

SBE 41CP CERTIFICATES

CTD Serial Number 41CP-5629

Instrument Configuration.....	1
DC - Coefficient Output File.....	2
Temperature Calibration Sheet.....	3
Conductivity Calibration Sheet.....	4
Pressure Calibration Sheet.....	5

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 41CP Instrument Configuration

Model Number: SBE 41CP

Serial Number: 41CP-5629

Part Number: 90499.014

Description : NKE-ARVOR Configuration

Firmware Version: 2.0

Pressure Type: Kistler

Pressure Range: 2000 Dbar

Pressure Serial Number: 2145989

SBE 41 ALACE-CP-MO V 2.0 SERIAL NO. 5629
temperature: 27-nov-13
TA0 = 1.010587e-04
TA1 = 2.669872e-04
TA2 = -1.928191e-06
TA3 = 1.388715e-07
conductivity: 27-nov-13
G = -9.848488e-01
H = 1.389031e-01
I = -3.101068e-04
J = 4.242922e-05
CPCOR = -9.570001e-08
CTCOR = 3.250000e-06
WBOTC = -1.249345e-07
pressure S/N = 2145989, range = 2900 psia: 21-nov-13
PA0 = -1.140282e-01
PA1 = 1.391731e-01
PA2 = 1.622924e-08
PTCA0 = 1.437223e+01
PTCA1 = -5.133096e-01
PTCA2 = 2.146079e-02
PTCB0 = 1.044643e+02
PTCB1 = -2.264958e-03
PTCB2 = 0.000000e+00
PTHA0 = -9.911835e+01
PTHA1 = 4.177247e-02
PTHA2 = 1.009046e-06
POFFSET = 0.000000e+00

Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, WA 98005-2010 USA

Phone: (+1) 425-643-9866 Fax (+1) 425-643-9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 5629
CALIBRATION DATE: 27-Nov-13

