SBE 41CP CERTIFICATES

CTD Serial Number 41CP-7272

SEA-BIRD ELECTRONICS, INC.
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SBE 41CP Instrument Configuration

Model Number: SBE 41CP

Serial Number: 41CP-7272

Part Number: 41CP.FA202

Description : METOCEAN 41CP with SBE63 Configuration

Firmware Version: 3.0C

Pressure Type: Kistler

Pressure Range: 2000 dBar

Pressure Serial Number: 4669462

Oxygen Sensor Type: SBE 63

Oxygen Serial Number: 1074

```
SBE 41 ALACE-CP V 3.0C  SERIAL NO. 7272
TEMPERATURE:  27-MAY-15
    TA0 =  6.644174E-05
    TA1 =  2.670219E-04
    TA2 = -1.913546E-06
    TA3 =  1.367382E-07
CONDUCTIVITY:  27-MAY-15
    G = -9.887230E-01
    H =  1.365228E-01
    I = -3.060917E-04
    J =  3.956556E-05
    CPCOR = -9.570001E-08
    CTCOR =  3.250000E-06
    WBOTC =  2.472122E-07
PRESSURE S/N = 4669462, RANGE = 2900 PSIA:  19-MAY-15
    PA0 =  4.742784E-01
    PA1 =  1.401949E-01
    PA2 =  1.079147E-08
    PTCA0 = -3.073305E+01
    PTCA1 = -3.729686E-01
    PTCA2 =  2.365243E-02
    PTCB0 =  1.036386E+02
    PTCB1 = -5.866616E-03
    PTCB2 =  0.000000E+00
    PTHA0 = -9.597142E+01
    PTHA1 =  3.974924E-02
    PTHA2 =  1.257917E-06
    POFFSET =  0.000000E+00
```

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SENSOR SERIAL NUMBER: 7272
CALIBRATION DATE: 27-May-15

SBE 41 TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

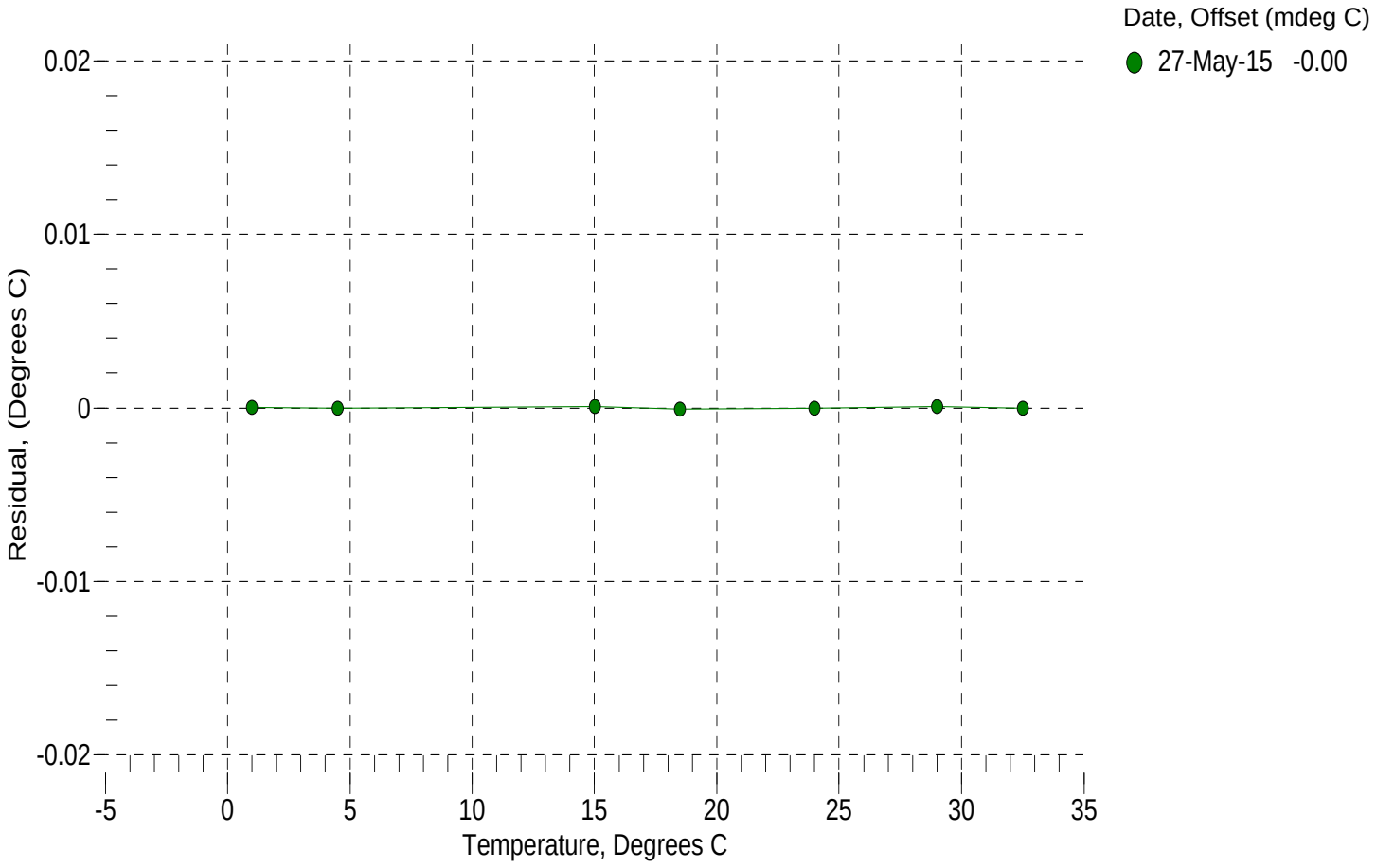
```
a0 =  6.644174e-005
a1 =  2.670219e-004
a2 = -1.913546e-006
a3 =  1.367382e-007
```

