



# Sea-Bird GmbH

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## Conductivity Calibration Report

Customer:	EMS/Spain		
Job Number:	E00966	Date of Report:	1/12/2016
Model Number:	SBE 04C	Serial Number:	043512

*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. 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'

Performed  Not Performed

Date: 10/20/2015

Drift since last cal: 0.00000 PSU/month\*

Comments:

### 'CALIBRATION AFTER REPAIR'

Performed  Not Performed

Date: 1/12/2016

Drift since 20 Oct 15 N/A PSU/month\*

Comments:

The conductivity cell was replaced.

*\*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.*

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SENSOR SERIAL NUMBER: 3512  
CALIBRATION DATE: 12-Jan-16

SBE 4 CONDUCTIVITY CALIBRATION DATA  
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

## COEFFICIENTS:

g = -9.83799186e+000  
h = 1.21504579e+000  
i = -1.61052893e-003  
j = 1.68694756e-004

CPcor = -9.5700e-008 (nominal)  
CTcor = 3.2500e-006 (nominal)

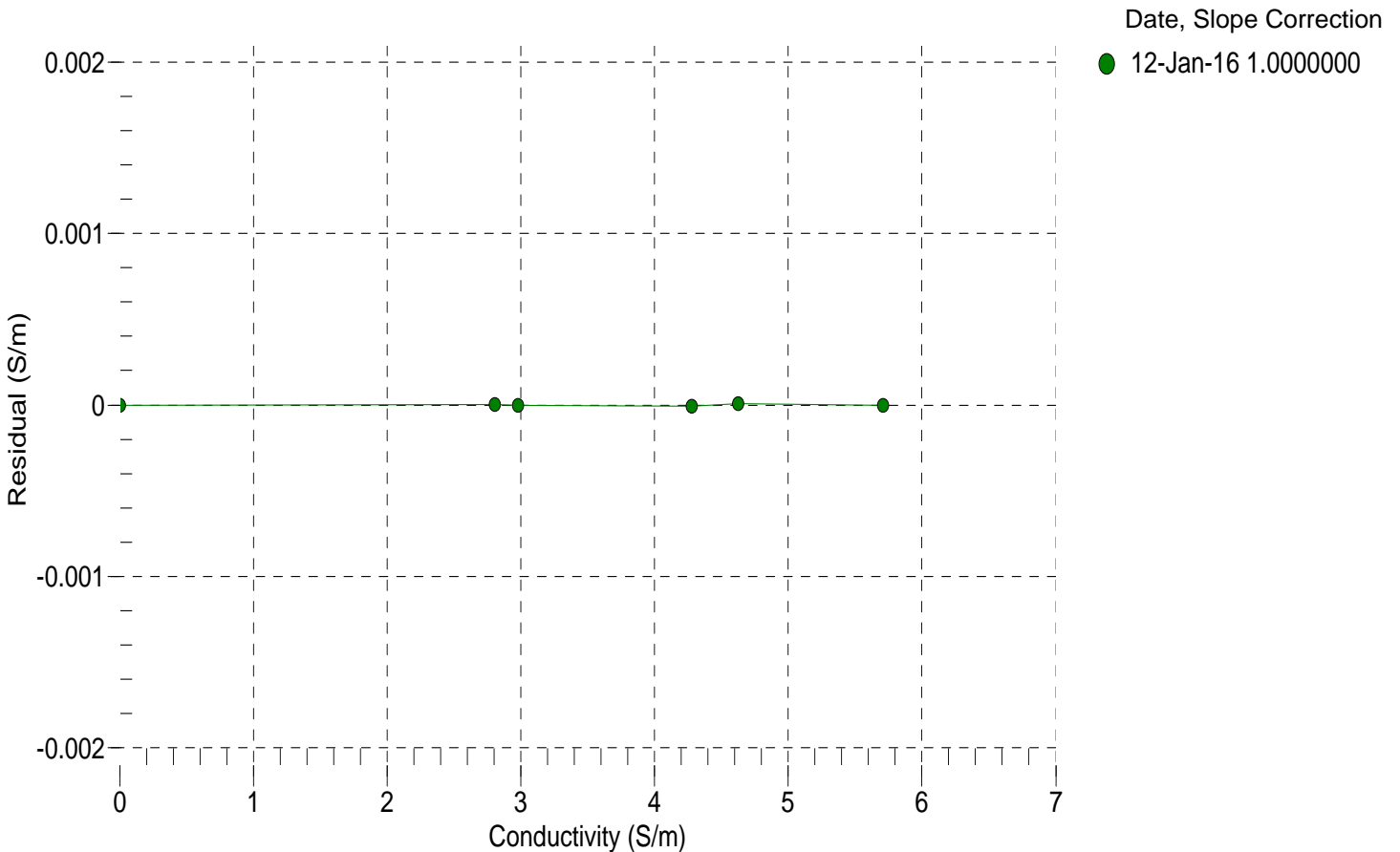
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (kHz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
0.0000	0.0000	0.00000	2.84927	0.00000	0.00000
-1.0000	34.8581	2.80763	5.59464	2.80763	0.00000
1.0016	34.8591	2.97941	5.71990	2.97941	-0.00000
15.0000	34.8600	4.27641	6.58873	4.27640	-0.00001
18.5000	34.8596	4.62349	6.80229	4.62350	0.00001
29.0000	34.8558	5.70806	7.42967	5.70806	-0.00000
32.5000	34.8454	6.08049	7.63279	6.07999	-0.00050

f = Instrument Output (kHz)

t = temperature (°C); p = pressure (decibars);  $\delta$  = CTcor;  $\epsilon$  = CPcor;

Conductivity (S/m) =  $(g + h * f^2 + i * f^3 + j * f^4) / 10 (1 + \delta * t + \epsilon * p)$

