



ECO Chlorophyll Fluorometer Characterization Sheet

Date: 6/9/2014

S/N: BB2FB-227

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

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

	Digital
Dark counts	55 counts
Scale Factor (SF)	0.0151 $\mu\text{g/l/count}$
Maximum Output	4122 counts
Resolution	1.0 counts
 Ambient temperature during characterization	 21.0 $^{\circ}\text{C}$

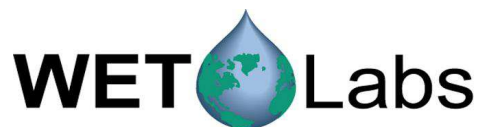
Dark Counts: Signal output of the meter in clean water with black tape over detector.

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.



Scattering Meter Calibration Sheet

6/9/2014

Wavelength: 470

S/N BB2FB-227

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 470 nm** = 3.640E-05 (m⁻¹sr⁻¹)/counts
- **Output** = meter reading counts
- **Dark Counts** = 70 counts

Instrument Resolution = 1.0 counts 3.64E-05 (m⁻¹sr⁻¹)

Definitions:

- **Scale Factor:** Calibration scale factor, $\beta(\theta_c)$ /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.



Scattering Meter Calibration Sheet

6/9/2014

Wavelength: 700

S/N BB2FB-227

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 700 nm** = 3.874E-06 (m⁻¹sr⁻¹)/counts
- **Output** = meter reading counts
- **Dark Counts** = 44 counts

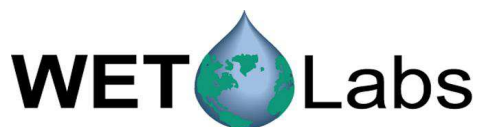
Instrument Resolution = 1.0 counts 3.87E-06 (m⁻¹sr⁻¹)

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.

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Thermistor Calibration

Thermistor output in degrees C can be derived using the equation:

$$\text{Temperature} = (\text{Output} \times \text{slope}) + \text{intercept}$$

R ²	0.9997		
Slope	-0.0056 °C/count		
Intercept	71.3221 °C		
Temp. change rate	0.27 °C/min		
Temp range	33.52 °C max	4.21	°C min
Nominal accuracy	0.01 °C		
RMSE	0.1514		

Pressure Sensor Calibration

Pressure sensor output in dBars can be derived using the equation:

$$\text{Pressure} = (\text{Output} \times \text{slope}) + \text{intercept}$$

R ²	1.0000		
Slope	0.0367 dBar/count		
Intercept	-26.9004 dBar		
Maximum output	10000.0000 counts		
Maximum pressure	345 dbars		
	500 psi		

