

SBE 41 CERTIFICATES

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SBE 41 Instrument Configuration

Model Number: SBE 41

Serial Number: 41-6318

Part Number: 90359.073

Description: APEX Standard Configuration

Firmware Version: 3.0

Pressure Type: Druck

Pressure Range: 2000 Dbar

Pressure Serial Number: 3843983

SBE 41-STD V 3.0 SERIAL NO. 6318

temperature: 09-jul-13

TA0 = 3.126866e-05

TA1 = 2.746988e-04

TA2 = -2.536503e-06

TA3 = 1.519744e-07

conductivity: 09-jul-13

G = -9.848552e-01

H = 1.440222e-01

I = -2.927222e-04

J = 4.208129e-05

CPCOR = -9.570001e-08

CTCOR = 3.250000e-06

WBOTC = -2.544839e-07

pressure S/N = 3843983, range = 2900 psia: 03-jul-13

PA0 = 2.300425e-01

PA1 = 1.405069e-01

PA2 = -4.143450e-08

PTCA0 = 2.365360e+01

PTCA1 = -3.576980e-02

PTCA2 = 4.801332e-03

PTCB0 = 2.520287e+01

PTCB1 = 3.750000e-04

PTCB2 = 0.000000e+00

PTHA0 = -6.973478e+01

PTHA1 = 5.210978e-02

PTHA2 = -5.053322e-07

POFFSET = 0.000000e+00

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SENSOR SERIAL NUMBER: 6318
CALIBRATION DATE: 09-Jul-13