SBE 41cp TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

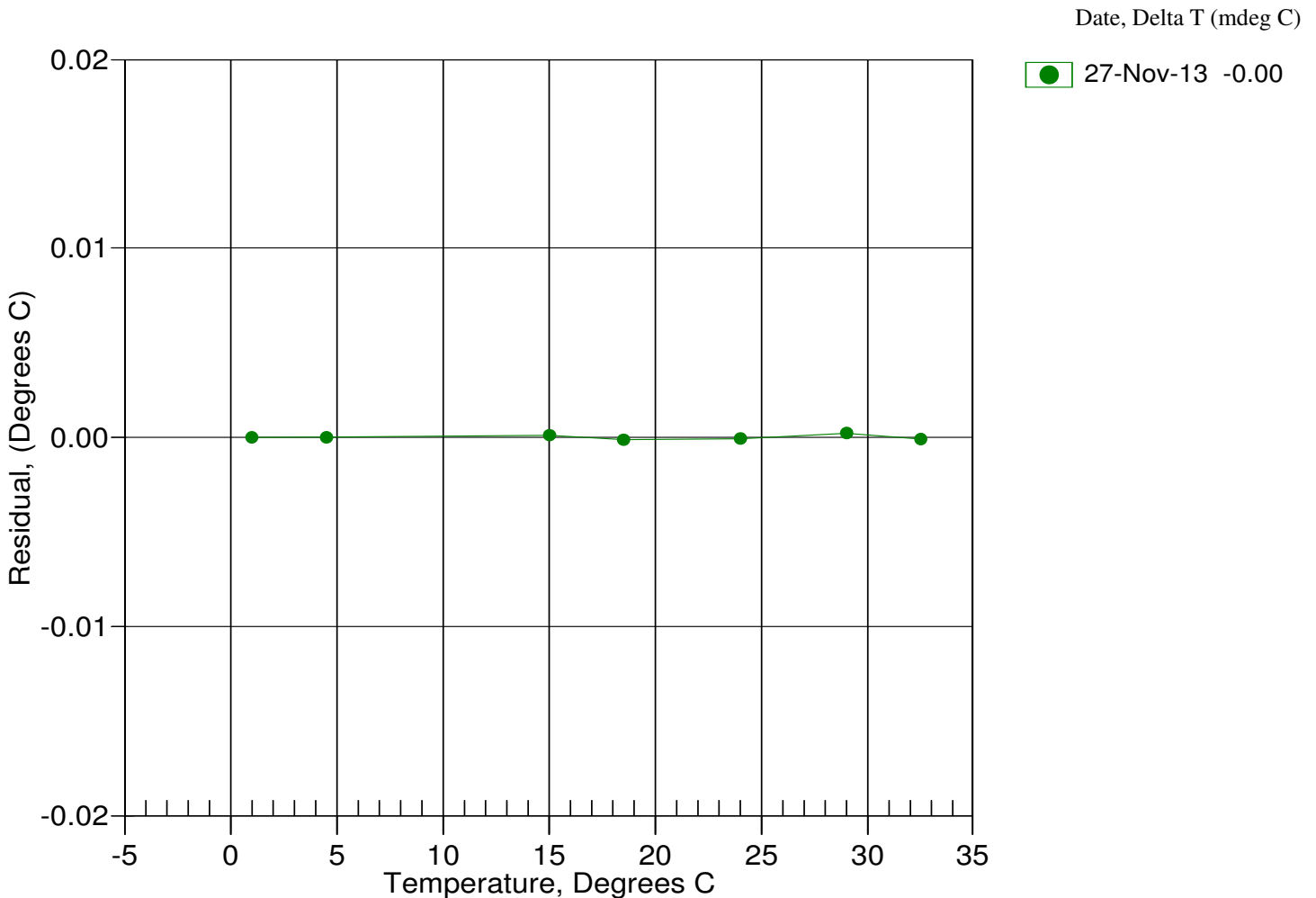
ITS-90 COEFFICIENTS

a0 = 1.010587e-004
a1 = 2.669872e-004
a2 = -1.928191e-006
a3 = 1.388715e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	618211.6	1.0000	-0.0000
4.5000	527296.5	4.5000	0.0000
15.0000	333722.3	15.0001	0.0001
18.5000	288329.9	18.4999	-0.0001
23.9940	230575.6	23.9939	-0.0001
29.0000	189242.9	29.0002	0.0002
32.5000	165385.5	32.4999	-0.0001

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



Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, WA 98005-2010 USA

Phone: (+1) 425-643-9866 Fax (+1) 425-643-9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 5629
CALIBRATION DATE: 27-Nov-13

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

COEFFICIENTS:

g = -9.848488e-001	CPcor = -9.5700e-008
h = 1.389031e-001	CTcor = 3.2500e-006
i = -3.101068e-004	WBOTC = -1.2493e-007
j = 4.242922e-005	