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	701582.0	1.0000	0.0000
4.5000	598472.5	4.5000	-0.0000
15.0000	378895.0	15.0001	0.0001
18.5000	327394.4	18.4999	-0.0001
23.9941	261860.5	23.9941	-0.0000
28.9999	214958.1	29.0000	0.0001
32.5000	187877.7	32.5000	-0.0000

Temperature ITS-90 = $1/\{a0 + a1[ln(n)] + a2[ln^2(n)] + a3[ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature

n = instrument output



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SENSOR SERIAL NUMBER: 7272
CALIBRATION DATE: 27-May-15

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

COEFFICIENTS:

```
g = -9.887230e-001
h =  1.365228e-001
i = -3.060917e-004
j =  3.956556e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC =  2.4721e-007
```

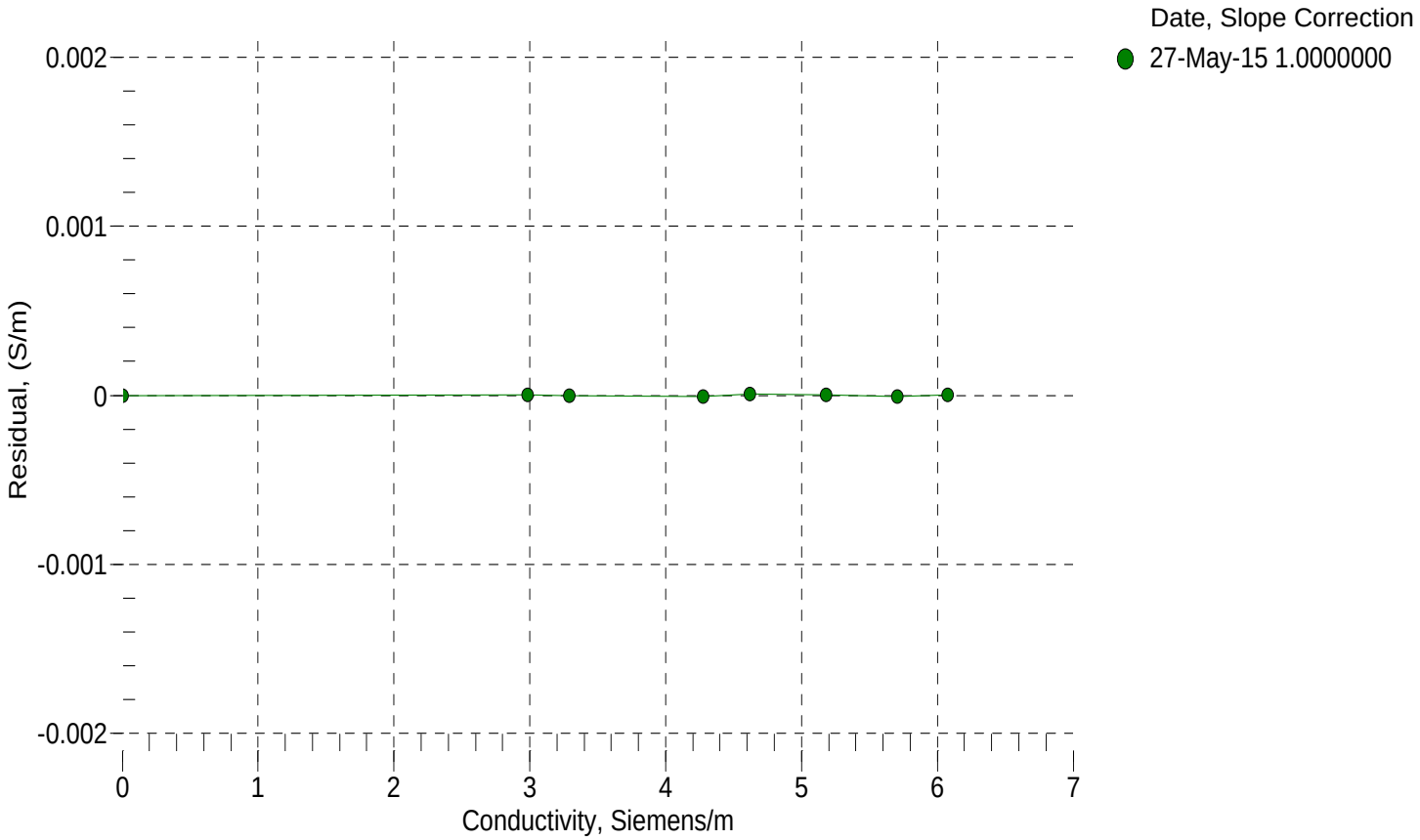
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2696.44	0.00000	0.00000
1.0000	34.9148	2.98358	5403.98	2.98358	0.00000
4.5000	34.8948	3.29140	5608.93	3.29140	-0.00000
15.0000	34.8518	4.27551	6218.24	4.27550	-0.00001
18.5000	34.8424	4.62146	6418.43	4.62146	0.00001
23.9941	34.8319	5.18008	6728.81	5.18008	0.00000
28.9999	34.8261	5.70373	7006.93	5.70373	-0.00001
32.5000	34.8232	6.07706	7198.45	6.07706	0.00000

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0

Conductiv ity = $(g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \varepsilon * p)$ Siemens / meter

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

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 7272
CALIBRATION DATE: 19-May-15

SBE 41 PRESSURE CALIBRATION DATA
2900 psia S/N 4669462

COEFFICIENTS:

PA0 =	4.742784e-001	PTCA0 =	-3.073305e+001
PA1 =	1.401949e-001	PTCA1 =	-3.729686e-001
PA2 =	1.079147e-008	PTCA2 =	2.365243e-002
PTHA0 =	-9.597142e+001	PTCB0 =	1.036386e+002
PTHA1 =	3.974924e-002	PTCB1 =	-5.866616e-003
PTHA2 =	1.257917e-006	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FS
14.65	73.6	2736.1	14.65	-0.00
592.51	4189.3	2744.1	592.54	0.00
1169.87	8299.0	2745.1	1169.99	0.00
1747.31	12406.5	2746.2	1747.50	0.01
2324.76	16510.5	2747.4	2324.89	0.00
2902.20	20610.6	2748.8	2902.10	-0.00
2324.73	16509.1	2748.8	2324.70	-0.00
1747.26	12404.3	2749.2	1747.20	-0.00
1169.92	8297.3	2749.5	1169.75	-0.01
592.28	4185.7	2749.6	592.02	-0.01
14.65	75.1	2750.4	14.79	0.00

THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2955.40	89.35
29.00	2881.60	85.46
23.99	2774.40	81.13
18.50	2656.40	77.65
15.00	2581.00	76.21
4.50	2352.50	75.20
1.00	2275.70	76.13

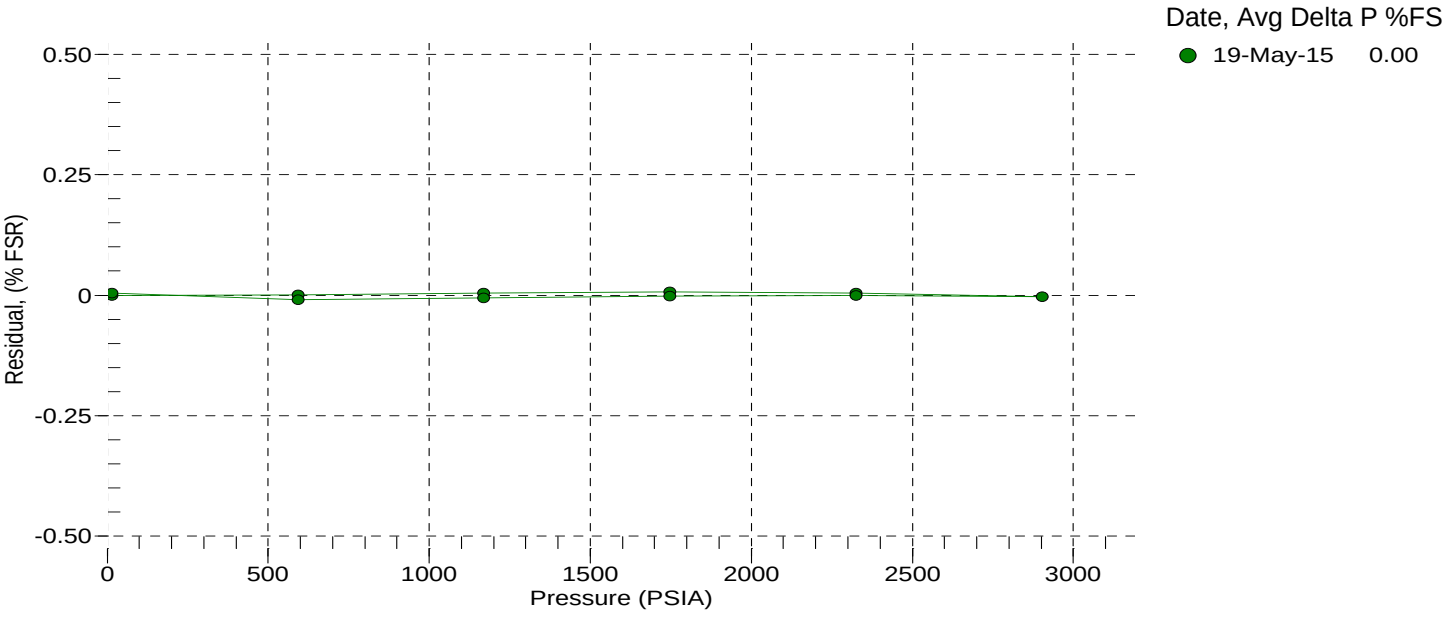
TEMP(ITS90)	SPAN(mV)
-4.38	103.66
37.48	103.42

y = thermistor output; $t = PTHA0 + PTHA1 * y + PTHA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$



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