**SENSOR SERIAL NUMBER:** 0075  
**CALIBRATION DATE:** 17-Mar-11

### ITS-90 COEFFICIENTS

<table>
<thead>
<tr>
<th>g</th>
<th>4.39973338e-003</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>6.42991151e-004</td>
</tr>
<tr>
<td>i</td>
<td>2.73283017e-005</td>
</tr>
<tr>
<td>j</td>
<td>3.09133554e-006</td>
</tr>
<tr>
<td>f0</td>
<td>1000.0</td>
</tr>
</tbody>
</table>

### BATH TEMP (ITS-90) | INSTRUMENT FREQ (Hz) | INST TEMP (ITS-90) | RESIDUAL (ITS-90) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0000</td>
<td>3402.763</td>
<td>0.9999</td>
<td>-0.00008</td>
</tr>
<tr>
<td>4.5000</td>
<td>3679.197</td>
<td>4.5001</td>
<td>0.00015</td>
</tr>
<tr>
<td>15.0000</td>
<td>4605.814</td>
<td>14.9999</td>
<td>-0.00007</td>
</tr>
<tr>
<td>18.5000</td>
<td>4948.569</td>
<td>18.4999</td>
<td>-0.00007</td>
</tr>
<tr>
<td>24.0000</td>
<td>5522.906</td>
<td>24.0000</td>
<td>-0.00001</td>
</tr>
<tr>
<td>29.0000</td>
<td>6083.987</td>
<td>29.0002</td>
<td>0.00022</td>
</tr>
<tr>
<td>32.5000</td>
<td>6499.307</td>
<td>32.4999</td>
<td>-0.00014</td>
</tr>
</tbody>
</table>

Temperature ITS-90 = 1/\{g + h[ln(f_0/f)] + i[ln^2(f_0/f)] + j[ln^3(f_0/f)]\} - 273.15 (°C)

Temperature IPTS-68 = 1/\{a + b[ln(f_0/f)] + c[ln^2(f_0/f)] + d[ln^3(f_0/f)]\} - 273.15 (°C)

Following the recommendation of JPTS: T_68 is assumed to be 1.00024 * T_90 (~2 to 35 °C)

Residual = instrument temperature - bath temperature

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**POST CRUISE CALIBRATION**
SENSOR SERIAL NUMBER: 0075
CALIBRATION DATE: 17-Mar-11

GHIJ COEFFICIENTS

g = -1.01086669e+001
h = 1.14765762e+000
i = -2.10884105e-003
j = 2.39811430e-004
CPcor = -9.5700e-008 (nominal)
CTcor = 3.2500e-006 (nominal)

PSS 1978: C(35, 15, 0) = 4.2914 Siemens/meter

ABCDM COEFFICIENTS

a = 4.54835264e-006
b = 1.14143908e+000
c = -1.00898445e+001
d = -8.76562022e-005
m = 5.3
CPcor = -9.5700e-008 (nominal)

BATH TEMP (ITS-90) | BATH SAL (PSU) | BATH COND (Siemens/m) | INST FREQ (kHz) | INST COND (Siemens/m) | RESIDUAL (Siemens/m)
---|---|---|---|---|---
22.0000 | 0.0000 | 0.00000 | 2.97322 | 0.00000 | 0.00000
1.0000 | 34.7828 | 2.97337 | 5.90259 | 2.97337 | -0.00000
4.5000 | 34.7614 | 3.28005 | 6.12512 | 3.28005 | -0.00000
15.0000 | 34.7167 | 4.26069 | 6.78721 | 4.26070 | 0.00001
18.5000 | 34.7076 | 4.60550 | 7.00490 | 4.60551 | 0.00001
24.0000 | 34.6977 | 5.16293 | 7.34291 | 5.16293 | -0.00001
29.0000 | 34.6922 | 5.68428 | 7.64521 | 5.68425 | -0.00002
32.5000 | 34.6893 | 6.05634 | 7.85368 | 6.05636 | 0.00002

