Total Algae (Chl & BGA-PE)

Sensor Overview

Specifications

<table>
<thead>
<tr>
<th>Units</th>
<th>Chlorophyll</th>
<th>BGA-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFU, µg/L Chl</td>
<td>RFU, µg/L Chl</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>5 to +50°C</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>20 to +80°C</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>Chl: 0-100 RFU, 0.000-0.050 µg/L Chl*</td>
<td>BGA-PE: 0-100 RFU, 0.025-0.050 µg/L*</td>
</tr>
<tr>
<td>Response</td>
<td>T63+2 sec</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>Chl: 0.001 RFU, 0.01 µg/L Chl, BGA-PE: 0.001 RFU, 0.05 µg/L</td>
<td></td>
</tr>
<tr>
<td>Sensor Type</td>
<td>Optical, fluorescence</td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>Chl: R²=0.9999 for serial dilution of Rhodamine WT solution from 0-400 µg/L Chl equivalents BGA-PE: R²=0.9999 for serial dilution of Rhodamine WT solution from 0-250 µg/L PE equivalents</td>
<td></td>
</tr>
<tr>
<td>Optics</td>
<td>Chl Excitation: 470±15 nm, PE Excitation: 525±15 nm</td>
<td></td>
</tr>
<tr>
<td>Emission</td>
<td>685±20 nm</td>
<td></td>
</tr>
</tbody>
</table>

*Pigment concentration ranges of algae sensors were determined in monocolonies of specific algae species. This range will vary depending on algae assemblage and environmental conditions. For accurate pigment concentration estimates at particular sites or samples, the user must determine the RFU to pigment concentration relationship on a site-by-site basis.

Chlorophyll

Please see the EXO User Manual for detailed information on chlorophyll.

Blue-green Algae

The EXO BGA readings show excellent linearity on serial dilution of a surrogate solution of Rhodamine WT (R²=0.9999) and this should ensure relative accuracy of field BGA-PE readings, i.e., a BGA-PE reading of 100 units will represent twice the algal content of water with a BGA-PE reading of 50 units. A significant advantage of the EXO BGA-PE sensor is that its readings show less interference from turbidity and this will allow for much more accurate determination of BGA-PE content during rainfall events which release both sediment and algae into the water.
RFU – 1- or 2-point
RFU is a percent full scale output; it outputs relative fluorescence from 0-100%. This calibration procedure is recommended if you are also using grab samples to post-calibrate in vivo algae readings.

Pour the correct amount of clear deionized or distilled water into the calibration cup. Immerse the probe end of the sonde in the water.

In the Calibrate menu, select BGA-PE/Chlor, then select BGA RFU. Select either a 1- or 2-point calibration. Enter 0 for first standard value and 45 for second standard value.

Click Start Calibration. Observe the readings under Current and Pending data points. While stabilizing, click the Wipe Sensors button to activate the wiper to remove any bubbles. When data are Stable (or data shows no significant change for approximately 40 seconds), click Apply to accept this calibration point.

Next place the sensors in the Rhodamine WT standard. Click Proceed on the pop-up window. Observe the readings under Current and Pending data points. While stabilizing, click the Wipe Sensors button to activate the wiper to remove any bubbles. When data are Stable (or data shows no significant change for approximately 40 seconds), click Apply to accept this calibration point.

Click Complete. View the Calibration Summary screen and QC score. Click Exit to return to the sensor calibration menu, and then the back arrows to return to main Calibrate menu.

Rinse the sonde in tap or purified water and dry the sonde.

Chlorophyll
Please see the EXO User Manual for detailed information on calibration of the chlorophyll channel.

Blue-green Algae Phycoerythrin
This procedure calibrates BGA RFU or BGA μg/L. If the user has both units selected, then this procedure must be performed twice, once for each unit, to completely calibrate the parameter.

For the 2-point calibration, one of the standards must be clear water (0 μg/L), and this standard must be calibrated first. The other standard should be in the range of the suspected BGA-PE content at the environmental site. Two general types of standards can be used: (a) phytoplankton suspensions of known BGA-PE content, and (b) dye solutions whose fluorescence can be correlated to that of BGA-PE. The user is responsible for determining the BGA-PE content of algal suspensions by using standard cell counting techniques.

For option (b), we recommend using a 25 μg/L Rhodamine WT dye solution (for detailed instructions, see next pages), and the solution is used in the calibration steps below.

μg/L – 1- or 2-point
This procedure will zero your fluorescence sensor and use the default sensitivity for calculation of phycoerythrin-containing BGA in μg/L, allowing quick and easy fluorescence measurements that are only semi-quantitative with regard to BGA-PE. However, the readings will reflect changes in BGA-PE from site to site, or over time at a single site.

Pour the correct amount of clear deionized or distilled water into the calibration cup. Immerse the probe end of the sonde in the water.

In the Calibrate menu, select BGA PE/Chlor, then select BGA μg/L. Select either a 1- or 2-point calibration. Enter 0 for first standard value and 126 for second standard value.

Click Start Calibration. Observe the readings under Current and Pending data points. While stabilizing, click the Wipe Sensors button to activate the wiper to remove any bubbles. When data are Stable (or data shows no significant change for approximately 40 seconds), click Apply to accept this calibration point.

Next place the sensors in the Rhodamine WT standard. Click Proceed on the pop-up window. Observe the readings under Current and Pending data points. While stabilizing, click the Wipe Sensors button to activate the wiper to remove any bubbles. When data are Stable (or data shows no significant change for approximately 40 seconds), click Apply to accept this calibration point.

Click Complete. View the Calibration Summary screen and QC score. Click Exit to return to the sensor calibration menu, and then the back arrows to return to main Calibrate menu.

Rinse the sonde in tap or purified water and dry the sonde.