

# **SBE 41CP CERTIFICATES**

## **CTD Serial Number 41CP-5633**

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](mailto:seabird@seabird.com)

# **SBE 41CP Instrument Configuration**

**Model Number: SBE 41CP**

**Serial Number: 41CP-5633**

**Part Number: 90499.014**

**Description : NKE-ARVOR Configuration**

**Firmware Version: 2.0**

**Pressure Type: Kistler**

**Pressure Range: 2000 Dbar**

**Pressure Serial Number: 2147108**

SBE 41 ALACE-CP-MO V 2.0 SERIAL NO. 5633  
temperature: 28-dec-13  
TA0 = 9.673800e-05  
TA1 = 2.659697e-04  
TA2 = -1.806301e-06  
TA3 = 1.352119e-07  
conductivity: 28-dec-13  
G = -9.800440e-01  
H = 1.416990e-01  
I = -3.210063e-04  
J = 4.350525e-05  
CPCOR = -9.570001e-08  
CTCOR = 3.250000e-06  
WBOTC = -4.743478e-07  
pressure S/N = 2147108, range = 2900 psia: 20-dec-13  
PA0 = -1.276067e+00  
PA1 = 1.390557e-01  
PA2 = 2.116940e-08  
PTCA0 = -8.299655e+01  
PTCA1 = -7.283321e-01  
PTCA2 = 1.421228e-02  
PTCB0 = 1.039895e+02  
PTCB1 = -5.933242e-03  
PTCB2 = 0.000000e+00  
PTHA0 = -9.767585e+01  
PTHA1 = 4.080636e-02  
PTHA2 = 1.098467e-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: 5633  
CALIBRATION DATE: 28-Dec-13

