

SBE 41 CERTIFICATES

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SEA-BIRD ELECTRONICS, INC.
13431 NE 20th Street
Bellevue, Washington 98005 USA
Phone: (425) 643 9866
Fax: (425) 643 9954
Email: seabird@seabird.com

SBE 41 Instrument Configuration

Model Number: SBE 41

Serial Number: 41-6319

Part Number: 90359.073

Description: APEX Standard Configuration

Firmware Version: 3.0

Pressure Type: Druck

Pressure Range: 2000 Dbar

Pressure Serial Number: 3827140

SBE 41-STD V 3.0 SERIAL NO. 6319

temperature: 16-jul-13

TA0 = 8.110779e-06

TA1 = 2.720184e-04

TA2 = -2.344051e-06

TA3 = 1.458220e-07

conductivity: 16-jul-13

G = -9.795148e-01

H = 1.403848e-01

I = -2.814695e-04

J = 4.015592e-05

CPCOR = -9.570001e-08

CTCOR = 3.250000e-06

WBOTC = -5.668558e-07

pressure S/N = 3827140, range = 2900 psia: 08-jul-13

PA0 = -1.085231e+00

PA1 = 1.408411e-01

PA2 = -4.118964e-08

PTCA0 = 3.027509e+01

PTCA1 = -2.707189e-01

PTCA2 = -3.088143e-03

PTCB0 = 2.517163e+01

PTCB1 = 9.250000e-04

PTCB2 = 0.000000e+00

PTHA0 = -7.061786e+01

PTHA1 = 5.218350e-02

PTHA2 = -5.743012e-07

POFFSET = 0.000000e+00

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SENSOR SERIAL NUMBER: 6319
CALIBRATION DATE: 16-Jul-13

