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SEA-BIRD SCIENTIFIC

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ECO CDOM Fluorometer Characterization Sheet

Date: 4/23/2020

S/N: FLBBCDSLC-4830

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

CDOM (ppb) = Scale Factor * (Output - Dark Counts)

	Digital
Dark Counts	49 counts
Scale Factor (SF)	0.0945 ppb/count
Maximum Output	4130 counts
Resolution	1.0 counts
Ambient temperature during characterization	22.5 °C

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

SF: Determined using the following equation: SF = *x* ÷ (output - 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.

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ECO Calibration and Repairs

Diagnosis: Evaluated instrument FLBBCDSLC-4830 and found no problems.

Repairs and Modifications: Standard service performed.

Comments: New Device file and characterization sheets included.

ECO Standard Service:

The instrument bulkhead connector, pressure housing and window\optics are inspected for damage. Instrument is checked to determine proper functionality. Incoming settings and memory are collected if incoming condition allows.

If applicable, a pre-service characterization is performed. Data is analyzed and Instrument is rescaled.

The head is inspected for cracks in detector and motor bores. Shaft, shaft seal, faceplate, and wiper are replaced (if equipped). Noise, stability, and live pressure test performed.

Final calibration and characterization is completed. Including calibration of thermistor and pressure sensor, if equipped. A device file, repair sheet, and new characterization sheets are provided to customer via hard copy and CD.

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Scattering Meter Calibration Sheet

4/23/2020
Wavelength: 700 S/N FLBBCDSLC-4830

Use the following equation to obtain either digital or analog "scaled" output values:

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

• **Scale Factor for 700 nm**	=	1.967E-06	$(m^{-1}sr^{-1})$/counts
• **Output**	=	meter output	counts
• **Dark Counts**	=	48	counts
Instrument Resolution	=	1.0	counts

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.

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ECO Chlorophyll Fluorometer Characterization Sheet

Date: 4/23/2020

S/N: FLBBCDSLC-4830

Chlorophyll concentration expressed in µg/l can be derived using the equation:

CHL (µg/l) = Scale Factor * (Output - Dark counts)

	Digital
Dark counts	48 counts
Scale Factor (SF)	0.0072 µg/l/count
Maximum Output	4130 counts
Resolution	1.0 counts
Ambient temperature during characterization	22.5 °C

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

SF: Determined using the following equation: SF = x ÷ (output - 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.