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APPLICATION NOTE NO. 9

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Calculating Calibration Coefficients for
Sea Tech Fluorometer and WET Labs Flash Lamp Fluorometer (FLF)

Some Sea-Bird CTDs can be equipped with a Sea Tech Fluorometer or WET Labs Flash Lamp Fluorometer. For these fluorometers, the CTD configuration file requires the *scale factor* and *offset* to enable the software to calculate the concentration:

Concentration = (voltage * *scale factor* / 5) + *offset*

Sea Tech Fluorometers and WET Labs FLFs have internal, switch-selectable ranges. The *scale factor* is dependent on the fluorometer range:

Fluorometer	Range (milligrams/cubic meter)	Scale Factor
Sea Tech	0 - 3	3
	0 - 10 (factory-set default)	10
	0 - 30	30
	0 - 100	100
	0 - 300	300
	0 - 1000	1000
WET Labs FLF	0 - 100	100
	0 - 300 (factory-set default)	300
	0 - 1000	1000

The *offset* can be calculated by measuring the fluorometer voltage output when its light sensor is completely blocked from the strobe light by an opaque substance such as heavy black rubber:

Offset = (-*scale factor* * output voltage) / 5

NOTE: The *scale factor* and *offset* can be adjusted to fit a linear regression of fluorometer responses to known chlorophyll a concentrations.

Using SEASAVE for Windows to Determine *Offset*

1. Start SEASAVE. See SEASAVE Help files details on how to use the program.

2. Select Instrument Configuration File appears. Select, change, or create a .con file, and click OK.

    Note: Current versions of Sea-Bird Windows software list the Seatech/WET Labs FLF under *Fluorometers* when modifying the .con file.
    - If the WET Labs FLF is not listed in the software version you are using, select the Sea Tech Fluorometer and enter the correct scale factor for the WET Labs FLF from the table above.

3. In the ScreenDisplay menu, select Add New Display Window → Fixed Display.

4. In the ScreenDisplay menu, select Edit Selected Display Window.
   A. Display Setup appears. Click on Modify Display Parameters.
   B. Fixed Display Variables Setup appears. In the desired row, click Select Variables.
   C. Select a Variable from the List appears. Double click on the desired voltage from the list of available voltage numbers (see CTD Configuration Sheet at beginning of CTD manual for voltage number).
   D. Fixed Display Variables Setup appears again. Click OK.
   E. Display Setup appears again. Click OK.
   F. You May Have Changed Your Display Parameters appears. Click Yes for Save Display Parameters to Disk.
   G. In the Save dialog box, select the desired location and file name, and click OK.

5. In the Fixed Display window, right click and select Update Rate. Change Display Rate appears. If desired, change the time between updates and click OK.

6. Connect the CTD to the desired COMM port on the computer.

7. Block the fluorometer light path with a completely opaque substance.

8. In the Realtime Data menu, select Start Acquisition. Acquire and Display Real-Time Data Set Up appears.
   A. Verify that the COMM port is correct.
   B. **For SBE 16/16*plus* only** - Start CTD logging.
   C. Click Start Acquire. (**Note**: SBE 9*plus* will start logging automatically.)
   D. **For SBE 19/19*plus* and 25 only** - Start CTD logging.

9. Record the fluorometer voltage and use this value in the equation to calculate the *offset*.

10. Enter the calculated *offset* in the .con file
    (select Configure → Instrument Configuration/Calibration Coefficients to access the .con file).