

# **SBE 41CP CERTIFICATES**

## **CTD Serial Number 41CP-4009**

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# **SBE 41CP Instrument Configuration**

**Model Number: SBE 41CP**

**Serial Number: 41CP-4009**

**Part Number: 90499.010**

**Description : NKE-ARVOR Configuration**

**Firmware Version: 1.3**

**Pressure Type: Kistler**

**Pressure Range: 2000 Dbar**

**Pressure Serial Number: 2099840**

SBE 41 ALACE-CP-MO V 1.3 SERIAL NO. 4009  
temperature: 02-dec-11  
TA0 = 1.256870e-04  
TA1 = 2.626705e-04  
TA2 = -1.589495e-06  
TA3 = 1.299268e-07  
conductivity: 02-dec-11  
G = -9.896129e-01  
H = 1.462981e-01  
I = -3.641646e-04  
J = 4.821277e-05  
CPCOR = -9.570001e-08  
CTCOR = 3.250000e-06  
WBOTC = 4.539722e-07  
pressure S/N = 2099840, range = 2900 psia: 28-nov-11  
PA0 = -1.319006e+00  
PA1 = 1.363191e-01  
PA2 = 1.799445e-08  
PTCA0 = -7.265810e+01  
PTCA1 = -1.018012e+00  
PTCA2 = 2.638530e-02  
PTCB0 = 1.041613e+02  
PTCB1 = -7.029338e-03  
PTCB2 = 0.000000e+00  
PTHA0 = -9.510843e+01  
PTHA1 = 4.022806e-02  
PTHA2 = 9.626653e-07  
POFFSET = 0.000000e+00

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SENSOR SERIAL NUMBER: 4009  
CALIBRATION DATE: 02-Dec-11