Conductivity = (g + hf" + if" + jf" + p)/(1 + e) Siemens/meter
Conductivity = (af" + bf" + c + dt)/(1 + ep) Siemens/meter
C = temperature[°C]; p = pressure[decibars]; δ = CTcor; ε = CPcor;
Residual = (instrument conductivity - bath conductivity) using g, h, i, j coefficients

Date, Slope Correction

04-Nov-09 1.0001394
17-Mar-11 1.000000
Temperature Calibration Report

<table>
<thead>
<tr>
<th>Customer:</th>
<th>SEAGLIDER FABRICATION CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Number:</td>
<td>63438</td>
</tr>
<tr>
<td>Date of Report:</td>
<td>3/17/2011</td>
</tr>
<tr>
<td>Model Number:</td>
<td>Glider</td>
</tr>
<tr>
<td>Serial Number:</td>
<td>0075 Glider T/C Assembly</td>
</tr>
</tbody>
</table>

Temperature sensors are normally calibrated 'as received', without adjustments, allowing a determination sensor drift. If the calibration identifies a problem, then a second calibration is performed after work is completed. The 'as received' calibration is not performed if the sensor is damaged or non-functional, or by customer request.

An 'as received' calibration certificate is provided, listing coefficients to convert sensor frequency to temperature. Users must choose whether the 'as received' calibration or the previous calibration better represents the sensor condition during deployment. In SEASOFT enter the chosen coefficients using the program SEACON. The coefficient 'offset' allows a small correction for drift between calibrations (consult the SEASOFT manual). Calibration coefficients obtained after a repair apply only to subsequent data.

**'AS RECEIVED CALIBRATION'**

- **Date:** 3/17/2011
- **Drift since last cal:** +0.00208 Degrees Celsius/year
- **Comments:**

**'CALIBRATION AFTER REPAIR'**

- **Date:**
- **Drift since Last cal:**
- **Comments:**
### Conductivity Calibration Report

<table>
<thead>
<tr>
<th>Customer:</th>
<th>SEAGLIDER FABRICATION CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Number:</td>
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<td>Glider</td>
</tr>
<tr>
<td>Serial Number:</td>
<td>0075 Glider T/C Assembly</td>
</tr>
</tbody>
</table>

Conductivity sensors are normally calibrated 'as received', without cleaning or adjustments, allowing a determination of sensor drift. If the calibration identifies a problem or indicates cell cleaning is necessary, then a second calibration is performed after work is completed. The 'as received' calibration is not performed if the sensor is damaged or non-functional, or by customer request.

An 'as received' calibration certificate is provided, listing the coefficients used to convert sensor frequency to conductivity. Users must choose whether the 'as received' calibration or the previous calibration better represents the sensor condition during deployment. In SEASOFT enter the chosen coefficients using the program SEACON. The coefficient 'slope' allows small corrections for drift between calibrations (consult the SEASOFT manual). Calibration coefficients obtained after a repair or cleaning apply only to subsequent data.

**'AS RECEIVED CALIBRATION'**

<table>
<thead>
<tr>
<th>Date: 3/17/2011</th>
<th>Drift since last cal: +0.00030 PSU/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

**'CALIBRATION AFTER CLEANING & REPLATINIZING'**

<table>
<thead>
<tr>
<th>Date:</th>
<th>Drift since Last cal: PSU/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

*Measured at 3.0 S/m

Cell cleaning and electrode replatinizing tend to 'reset' the conductivity sensor to its original condition. Lack of drift in post-cleaning-calibration indicates geometric stability of the cell and electrical stability of the sensor circuit.
Customer Information:
Company: SEAGLIDER FABRICATION CENTER  
Contact: Karl Kunkle  
PO Number: 100790  

Serial Number: 0075 Glider T/C Assembly  
Model Number: Glider  

Services Requested:
1. Evaluate/Repair Instrumentation.  
2. Perform Routine Calibration Service.  

Problems Found:  

Services Performed:
1. Performed initial diagnostic evaluation.  
2. Performed "Post Cruise" calibration of the temperature & conductivity sensors.  
3. Performed complete system check and full diagnostic evaluation.  

Special Notes:  

Tuesday, April 05, 2011