SBE 41cp TEMPERATURE CALIBRATION DATA  
ITS-90 TEMPERATURE SCALE

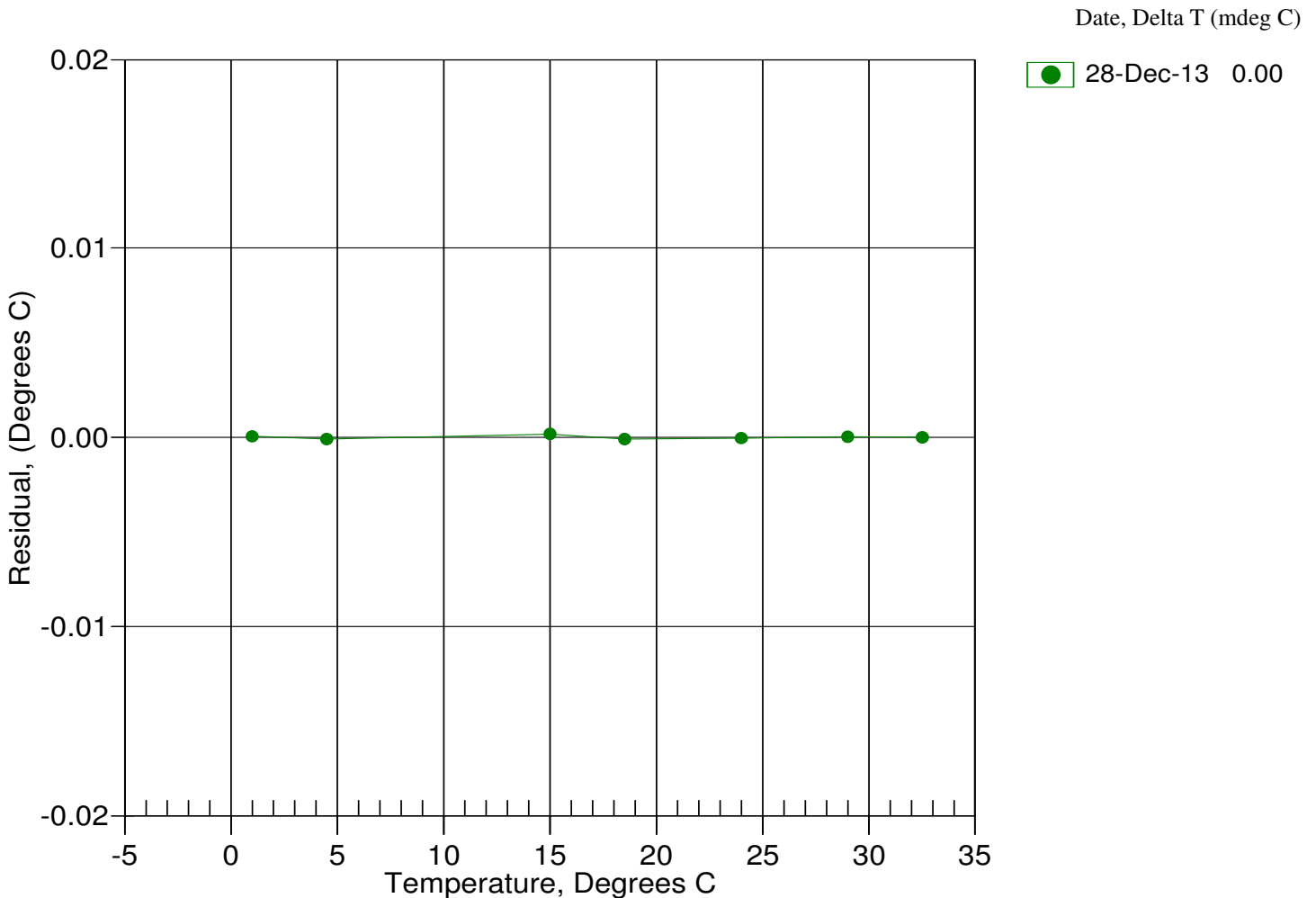
## ITS-90 COEFFICIENTS

a0 = 9.673800e-005  
a1 = 2.659697e-004  
a2 = -1.806301e-006  
a3 = 1.352119e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	628727.7	1.0001	0.0001
4.5000	536389.9	4.4999	-0.0001
15.0000	339701.2	15.0002	0.0002
18.5000	293560.3	18.4999	-0.0001
23.9940	234838.5	23.9940	-0.0000
29.0000	192802.3	29.0000	0.0000
32.5000	168529.7	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



# 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: 5633  
CALIBRATION DATE: 28-Dec-13

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

## COEFFICIENTS:

g = -9.800440e-001	CPcor = -9.5700e-008
h = 1.416990e-001	CTcor = 3.2500e-006
i = -3.210063e-004	WBOTC = -4.7435e-007
j = 4.350525e-005	