SBE 41cp TEMPERATURE CALIBRATION DATA  
ITS-90 TEMPERATURE SCALE

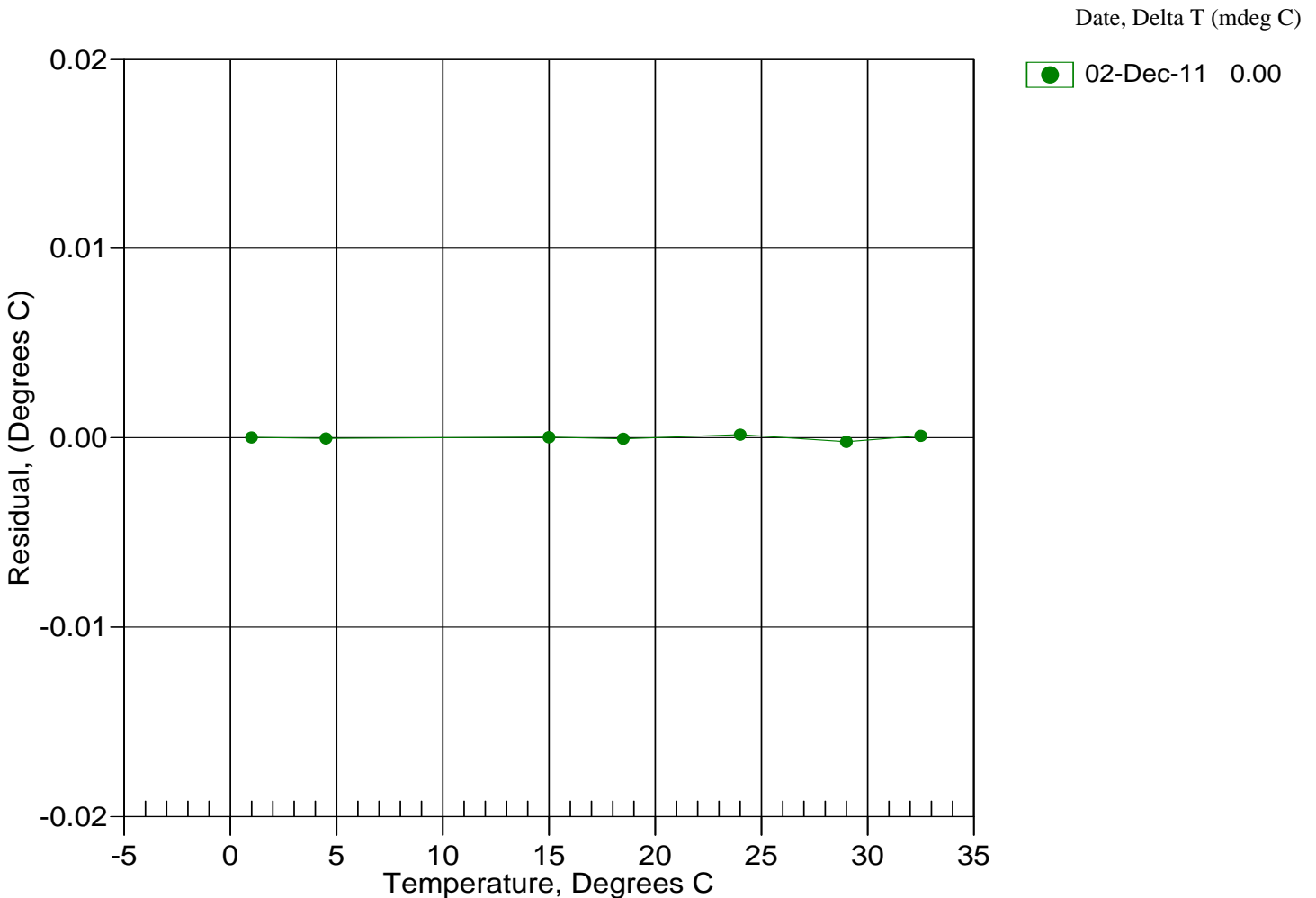
## ITS-90 COEFFICIENTS

a0 = 1.256870e-004  
a1 = 2.626705e-004  
a2 = -1.589495e-006  
a3 = 1.299268e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	605356.9	1.0000	0.0000
4.5000	516276.0	4.5000	-0.0000
15.0000	326648.0	15.0000	0.0000
18.5000	282189.3	18.4999	-0.0001
23.9940	225630.8	23.9942	0.0002
29.0000	185165.6	28.9998	-0.0002
32.5000	161803.8	32.5001	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



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SENSOR SERIAL NUMBER: 4009  
CALIBRATION DATE: 02-Dec-11

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

## COEFFICIENTS:

g = -9.896128e-001	CPcor = -9.5700e-008
h = 1.462981e-001	CTcor = 3.2500e-006
i = -3.641646e-004	WBOTC = 4.5397e-007
j = 4.821277e-005	