SBE 41 TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

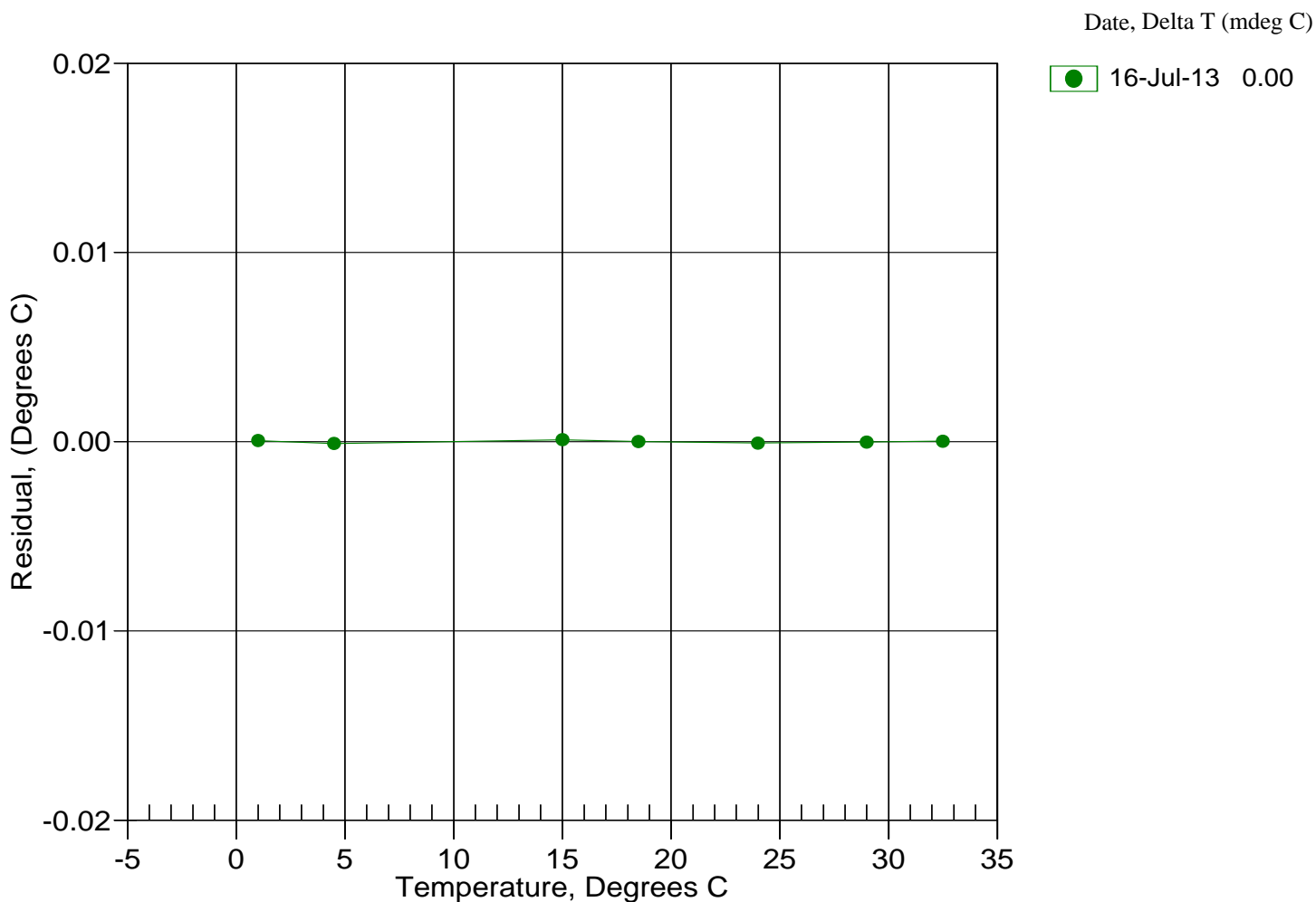
ITS-90 COEFFICIENTS

a0 = 8.110779e-006
a1 = 2.720184e-004
a2 = -2.344051e-006
a3 = 1.458220e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	825370.4	1.0001	0.0001
4.5000	703880.6	4.4999	-0.0001
15.0000	445273.9	15.0001	0.0001
18.5000	384651.2	18.5000	0.0000
23.9940	307539.9	23.9939	-0.0001
29.0000	252367.7	29.0000	-0.0000
32.5000	220523.2	32.5000	0.0000

Temperature ITS-90 = $1 / \{a_0 + a_1[\ln(n)] + a_2[\ln^2(n)] + a_3[\ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature



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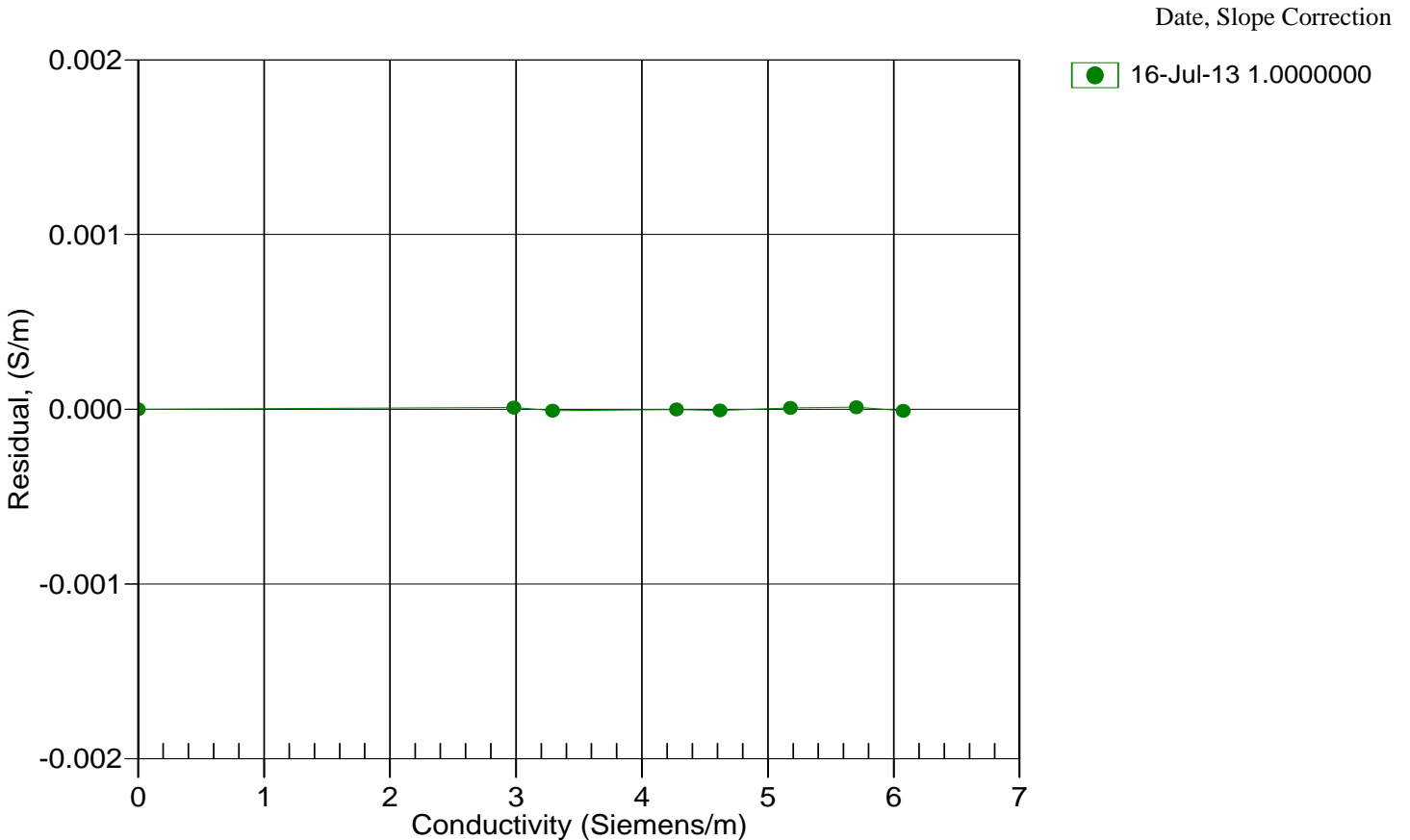
SBE 41 CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.795148e-001	CPcor = -9.5700e-008
h = 1.403848e-001	CTcor = 3.2500e-006
i = -2.814695e-004	WBOTC = -5.6686e-007
j = 4.015592e-005	

BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2645.86	0.00000	0.00000
1.0000	34.9009	2.98251	5319.35	2.98252	0.00001
4.5000	34.8816	3.29028	5521.49	3.29027	-0.00001
15.0000	34.8403	4.27425	6122.42	4.27424	-0.00000
18.5000	34.8313	4.62014	6319.81	4.62014	-0.00001
23.9940	34.8213	5.17867	6625.85	5.17867	0.00001
29.0000	34.8153	5.70217	6900.03	5.70218	0.00001
32.5000	34.8114	6.07523	7088.74	6.07522	-0.00001

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0
 Conductivity = (g + hf² + if³ + jf⁴) / (1 + δt + εp) Siemens/meter
 t = temperature[°C]; p = pressure[decibars]; δ = CTcor; ε = CPCor;
 Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 6319
CALIBRATION DATE: 08-Jul-13

SBE 41 PRESSURE CALIBRATION DATA
2900 psia S/N 3827140

COEFFICIENTS:

PA0 = -1.085231e+000	PTCA0 = 3.027509e+001
PA1 = 1.408411e-001	PTCA1 = -2.707189e-001
PA2 = -4.118964e-008	PTCA2 = -3.088143e-003
PTHA0 = -7.061786e+001	PTCB0 = 2.517163e+001
PTHA1 = 5.218350e-002	PTCB1 = 9.250000e-004
PTHA2 = -5.743012e-007	PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.58	134.2	1823.7	14.62	0.00
591.07	4235.3	1825.6	591.02	-0.00
1167.37	8347.5	1826.6	1167.59	0.01
1743.85	12468.1	1827.9	1743.93	0.00
2320.28	16599.0	1829.1	2320.31	0.00
2896.42	20738.1	1830.1	2896.43	0.00
2320.25	16598.1	1829.6	2320.18	-0.00
1744.02	12468.2	1829.6	1743.94	-0.00
1167.36	8345.4	1829.0	1167.29	-0.00
591.10	4234.9	1828.6	590.97	-0.00
14.58	133.9	1830.3	14.60	0.00

THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2020.40	133.42
29.00	1951.90	135.24
23.99	1850.30	137.54
18.50	1741.40	139.55
15.00	1671.30	140.68
4.50	1462.70	144.29
1.00	1394.10	145.41

TEMP (ITS90)	SPAN (mV)
-5.00	25.17
35.00	25.20

$$y = \text{thermistor output}; t = \text{PTHA0} + \text{PTHA1} * y + \text{PTHA2} * y^2$$

$$x = \text{pressure output} - \text{PTCA0} - \text{PTCA1} * t - \text{PTCA2} * t^2$$

$$n = x * \text{PTCB0} / (\text{PTCB0} + \text{PTCB1} * t + \text{PTCB2} * t^2)$$

$$\text{pressure (psia)} = \text{PA0} + \text{PA1} * n + \text{PA2} * n^2$$

Date, Avg Delta P %FS

08-Jul-13 -0.00