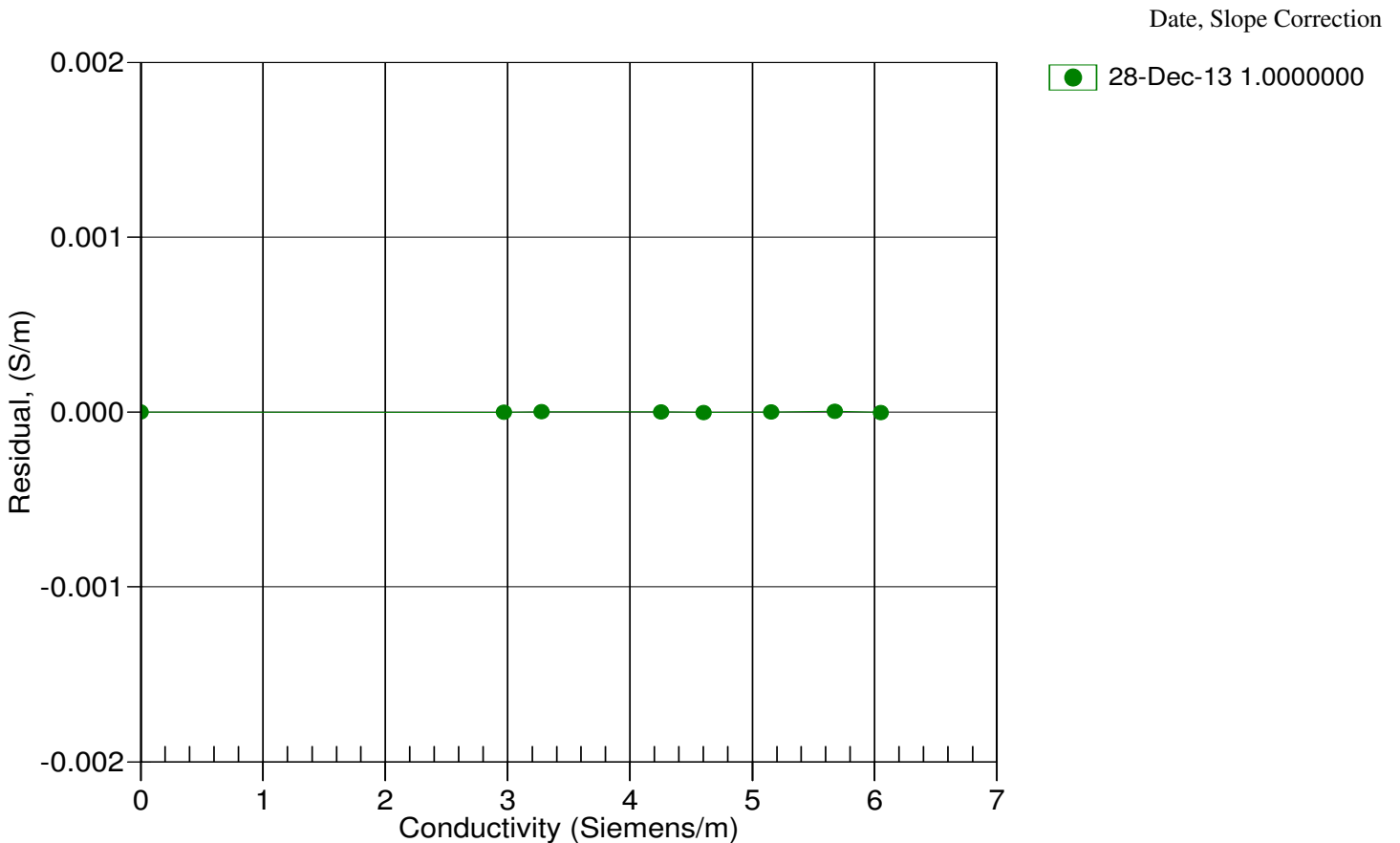
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2634.97	0.00000	0.00000
1.0000	34.7274	2.96909	5288.18	2.96909	-0.00000
4.5000	34.7076	3.27548	5488.94	3.27548	0.00000
15.0000	34.6651	4.25502	6085.73	4.25502	0.00000
18.5000	34.6560	4.59939	6281.80	4.59939	-0.00000
23.9940	34.6459	5.15546	6585.77	5.15545	-0.00000
29.0000	34.6401	5.67670	6858.14	5.67670	0.00000
32.5000	34.6372	6.04828	7045.66	6.04828	-0.00000

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

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

t = temperature[°C]; p = pressure[decibars];  $\delta = \text{CTcor}$ ;  $\epsilon = \text{CPcor}$ ;

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: 5633  
 CALIBRATION DATE: 20-Dec-13

SBE 41cp PRESSURE CALIBRATION DATA  
 2900 psia S/N 2147108

**COEFFICIENTS:**

PA0 = -1.276067e+000	PTCA0 = -8.299655e+001
PA1 = 1.390557e-001	PTCA1 = -7.283321e-001
PA2 = 2.116940e-008	PTCA2 = 1.421228e-002
PTHA0 = -9.767585e+001	PTCB0 = 1.039895e+002
PTHA1 = 4.080636e-002	PTCB1 = -5.933242e-003
PTHA2 = 1.098467e-006	PTCB2 = 0.000000e+000

**PRESSURE SPAN CALIBRATION**

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.57	21.5	2736.0	14.55	-0.00
591.02	4160.3	2737.2	591.19	0.01
1167.54	8292.1	2738.3	1167.58	0.00
1744.11	12420.0	2739.1	1744.16	0.00
2320.76	16543.3	2739.7	2320.81	0.00
2897.41	20661.4	2740.2	2897.46	0.00
2320.80	16542.6	2740.3	2320.72	-0.00
1744.41	12420.8	2740.3	1744.27	-0.00
1167.67	8292.5	2740.3	1167.65	-0.00
590.94	4158.4	2740.2	590.93	-0.00
14.55	21.0	2747.1	14.49	-0.00

**THERMAL CORRECTION**

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2954.80	28.13
29.00	2881.40	27.55
23.99	2774.10	27.34
18.50	2657.10	28.13
15.00	2581.60	29.03
4.50	2355.00	33.88
1.00	2278.20	35.91

TEMP (ITS90)	SPAN (mV)
-4.58	104.02
35.42	103.78

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

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

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

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