SBE 41 TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

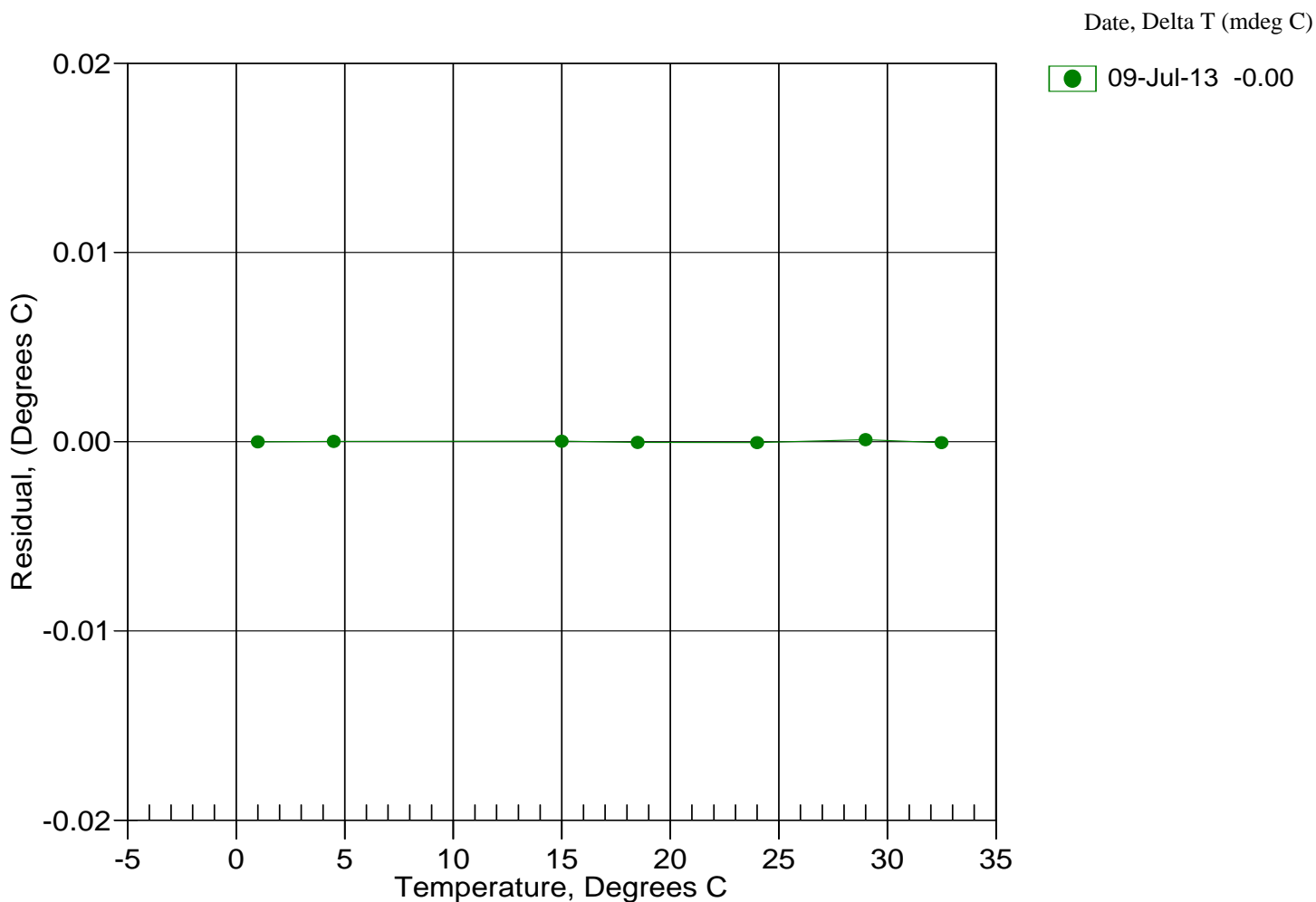
ITS-90 COEFFICIENTS

a0 = 3.126866e-005
a1 = 2.746988e-004
a2 = -2.536503e-006
a3 = 1.519744e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	720145.9	1.0000	-0.0000
4.5000	614095.0	4.5000	0.0000
15.0000	388399.8	15.0000	0.0000
18.5000	335499.3	18.5000	-0.0000
23.9939	268217.5	23.9939	-0.0000
29.0001	220080.8	29.0002	0.0001
32.5000	192303.6	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



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CALIBRATION DATE: 09-Jul-13

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

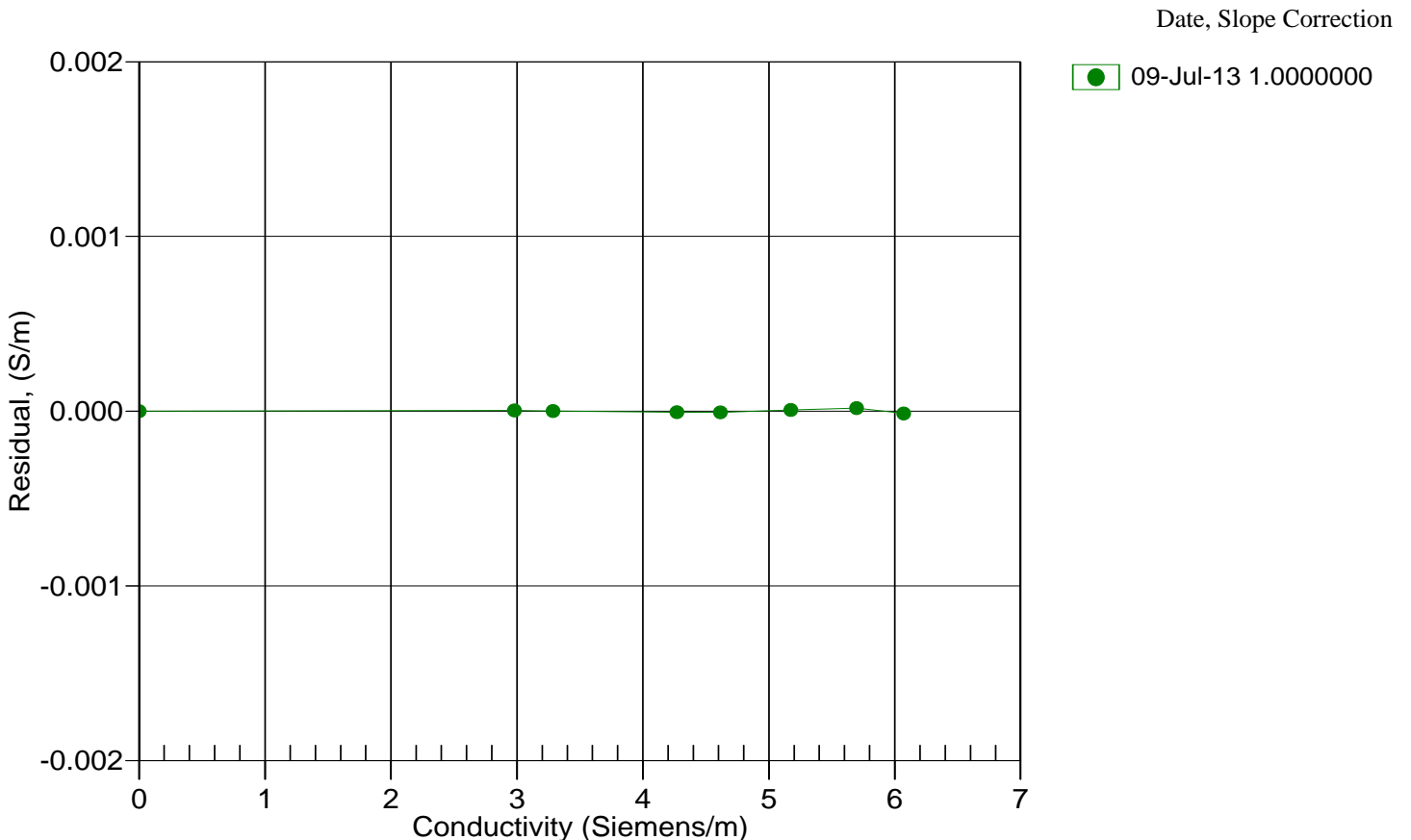
COEFFICIENTS:

g = -9.848552e-001	CPcor = -9.5700e-008
h = 1.440222e-001	CTcor = 3.2500e-006
i = -2.927222e-004	WBOTC = -2.5448e-007
j = 4.208129e-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	2619.36	0.00000	0.00000
1.0000	34.8679	2.97995	5253.70	2.97996	0.00000
4.5000	34.8483	3.28745	5453.05	3.28745	0.00000
15.0000	34.8062	4.27051	6045.68	4.27050	-0.00001
18.5000	34.7972	4.61611	6240.39	4.61610	-0.00001
23.9939	34.7872	5.17414	6542.26	5.17415	0.00001
29.0001	34.7806	5.69714	6812.71	5.69716	0.00002
32.5000	34.7754	6.06966	6998.76	6.06965	-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: 6318
 CALIBRATION DATE: 03-Jul-13

SBE 41 PRESSURE CALIBRATION DATA
 2900 psia S/N 3843983

COEFFICIENTS:

PA0 = 2.300425e-001	PTCA0 = 2.365360e+001
PA1 = 1.405069e-001	PTCA1 = -3.576980e-002
PA2 = -4.143450e-008	PTCA2 = 4.801332e-003
PTHA0 = -6.973478e+001	PTCB0 = 2.520287e+001
PTHA1 = 5.210978e-002	PTCB1 = 3.750000e-004
PTHA2 = -5.053322e-007	PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.58	127.9	1802.8	14.64	0.00
590.95	4236.3	1804.6	590.97	0.00
1167.25	8355.6	1805.9	1167.42	0.01
1743.48	12483.3	1807.5	1743.64	0.01
2319.71	16620.6	1809.1	2319.78	0.00
2895.68	20766.3	1810.4	2895.67	-0.00
2319.75	16619.8	1810.1	2319.67	-0.00
1743.72	12483.1	1810.0	1743.61	-0.00
1167.37	8354.7	1809.7	1167.29	-0.00
590.96	4234.7	1809.5	590.74	-0.01
14.58	127.7	1809.1	14.61	0.00

THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2000.40	133.95
29.00	1931.20	133.30
23.99	1831.50	132.29
18.50	1721.90	131.16
15.00	1652.40	130.53
4.50	1444.60	130.16
1.00	1376.00	130.18
TEMP (ITS90)		SPAN (mV)
-5.00		25.20
35.00		25.22

$y = \text{thermistor output}; t = \text{PTHA0} + \text{PTHA1} * y + \text{PTHA2} * y^2$
 $x = \text{pressure output} - \text{PTCA0} - \text{PTCA1} * t - \text{PTCA2} * t^2$
 $n = x * \text{PTCB0} / (\text{PTCB0} + \text{PTCB1} * t + \text{PTCB2} * t^2)$
 $\text{pressure (psia)} = \text{PA0} + \text{PA1} * n + \text{PA2} * n^2$

Date, Avg Delta P %FS

03-Jul-13 -0.00