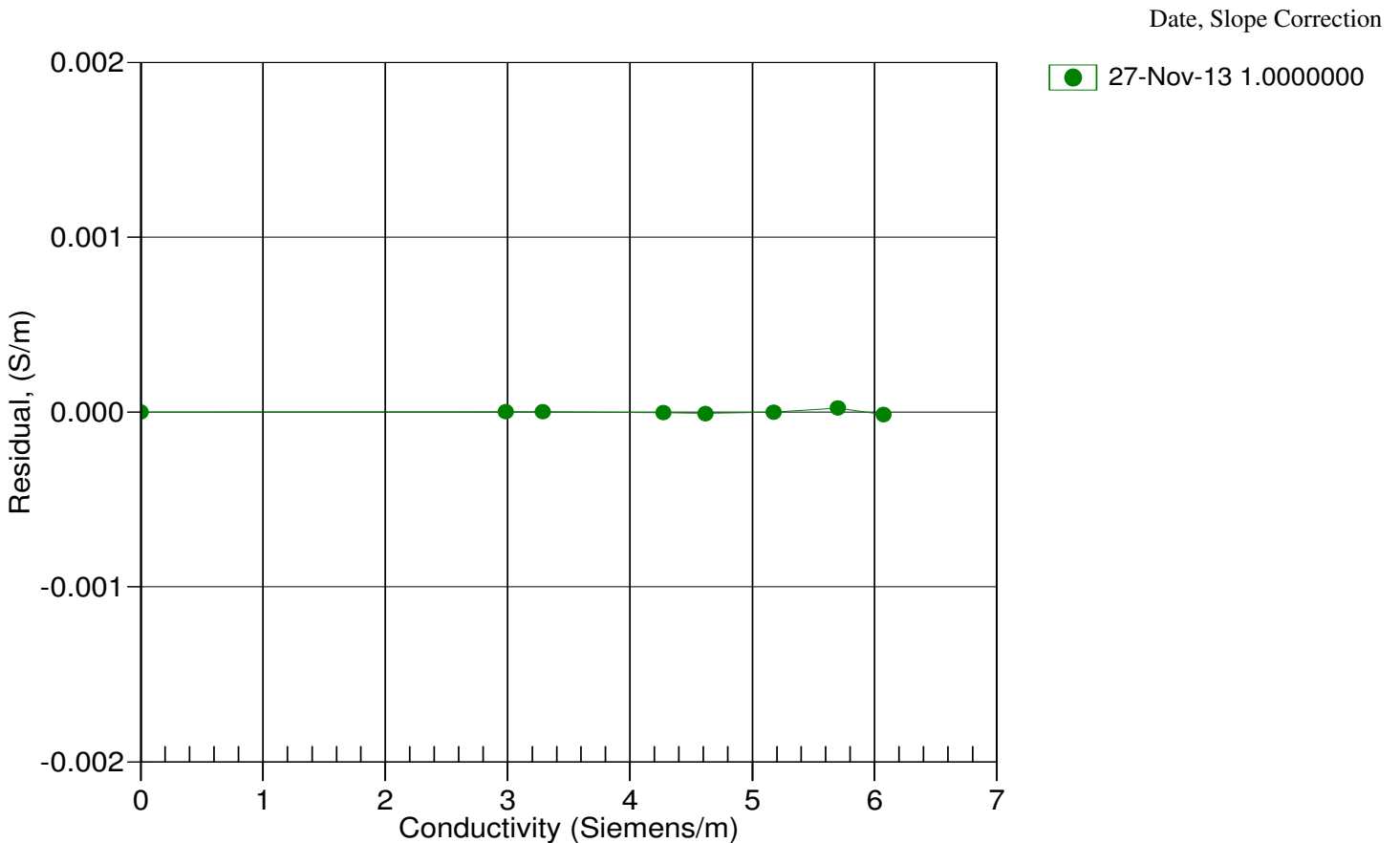
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2667.79	0.00000	0.00000
1.0000	34.8878	2.98149	5352.24	2.98149	0.00000
4.5000	34.8679	3.28911	5555.32	3.28911	0.00000
15.0000	34.8248	4.27255	6158.97	4.27254	-0.00000
18.5000	34.8156	4.61829	6357.29	4.61828	-0.00001
23.9940	34.8056	5.17659	6664.76	5.17659	-0.00000
29.0000	34.7993	5.69985	6940.23	5.69987	0.00002
32.5000	34.7947	6.07265	7129.75	6.07263	-0.00001

$$f = \text{INST FREQ} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$$

$$\text{Conductivity} = (g + hf^2 + if^3 + jf^4) / (1 + \delta t + \epsilon p) \text{ Siemens/meter}$$

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

Residual = instrument conductivity - bath conductivity



Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, WA 98005-2010 USA

Phone: (+1) 425-643-9866 Fax (+1) 425-643-9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 5629
CALIBRATION DATE: 21-Nov-13

SBE 41cp PRESSURE CALIBRATION DATA
2900 psia S/N 2145989

COEFFICIENTS:

PA0 = -1.140282e-001
PA1 = 1.391731e-001
PA2 = 1.622924e-008
PTHA0 = -9.911835e+001
PTHA1 = 4.177247e-002
PTHA2 = 1.009046e-006

PTCA0 = 1.437223e+001
PTCA1 = -5.133096e-001
PTCA2 = 2.146079e-002
PTCB0 = 1.044643e+002
PTCB1 = -2.264958e-003
PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.91	121.8	2724.9	14.96	0.00
592.20	4266.4	2723.6	592.35	0.01
1746.56	12541.0	2722.5	1746.76	0.01
2323.78	16671.5	2722.3	2323.85	0.00
2900.74	20796.6	2722.2	2900.74	-0.00
2323.92	16671.4	2721.2	2323.84	-0.00
1746.92	12541.3	2720.2	1746.81	-0.00
1169.44	8404.1	2719.5	1169.34	-0.00
592.18	4264.3	2718.3	592.07	-0.00
14.91	121.0	2716.4	14.87	-0.00

THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2941.60	130.50
29.00	2868.60	127.60
23.99	2763.00	124.38
18.50	2646.70	122.28
15.00	2571.60	121.64
4.50	2347.90	122.67
1.00	2271.80	123.93

TEMP (ITS90)	SPAN (mV)
-4.54	104.47
36.12	104.38

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

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

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

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

Date, Avg Delta P %FS

21-Nov-13 -0.00