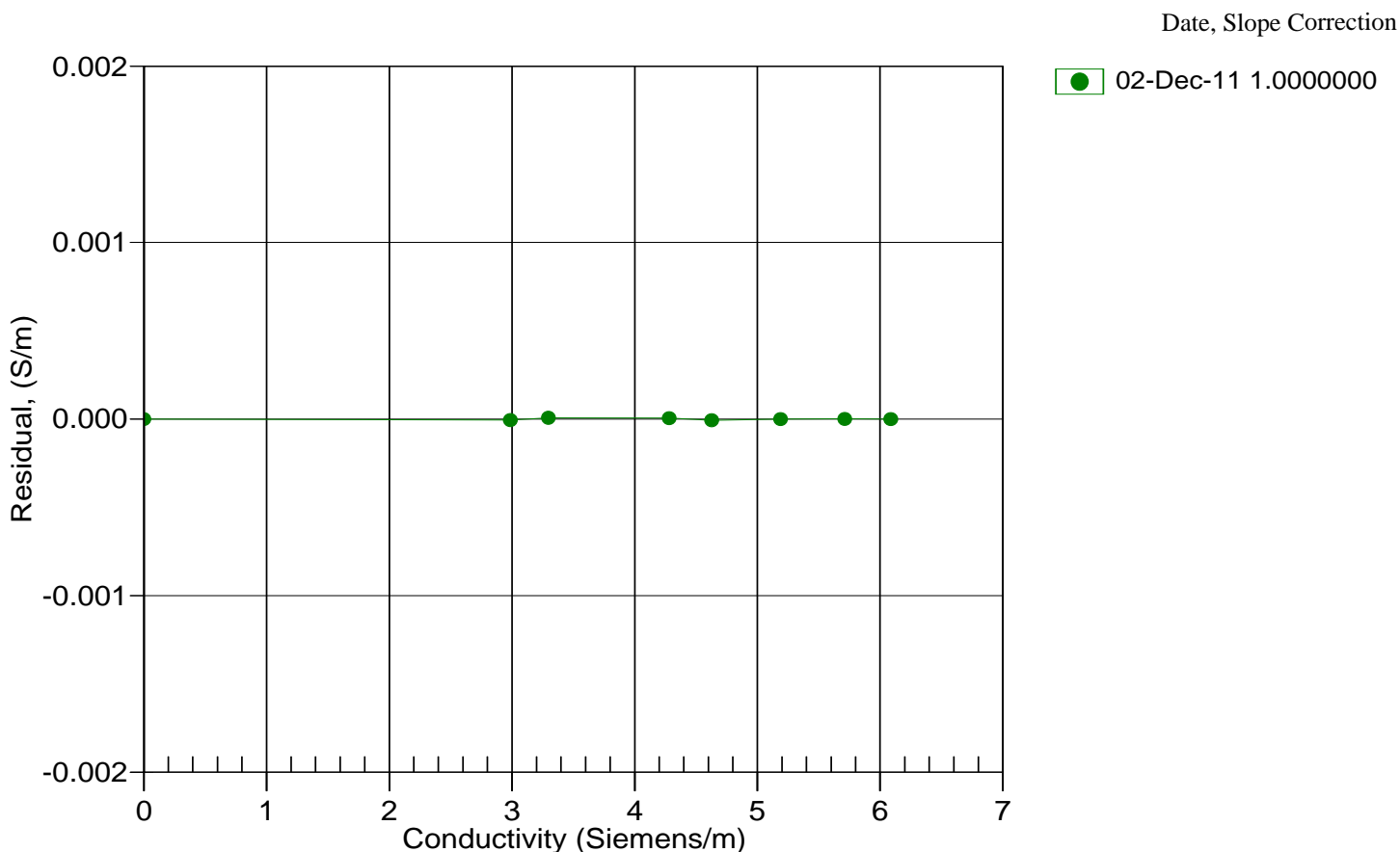
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2606.37	0.00000	0.00000
1.0000	34.9780	2.98846	5225.04	2.98846	-0.00001
4.5000	34.9576	3.29674	5423.19	3.29674	0.00001
15.0000	34.9139	4.28232	6012.25	4.28232	0.00001
18.5000	34.9042	4.62877	6205.75	4.62876	-0.00001
23.9940	34.8935	5.18822	6505.77	5.18822	0.00000
29.0000	34.8873	5.71264	6774.59	5.71264	0.00000
32.5000	34.8833	6.08635	6959.62	6.08635	0.00000

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

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

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

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 4009  
CALIBRATION DATE: 28-Nov-11

SBE 41cp PRESSURE CALIBRATION DATA  
2900 psia S/N 2099840

## COEFFICIENTS:

PA0 = -1.319006e+000	PTCA0 = -7.265810e+001
PA1 = 1.363191e-001	PTCA1 = -1.018012e+000
PA2 = 1.799445e-008	PTCA2 = 2.638530e-002
PTHA0 = -9.510843e+001	PTCB0 = 1.041613e+002
PTHA1 = 4.022806e-002	PTCB1 = -7.029338e-003
PTHA2 = 9.626652e-007	PTCB2 = 0.000000e+000

## PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.85	35.7	2726.8	14.79	-0.00
589.91	4247.8	2731.4	590.17	0.01
1167.76	8472.7	2731.9	1167.94	0.01
1745.58	12692.3	2732.9	1745.64	0.00
2323.25	16906.8	2733.9	2323.28	0.00
2900.82	21116.5	2735.0	2900.91	0.00
2323.28	16905.9	2734.8	2323.16	-0.00
1745.74	12691.4	2734.7	1745.52	-0.01
1167.71	8470.1	2734.1	1167.59	-0.00
589.87	4245.2	2733.4	589.82	-0.00
14.85	35.6	2734.9	14.77	-0.00

## THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2961.70	45.20
29.00	2886.30	42.74
23.99	2776.60	40.92
18.50	2655.30	40.51
15.00	2577.60	41.00
4.50	2344.70	46.24
1.00	2266.20	49.21

TEMP (ITS90)	SPAN (mV)
-5.82	104.20
37.91	103.89

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

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

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

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

Date, Avg Delta P %FS

28-Nov-11 0.00