Residual (Siemens/meter) = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 3512  
CALIBRATION DATE: 20-Oct-15

SBE 4 CONDUCTIVITY CALIBRATION DATA  
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

## COEFFICIENTS:

g = -1.00849285e+001  
h = 1.24648837e+000  
i = -2.05935610e-003  
j = 1.95483257e-004

CPcor = -9.5700e-008 (nominal)  
CTcor = 3.2500e-006 (nominal)

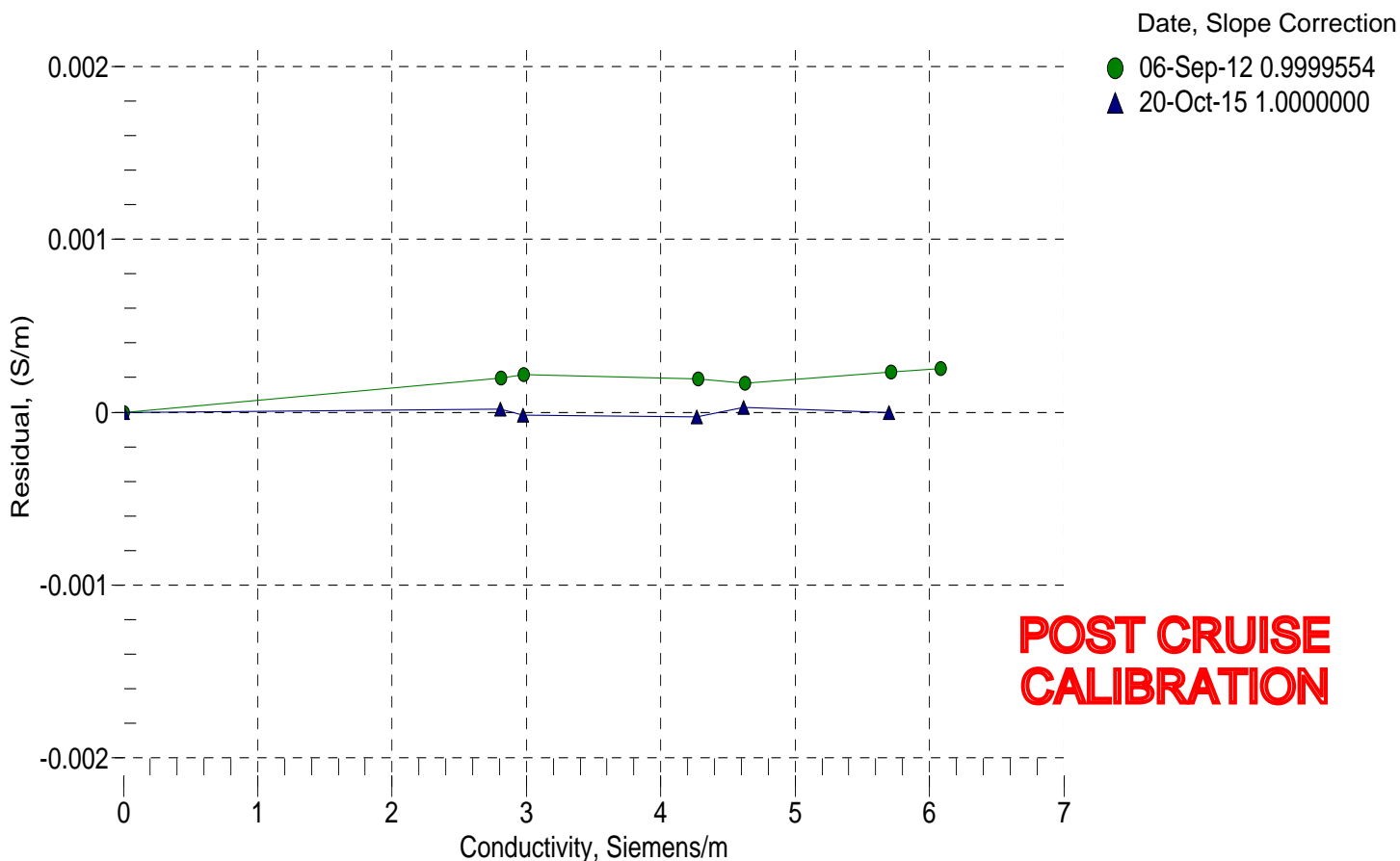
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (kHz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
0.0000	0.0000	0.00000	2.84931	0.00000	0.00000
-1.0001	34.7998	2.80336	5.54203	2.80338	0.00002
1.0000	34.8008	2.97477	5.66521	2.97475	-0.00002
15.0000	34.8012	4.26996	6.52093	4.26993	-0.00003
18.5000	34.8005	4.61650	6.73135	4.61653	0.00003
29.0000	34.7967	5.69947	7.34966	5.69946	-0.00000
32.5000	34.7878	6.07158	7.54974	6.07056	-0.00102

f = INST FREQ / 1000.0

Conductivity = (g + h \* f<sup>2</sup> + i \* f<sup>3</sup> + j \* f<sup>4</sup>) / (1 + δ \* t + ε \* p) Siemens / meter

t = temperatur e[°C]; p = pressure[decibars]; δ = CTcor; ε = CPcor;

Residual = instrument conductivity - bath conductivity





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## Pressure Test Certificate

Customer EMS/Spain  
Job Number E00966  
Date 1/14/2016  
Technician SH

Serial Number 043512

Low Pressure (PSI) 45 PSI  
Time (Minutes) 15 Minutes  
High Pressure (PSI) 8000 PSI  
Time (Minutes) 30 Minutes

Pass   
Fail

Comments

Replaced the main piston "O"-Rings.

