient temperature during characterization	22.3 °C

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

SF: Determined using the following equation: $\text{SF} = x \div (\text{output} - \text{dark counts})$, where x is the concentration of the solution used during instrument characterization. SF is used to derive instrument output concentration from the raw signal output of the fluorometer.

Maximum Output: Maximum signal output the fluorometer is capable of.

Resolution: Standard deviation of 1 minute of collected data.

The relationship between fluorescence and chlorophyll-a concentrations in-situ is highly variable. The scale factor listed on this document was determined 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 determining chlorophyll concentration see "Standard Methods for the Examination of Water and Wastewater" part 10200 H, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation.

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ECO CDOM Fluorometer Characterization Sheet

Date: 8/27/2009

S/N: BBFL2VMT-673

CDOM concentration expressed in ppb can be derived using the equation:

$$\text{CDOM (ppb)} = \text{Scale Factor} * (\text{Output} - \text{Dark Counts})$$

Dark Counts	Digital 47 counts
Scale Factor (SF)	0.0912 ppb/count
Maximum Output	4119 counts
Resolution	1.5 counts
Ambient temperature during characterization	22.3 °C

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

SF: Determined using the following equation: $SF = x \div (\text{output} - \text{dark counts})$, where x is the concentration of the solution used during instrument characterization. SF is used to derive instrument output concentration from the raw signal output of the fluorometer.

Maximum Output: Maximum signal output the fluorometer is capable of.

Resolution: Standard deviation of 1 minute of collected data.

Appendix: Triplet BBFL2-VMT Configuration

Diameter	6.25 cm
Length (approx.)	5.58 cm
Weight in air	0.02 kg
Verify actual weight before deployment	
Material	ABS
Temperature range	0–30 deg C
Depth rating	600 m
Digital output resolution	12 bit
Input	7–15 VDC
Current, typical	90 mA
Sample rate	to 8 Hz
RS-232 output	19200 baud
Scattering wavelength	650 nm
Accuracy, min.	0.005 m ⁻¹
Sensitivity, red	2.1 x 10 ⁻⁶ m ⁻¹ /sr
Chlorophyll EX/EM	470/695 nm
CDOM EX/EM	370/460 nm
Sensitivity, chlorophyll	0.02 µg/l
Sensitivity, CDOM	0.3 ppb
Linearity	99% R ²

Connector and Pin-outs

	Pin	Function
	1	Ground
	2	RS-232 RX
	3	Reserved
	4	V in
	5	RS-232 TX
6	Reserved	

Molex connector (Pressure housing and 6-pin connector removed)

WARNING

If you are going to build or use a non-WET Labs-built cable, do not use the wire from pin 3 or the ECO meter will be damaged.

Sample Data Output

N/U	650 Sig	N/U	Chl Sig	N/U	CDOM Sig	Therm
650	54	695	57	460	142	550
650	55	695	57	460	142	550
650	55	695	57	460	152	550
650	55	695	57	460	154	550
650	55	695	57	460	148	550
650	54	695	57	460	145	550